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ORIGINAL ARTICLE

Alcohol abuse and other factors associated with risky sexual behaviors among adolescent students from the poorest areas in Costa Rica

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Abstract
Objectives We applied the Integrative Model of Behavioral Prediction to analyze factors associated with risky sexual behaviors for adolescent students living in the poorest segments in Costa Rica.
Methods We used data from a school-based knowledge, attitudes, and behaviors survey from the poorest districts of Costa Rica, collected for Salud Mesoamerica Initiative. We analyzed responses of 919 male and female students (12–19 years old) to determine factors associated with sexual intercourse and condom use.
Results One of every four students reported being sexually active. Students that reported being sexually active were more likely to consume excessive alcohol (OR 3.04 [95 % CI 1.94–4.79]). While 88.0 % [95 % CI 73.5–95.1] of sexually active adolescents said they would use a condom the next time they have sex, only 53.1 % [95 % CI 39.3–66.5] reported condom use the last time. Non-condom-users felt purchasing condoms was uncomfortable (OR 0.34 [95 % CI 0.12–0.93]).
Conclusions Poor adolescents in Costa Rica begin sexual activities early and undertake behaviors that increase their risk for unwanted pregnancies and sexually transmitted infections. We found the urgent need to address alcohol abuse, and recognize gender differences in youth health programs.

Keywords Costa Rica · Integrative model · Condom use · Adolescents · Poverty · Alcohol abuse

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Introduction

Adolescent women worldwide have two times the risk of dying during pregnancy and childbirth than women 20 years and older (WHO 2011). More than one-third of unsafe abortions globally are among women 15–19 years old (Shah and Åhman 2012). Babies from teenage mothers also have higher risks of being still born, dying early, and suffering developmental problems (WHO 2011, 2014a). Moreover, adolescent mothers are also less likely to complete their education, and they are at increased risk of continuing the intergenerational cycle of poverty and increased inequality (Klepinger et al. 1999; Azevedo et al. 2012). Latin America is the third region of the world with the highest adolescent fertility rate, and adolescent fertility has declined at a slower pace than other regions (Azevedo et al. 2012). In Costa Rica, adolescents births every year account for around 20 % of all births (González Gómez 2013). Almost one of every ten adolescents 12–19 years

had at least one live birth, and those from poor backgrounds and indigenous ethnicity were more likely to have a live birth (González Gómez 2013). Adolescents from poor backgrounds are at increased risk of becoming pregnant, and face poorer outcomes from pregnancies (Azevedo et al. 2012).

Adolescents are also at risk of sexually transmitted infections (STI), and the global rates of infection are the second highest among adolescents 15–19 years old (Dehne et al. 2005). In addition, almost half of the new cases of HIV infections are among adolescents 15–19 years old (UNICEF 2008). According to the Global Burden of Disease Study 2013 (Murray et al. 2014), the overall incidence of HIV/AIDS in Costa Rica in 2000–2013 did not decline, and unsafe sex was the main risk factor.

Despite the relevance of adolescent pregnancy and the well-established link between poverty and adolescent pregnancies (Azevedo et al. 2012; Pradhan et al. 2015), little is known about risky behaviors of poor adolescents in Costa Rica. We applied the Integrative Model of Behavioral Prediction (Fishbein and Yzer 2003) to analyze the factors associated with adolescent risky sexual behaviors. This model has been widely used to analyze adolescent sexual behaviors (Kirby 2011). The model establishes that behavior is mainly determined by intentions, although skills and environmental factors may limit the ability to act upon them. Intentions in turn are a function of: attitudes, in other words, personal favorable or unfavorable views of the behavior; perceived norms, or perceptions about others approval or disapproval of the behavior; and self-efficacy, which is the person's own ability to perform the behavior. We focused our analysis on two behaviors that increase risk of adolescent pregnancy and sexually transmitted diseases: reported sexual intercourse and reported condom use.

We analyzed factors associated with risky sexual behaviors for adolescent students living in the poorest segments in Costa Rica. We used baseline data collected for Salud Mesoamérica Initiative (SMI), a results-based aid program supporting countries in Central America and the State of Chiapas in Mexico improve maternal and child health. We seek to provide information to strengthen the design of behavior-change interventions aimed at reducing risky sexual behaviors among adolescents.

Methods

Data source

We analyzed SMI baseline data from a school-based knowledge, attitudes, and behaviors (KAP) survey collected in high schools in the Brunca and Atlantic Region (now Huetar Caribe) that encompass some of the poorest districts of Costa Rica (INEC 2013). More than 784 thousand people live in these two regions, over half of them in a rural setting (INEC 2012). Data were collected in August–September 2013 to set a baseline for SMI interventions. The survey methodology has been described in detail (Mokdad et al. 2015). In summary, a random sample of 39 high schools was selected. Then, one class from each grade was selected at random. The questionnaire was paper-based, written in Spanish (given that school instruction is in Spanish), and had to be completed by students in the classroom under the supervision of a trained surveyor. To be included in the study, both the student and parents had to agree to participate and sign an informed consent letter. In total, 3239 students were invited to participate in the study, and 924 completed the survey, giving a response rate of 28.5 %. This response rate is consistent with response rates observed in similar studies, and it is not unexpected given the sensitivity of the topic, and engagement of families in these areas (Groves 2006; Mokdad 2009). We restricted our analysis to 919 male and female students 12–19 years old with complete data. Surveys were approved by the Institutional Review Board of the University of Washington and the Ministries of Health and Education of Costa Rica.

Study variables

For intentions, we included plans to have sex in the future and to use a condom in next sexual intercourse. Attitude variables included perception of chances of getting a sexually transmitted infection, chances of pregnancy (either themselves or their partner), and aspired educational level (as a reason to avoid pregnancy). Perceived norms included the belief that girls who have sex are more popular, boys who have sex are more popular, condom users have a lot of sex, condoms should only be used with strangers, people same age as student have sex, mother's approval about having sex, and friends' approval about having sex. For efficacy-beliefs, we computed a composite 0–3 score based on positive (1) and negative (0) responses about student's perceived ability to stop crush from having sex, ability to tell a partner to wear a condom, and capacity to stop sex after drinking alcohol. For self-efficacy, we considered if students had ever been forced to have sex. Distal variables included age, sex, and indigenous ethnicity, excessive alcohol consumption, having received HIV information at school, and having received HIV information at the health facility. Skills variables included the knowledge of where to get methods for pregnancy prevention and feeling embarrassed to buy a condom from a local pharmacy. We also analyzed age at first sexual intercourse by gender. Then, we analyzed correlates with past condom use on a

subsample of sexually active students. We considered sexually active students as those that reported having sexual intercourse in the past. In all cases, the survey defined sexual intercourse as coital relations (penetrative sex).

Statistical analysis

We compared potential correlates with past sexual intercourse using Chi-square tests for categorical variables and *t* tests for continuous variables. Then, we used logistic regression to determine factors associated with sexual intercourse, and on the subsample of sexually active students to determine factors associated with condom use. We compared our analysis for male and female students. We performed goodness-of-fit tests on the unweighted models. We used Stata SE 12.1 for the analyses and accounted for complex survey design. A $p = 0.05$ was set as the a priori threshold for statistical significance. We performed the Hosmer and Lemeshow goodness-of-fit test (Archer and Lemeshow 2006) for the full model and performed link tests for model specification (Pregibon 1979). We plotted receiver operating characteristics (ROC) curves and areas under the ROC curves to evaluate the accuracy of each model (Newson 2006).

Response rate

We analyzed the correlation of our response rate by Canton with reported past sexual intercourse and condom usage, poverty measures, heath indicators and demographic variables (INEC 2013, 2015). We included the percentage of catholic marriages as a proxy for cultural differences.

Results

Adolescents' sexual behavior, intentions, attitudes, perceived norms and self-efficacy

One of every four students reported being sexually active (see Table 1). On average, students reported their first sexual intercourse at age 14.7 [95 % CI 14.5–15.0], with some initiating as early as 8 years old. The median reported age of the first sexual intercourse is 15, both for male and female students (see Fig. 1). For most students, the next time they were going to have sex was uncertain, most students either did not know 43.1 % [95 % CI 26.0–62.1], or were going to when they got a boyfriend or girlfriend 16.7 % [95 % CI 11.3–23.9]; only 2.7 % [95 % CI 1.2–5.8] expected to have sex the following month. Four of every five students intended to use a condom the next time they had sex and three of every five students knew where to get a contraceptive method. 75.6 % [95 % CI 68.4–81.5] believed they could get a sexually transmitted infection, and a higher proportion of sexually active students believed to be at risk. In contrast, 57.5 % [95 % CI 46.5–67.7] believed to be at risk of getting themselves or their partner pregnant, and there was no statistically significant difference between the sexually active and non-active groups. While 36.6 % [95 % CI 28.8–45.3] of non-sexually active students believed their peers were sexually active, 77.8 % [95 % CI 65.4–86.6] sexually active students believed that their peers were sexually active too. The proportion of sexually active students who believe their mother would approve if she knew they had sex is also higher (27.5 % 95 % CI [12.1–51.1] for sexually active compared to 5.9 % [95 % CI 3.4–10.3] for non-active), as well as the friends' approval (82.6 % [95 % CI 67.7–91.5] for sexually active vs. 38.7 % [95 % CI 32.0–45.8] for non-active). Most students believe they would be able stop someone they like from having sex and to ask their partner to wear a condom (82.7 % [95 % CI 75.5–88.2] and 93.7 % [95 % CI 89.2–96.4], respectively); nevertheless, they feel less able to do so after drinking alcohol (64.2 % [95 % CI 56.5–71.1]).

Sexually active adolescents' intentions, attitudes, perceived norms and self-efficacy

Only half of sexually active adolescents said they used a condom the last time they had sex (53.1 % [95 % CI 39.3–66.5]); however, most of them said they would use a condom the next time they have sex (88.0 % [95 % CI 73.5–95.1]) (see Table 2). 94.5 % [95 % CI 88.5–97.5] of students that reported using a condom knew where to get a pregnancy prevention method, compared to 54.6 % [95 % CI 19.4–85.7] that did not use a condom. More students that reported using a condom, 78.4 % [95 % CI 62.0–89.0], believed they could get a sexually transmitted infection, compared to 54.4 % [95 % CI 20.0–85.1] that did not. A higher proportion of students who used a condom also aspired to attain more education (94.2 % [95 % CI 83.4–98.1] for condom users compared to 46.7 % [95 % CI 15.4–80.9] for non-users). More condom users considered that people who use condoms have sex with many people (46.3 % [95 % CI 34.1–58.9] compared to 23.4 % [95 % CI 7.6–53.3]) for non-users) and fewer believed that condoms should only be used with people they do not know (15.6 % [95 % CI 10.5–22.7] of users compared to 55 % [95 % CI 21.6–84.4] non-users). An increased proportion of non-users thought it was uncomfortable to buy condoms from a drugstore (89.3 % [95 % CI 79.4–94.8] non-users compared to 65.1 % [95 % CI 50.7–77.2] of users). Almost twice the proportion of condom users had received HIV/AIDS information at a health facility.

Table 1 Bivariate analysis of factors associated with being sexually active among students from the poorest quintile of the population (Costa Rica, 2013)

	All students		Ever had sex ($n = 919$)				p
	%	95 % CI	No		Yes		
			Col %	95 % CI	Col %	95 % CI	
Behavior							
Ever had sex			74.3	[62.3–83.4]	25.7	[16.6–37.7]	
Intentions							
Planned to have sex next time							0.000*
After becoming 18 years old	37.5	[20.2–58.7]	70	[49.3–84.9]	5.1	[2.7–9.6]	
When I get a boyfriend/girlfriend	16.7	[11.3–23.9]	24.1	[10.8–45.6]	9.1	[3.4–22.3]	
Next month	2.7	[1.2–5.8]	2.1	[0.7–6.6]	3.3	[1.1–9.5]	
Do not know	43.1	[26.0–62.1]	3.7	[1.4–9.3]	82.5	[67.3–91.6]	
Condom use intent on next sexual intercourse (very likely/somewhat likely)	80.8	[76.3–84.5]	78.5	[74.2–82.2]	88	[73.5–95.1]	0.178
Skills							
Knows where to get pregnancy prevention method	61.4	[54.1–68.2]	56.6	[49.0–64.0]	75.6	[49.9–90.6]	0.148
It is uncomfortable to purchase condoms at a drugstore (completely agree/agree)	74.4	[69.1,79.1]	73.6	[66.3,79.9]	75.9	[68.2,82.3]	0.661
Attitudes							
Chances that I will get a sexually transmitted infection (could happen/very likely)	75.6	[68.4–81.5]	71.9	[61.3–80.5]	85.5	[81.3–89.0]	0.003*
Chances of getting pregnant or getting partner pregnant (could happen/very likely)	57.5	[46.5–67.7]	54.2	[43.3–64.8]	67.2	[47.2-82.5]	0.137
Aspired educational level (high school or above)	81.3	[69.9–89.1]	84.2	[77.0–89.4]	72.7	[49.3–87.9]	0.097
Perceived norms							
Girls are more popular if they have sex (completely agree/agree)	17.5	[11.5–25.7]	19.3	[10.0–34.0]	12.9	[7.8–20.7]	0.441
Boys are more popular if they have sex (completely agree/agree)	20.6	[14.7–28.1]	22.6	[12.9–36.6]	15.6	[9.4–24.9]	0.448
People who use condoms have sex with many people (completely agree/agree)	34.5	[29.2–40.2]	33.8	[26.8–41.5]	35.7	[21.0–53.6]	0.850
People should use condoms only with people they do not know (completely agree/agree)	24	[17.4–32.3]	20.8	[16.0-26.7]	33.5	[17.3–54.8]	0.157
Other people my age have sex							
No	14.6	[10.3–20.2]	17.2	[12.2–23.6]	7.7	[3.1–17.6]	0.000*
Yes	47.2	[37.0–57.7]	36.6	[28.8–45.3]	77.8	[65.4–86.6]	
Not sure	38.2	[30.4–46.6]	46.2	[39.3–53.2]	14.5	[7.7–25.7]	
Belief about mother's approval if I had sex (definitely/probably approve)	11.4	[6.0–20.6]	5.9	[3.4–10.3]	27.5	[12.1–51.1]	0.004*
Belief about friends' approval if I had sex (definitely/probably approve)	50.1	[39.3–61.0]	38.7	[32.0–45.8]	82.6	[67.7–91.5]	0.000*
Self–efficacy							
Able to stop someone I like from having sex	82.7	[75.5–88.2]	80	[73.8-85.1]	90.2	[78.4–95.9]	0.036*
Able to ask partner to use condom	93.7	[89.2–96.4]	93.3	[88.5–96.2]	94.5	[84.8–98.1]	0.734
Able to stop sex even after drinking alcohol	64.2	[56.5–71.1]	63.3	[57.0–69.2]	68.6	[51.6–81.8]	0.488
Efficacy-beliefs score (mean)	2.4	[2.3–2.5]	2.4	[2.3–2.5]	2.5	[2.3–2.8]	0.086
Ever been forced to have sex	1.0	[0.4–2.7]	0.0		4.1	[1.4–11.6]	0.005*
Distal variables							
Age (mean)	14.7	[14.5–15.0]	14.3	[14.1–14.5]	16.0	[15.8–16.3]	0.000*
Sex (male)	41.5	[35.0–48.3]	39.6	[32.2–47.6]	47.2	[28.2–67.1]	0.530
Indigenous ethnicity	2	[1.0–4.0]	1.9	[0.9–4.0]	1.8	[0.6–4.9]	0.840

Table 1 continued

	All students		Ever had sex ($n = 919$)				p
	%	95 % CI	No		Yes		
			Col %	95 % CI	Col %	95 % CI	
Received HIV/AIDS info at health facility	46.1	[37.7–54.7]	44.9	[36.8–53.3]	48.3	[31.9–65.2]	0.679
Received HIV/AIDS info at school	65.4	[59.4–71.0]	60.1	[49.4–69.8]	79.6	[64.6–89.3]	0.067
Talked to doctor about sex	11.8	[7.9–17.1]	9.9	[5.5–17.3]	17.5	[11.0–26.5]	0.110
Talked to parents about sex	54.6	[48.7–60.3]	50	[40.5–59.6]	67.4	[57.9–75.6]	0.034*
Talked to teacher about sex	28.8	[23.2–35.1]	28.3	[22.1–35.3]	30.5	[21.9–40.7]	0.640
Excessive alcohol consumption in last 30 days	38.2	[26.3–51.7]	27.8	[18.7–39.2]	66.1	[51.9–77.9]	0.000*

Survey-weighted percentages of factor associated with being sexually active (ever had sex)

* $p < 0.05$

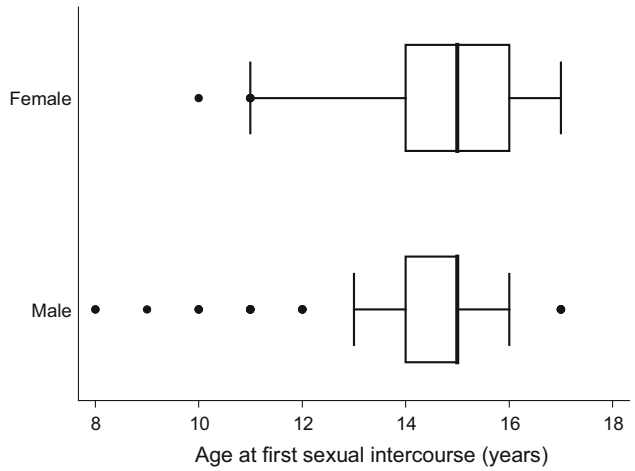

Fig. 1 Age of initiation of sexual activity by sex among students from the poorest quintile of the population (Costa Rica, 2013). Survey-weighted box plot of reported age of initiation of sexual activity by sex

Factors associated with sexual intercourse

Students that reported being sexually active were older than those that reported being non-sexually active (OR 2.17 [95 % CI 1.58–2.99]) (see Table 3). Sexually active students were less likely to believe that people should use condoms only with people they do not know (OR 0.38 [95 % CI 0.16–0.90]) and more likely to believe that their mother or friends would approve if they had sex (OR 2.88 [95 % CI 1.02–8.17] and OR 5.43 [95 % CI 2.47–11.9], respectively). In addition, they were more likely to have consumed excessive alcohol in the last 30 days (OR 3.04 [95 % CI 1.94–4.79]). Factors associated with reported sexual activity differed for the male and female subsamples. While males that reported being sexually active were more likely to believe they could get an STI (OR 3.80 [95 % CI 1.19–12.1]), females that reported being sexually active were more likely to believe they could get pregnant (OR 5.76 [95 % CI 1.66–19.99]). Females that reported being sexually active were also more likely to feel uncomfortable purchasing condoms (OR 2.99 [95 % CI 1.26–7.07]). However, they were less likely to have received HIV/AIDS information at school (OR 0.31 [95 % CI 0.11–0.86]) or to have talked to a doctor about sex (OR 0.32 [95 % CI 0.13–0.75]). The area under the ROC curve was 0.908 for the full model, 0.824 for the female subpopulation, and 0.862 male subpopulation; which indicate a good level of accuracy.

Factors associated with condom use among sexually active adolescents

Sexually active students that reported using a condom the last time they had sex were more likely to anticipate use of condom in their next sexual intercourse (OR 11.05 [95 % CI 3.78–32.36]) when compared to non-users (see Table 4). They were also more likely to know where to get a contraceptive method (OR 17.16 [95 % CI 2.98–98.68]) and to aspire a higher educational level (OR 5.75 [95 % CI 1.5–22.02]). Sex or age was not statistically significant for condom use. Condom users were less likely to think other people their age had sex (OR 0.04 [95 % CI 0.00–0.62]). Non-condom-users thought it was uncomfortable to purchase condoms from a drugstore (OR 0.34 [95 % CI 0.12–0.93]). Condoms users were more likely to have a higher efficacy-beliefs score (OR 1.96 [95 % CI 1.05–3.66]) and were less likely to have talked with a teacher about sex (OR 0.18 [95 % CI 0.04–5.28]). The model also showed good accuracy (area under ROC curve: 0.919).

Response rate and socio-economic variables

As expected, all Cantons selected had similar levels of poverty, with Talamaca having a slightly higher rate (see Table 5). On average, 12.1 % of all births were from

Table 2 Bivariate analysis of factors associated with condom use among sexually active students from the poorest quintile of the population (Costa Rica, 2013)

	%	95 % CI	Used condom last time had sex ($n = 234$)				p
			No		Yes		
			Col %	95 % CI	Col %	95 % CI	
Behavior							
Used condom last time had sex			46.9	[33.5–60.7]	53.1	[39.3–66.5]	
Intentions							
Planned to have sex next time							0.015*
After becoming 18 years old	5.1	[2.7–9.6]	0.5	[0.1–3.0]	9.4	[4.4–18.8]	
When I get a boyfriend/girlfriend	9.1	[3.4–22.3]	10.5	[2.9–31.7]	7.7	[2.9–18.7]	
Next month	3.3	[1.1–9.5]	1.4	[0.2–8.0]	5.1	[1.7–14.1]	
Do not know	82.5	[67.4–91.5]	87.5	[64.9–96.4]	77.9	[64.5–87.2]	
Condom use intent on next sexual intercourse (very likely/somewhat likely)	88.0	[73.5–95.1]	81.2	[53.2–94.3]	93.8	[83.9–97.8]	0.059
Skills							
Knows where to get pregnancy prevention method	75.6	[49.9–90.6]	54.6	[19.4–85.7]	94.5	[88.5–97.5]	0.007*
It is uncomfortable to purchase condoms at a drugstore (completely agree/agree)	75.9	[68.2,82.3]	89.3	[79.4,94.8]	65.1	[50.7,77.2]	0.007*
Attitudes							
Chances that I will get a sexually transmitted infection (could happen/very likely)	85.5	[81.3–89.0]	54.4	[20.0–85.1]	78.4	[62.0–89.0]	0.032*
Chances of getting pregnant or getting partner pregnant (could happen/very likely)	67.2	[47.2–82.5]	95.4	[84.6–98.7]	76.9	[63.4–86.5]	0.267
Aspired educational level (high school or more)	72.7	[49.3–87.9]	46.7	[15.4–80.9]	94.2	[83.4–98.1]	0.008*
Perceived norms							
Girls are more popular if they have sex (completely agree/agree)	12.9	[7.8–20.7]	11.4	[7.8–16.2]	14.5	[7.1–27.3]	0.438
Boys are more popular if they have sex (completely agree/agree)	15.6	[9.4–24.9]	12.7	[9.3–17.1]	18.4	[9.4–33.0]	0.166
People who use condoms have sex with many people (completely agree/agree)	35.7	[21.0–53.6]	23.4	[7.6–53.3]	46.3	[34.1–58.9]	0.087
People should use condoms only with people they don't know (completely agree/agree)	33.5	[17.3–54.8]	55	[21.6–84.4]	15.6	[10.5–22.7]	0.022*
Other people my age have sex							
No	7.7	[3.1–17.6]	5	[1.7–13.7]	10.2	[2.7–31.7]	0.460
Yes	77.8	[65.4–86.6]	83.3	[72.3–90.5]	72.8	[56.9–84.4]	
Not sure	14.5	[7.7–25.7]	11.7	[3.7–31.4]	17	[10.2–27.0]	
Belief about mother's approval if I had sex (definitely/probably approve)	27.5	[12.1–51.1]	44.6	[11.2–83.7]	12.7	[6.2–24.2]	0.158
Belief about friends' approval if I had sex (definitely/probably approve)	82.6	[67.7–91.5]	89	[69.3–96.6]	77	[64.1–86.3]	0.085
Self-efficacy							
Able to stop someone I like from having sex	90.2	[78.4–95.9]	87.8	[65.8–96.4]	92.2	[84.2–96.3]	0.374
Able to ask partner to use condom	94.5	[84.8–98.1]	90.1	[68.7–97.4]	98.3	[91.4–99.7]	0.033*
Able to stop sex even after drinking alcohol	68.6	[51.6–81.8]	74.4	[49.0–89.8]	62.7	[49.2–74.6]	0.284
Efficacy-beliefs score (mean)	2.5	[2.3–2.8]	2.6	[2.1–3.0]	2.5	[2.4–2.7]	0.862
Ever been forced to have sex	4.1	[1.4–11.6]	4.1	[1.2–13.4]	4.1	[0.9–16.9]	0.985
Distal variables							
Age (mean)	16	[15.8–16.3]	15.7	[15.5–16.0]	16.3	[15.9–16.7]	0.030*
Sex (male)	47.2	[28.2–67.1]	53.8	[24.9–80.4]	41.5	[28.0–56.5]	0.376
Indigenous ethnicity	1.8	[0.6–4.9]	1.6	[0.3–7.1]	2	[0.8–4.9]	0.732

Table 2 continued

	%	95 % CI	Used condom last time had sex ($n = 234$)				p
			No		Yes		
			Col %	95 % CI	Col %	95 % CI	
Received HIV/AIDS info at health facility	48.3	[31.9–65.2]	30	[9.5–63.8]	63.7	[53.0–73.2]	0.067
Received HIV/AIDS info at school	79.6	[64.6–89.3]	80.8	[65.8–90.2]	78.5	[59.2–90.2]	0.740
Talked to doctor about sex	17.5	[11.0–26.5]	12.7	[4.9–28.9]	21.5	[12.3–34.7]	0.340
Talked to parents about sex	67.4	[57.9–75.6]	76	[59.7–87.1]	59.8	[50.2–68.7]	0.081
Talked to teacher about sex	30.5	[21.9–40.7]	24.4	[9.3–50.4]	36.3	[23.5–51.3]	0.459
Excessive alcohol consumption in last 30 days	66.1	[51.9–77.9]	75.2	[47.7–90.9]	58.3	[46.1–69.6]	0.240

Survey-weighted percentages of factor associated with condom use among sexually active students

* $p < 0.05$

adolescent mothers under 18 years old. Infant mortality and the percentage of catholic marriages varied widely across Cantons. We found a strong inverse correlation between our response rate and births from adolescent mothers under 15 year and under 18 years. No other variables were correlated with our response rate.

Discussion

Our study calls for increased focus on adolescent sexual and reproductive health in Costa Rica. We found that adolescent students living in poor areas initiate their sexual life early and have sexual intercourse mostly unprotected. While students intended to use condoms, they failed to act upon their intention. We found excessive drinking to be an important concern among adolescent students in these areas. Our findings highlight the need for interventions to improve adolescents' skills and reduce risky behaviors.

Our findings were consistent with other studies. Excessive drinking and drug use have shown to lead to an increased likelihood of having sex, having sex more often, having sex with more partners, and becoming pregnant (Santelli et al. 2001; WHO 2014b). Studies have also demonstrated that adolescents are more likely to have sex if their friends have permissive values about sex (Kinsman et al. 1998; Näslund-Hadley and Binstock 2010). We found that knowing where to get contraceptives increased condom use, which is consistent with literature stating that access to family planning services decreases risky sexual behaviors (Bersamin et al. 2011). More information is necessary to understand why students who talked to their teacher about sex were less likely to use a condom. Studies in developing countries have shown that teachers are often unprepared and feel uncomfortable teaching about sexual education (Chandra-Mouli et al. 2015).

The Integrative Model of Behavioral Prediction (Fishbein and Yzer 2003) helped us identify opportunities to intervene. We found that attitudes, perceived norms and self-efficacy were associated with reported sexual activity and condom use among adolescent students. We identified important differences in factors associated with sexual activity for male and female students. Female students were concerned with pregnancies while male students were concerned with STIs. The burden and responsibility of unintended pregnancies may disproportionally affect females. Further study is necessary to understand gender disparities and how to address them. Interventions seeking to reduce sexual activity should consider these differences. On the other hand, our measures of self-efficacy may reflect situations of coercion and power imbalances, including sexual violence and couples with adult partners. Self-efficacy itself may not be enough for individuals to stop someone having sex with them. Other factors play a role. In these cases, in addition to improving self-efficacy, addressing social and environmental conditions may be necessary to protect adolescents. For example, the government could improve enforcement against sexual violence and institutional support for victims, increase community awareness of inappropriate relationships, improve community economic conditions, address gangs and crime violence, among other measures (WHO 2002). Qualitative research is necessary to understand in detail adolescents' perspectives on attitudes, social norms and self-efficacy.

We found the need to prevent adolescent drinking. Heavy drinking is not limited to poor populations. At the national level, more than half students in grades 7–11 reported heavy drinking (IAFA 2013). Although excessive drinking may also be associated with risk-seeking personalities, the high prevalence in this age-group calls for action on this behavior per se. Excessive drinking has also been associated with multiple health risks among

Table 3 Multivariate analysis of factors associated with sexual activity among students from the poorest quintile of the population (Costa Rica, 2013)

Dependent: reported ever had sex	Full sample (number of obs = 703)			Male students (number of obs = 278)			Female students (number of obs = 425)		
	Odds ratio	95 % CI	*p*	Odds ratio	95 % CI	*p*	Odds ratio	95 % CI	*p*
Intentions									
Condom use intent on next sexual intercourse (very likely/somewhat likely)	0.88	[0.36, 2.17]	0.782	0.36	[0.1, 1.29]	0.114	0.81	[0.33, 1.95]	0.623
Skills									
Knows where to get pregnancy prevention method	1.46	[0.77, 2.79]	0.243	0.72	[0.23, 2.23]	0.562	3.14	[0.96, 10.27]	0.059
It is uncomfortable to purchase condoms at a drugstore (agree/completely agree)	1.46	[0.68, 3.15]	0.327	0.58	[0.15, 2.32]	0.432	2.99	[1.26, 7.07]	0.014*
Attitudes									
Chances that I will get a sexually transmitted infection (could happen/very likely)	1.49	[0.70, 3.16]	0.293	3.80	[1.19, 12.1]	0.025*	0.64	[0.28, 1.49]	0.295
Chances of getting pregnant or getting partner pregnant (could happen/very likely)	1.60	[0.77, 3.33]	0.199	0.75	[0.27, 2.07]	0.572	5.76	[1.66, 19.99]	0.007*
Aspired educational level (high school or more)	0.80	[0.38, 1.69]	0.552	2.03	[0.89, 4.67]	0.092	0.98	[0.22, 4.48]	0.981
Perceived norms									
Girls are more popular if they have sex (completely agree/agree)	1.59	[0.36, 6.90]	0.529	1.08	[0.24, 4.90]	0.918	4.86	[0.58, 40.56]	0.140
Boys are more popular if they have sex (completely agree/agree)	0.83	[0.32, 2.13]	0.690	0.64	[0.18, 2.30]	0.483	0.38	[0.07, 1.97]	0.242
People who use condoms have sex with many people (completely agree/agree)	1.12	[0.49, 2.58]	0.783	1.90	[0.76, 4.76]	0.167	0.66	[0.26, 1.65]	0.366
People should use condoms only with people they don't know (completely agree/agree)	0.38	[0.16, 0.90]	0.030*	0.18	[0.05, 0.69]	0.013*	1.20	[0.31, 4.59]	0.787
Other people my age have sex									
No	Reference			Reference			Reference		
Yes	2.49	[0.72, 8.58]	0.145	1.98	[0.49, 8.02]	0.328	2.74	[0.71, 10.51]	0.138
Not sure	0.77	[0.21, 2.77]	0.677	1.21	[0.34, 4.31]	0.764	0.30	[0.04, 2.09]	0.216
Belief about mother's approval if I had sex (definitely/probably approve)	2.88	[1.02, 8.17]	0.047*	2.14	[0.77, 5.94]	0.141	0.88	[0.03, 24.95]	0.937
Belief about friends' approval if I had sex (definitely/probably approve)	5.43	[2.47, 11.9]	0.000*	6.45	[1.44, 28.95]	0.016*	5.75	[2.52, 13.14]	0.000*
Self-efficacy									
Efficacy-beliefs score	1.07	[0.76, 1.52]	0.688	1.30	[0.81, 2.08]	0.273	1.17	[0.63, 2.20]	0.608
Distal variables									
Age (mean)	2.17	[1.58, 2.99]	0.000*	1.97	[1.54, 2.53]	0.000*	2.44	[1.54, 3.86]	0.000*
Sex (male)	0.58	[0.29, 1.17]	0.124						
Received HIV/AIDS info at health facility	0.95	[0.53, 1.69]	0.853	0.68	[0.32, 1.44]	0.308	1.04	[0.52, 2.07]	0.906
Received HIV/AIDS info at school	0.62	[0.24, 1.63]	0.326	0.60	[0.15, 2.43]	0.468	0.31	[0.11, 0.86]	0.026*
Talked to doctor about sex	1.28	[0.52, 3.15]	0.578	0.55	[0.14, 2.21]	0.395	2.02	[0.86, 4.70]	0.102
Talked to parents about sex	0.79	[0.40, 1.55]	0.485	1.97	[0.48, 8.08]	0.335	0.32	[0.13, 0.75]	0.011*
Talked to teacher about sex	1.44	[0.74, 2.78]	0.270	1.12	[0.48, 2.58]	0.794	1.08	[0.44, 2.66]	0.858
Excessive alcohol consumption in last 30 days	3.04	[1.94, 4.79]	0.000*	6.81	[2.09, 22.2]	0.002*	1.60	[0.82, 3.13]	0.162
	Prob > F = 0.0000			Prob > F = 0.0000			Prob > F = 0.0000		
	H&L gof: Prob > F = 0.7134			Link test: p = 0.082			Link test: p = 0.711		
	Link test: p = 0.732								

Logistic regression results, odd ratios are survey-weighted. Hosmer and Lemeshow goodness-of-fit (H&L gof)

* $p < 0.05$

Table 4 Multivariate analysis of factors associated with condom use among sexually active students from the poorest quintile of the population (Costa Rica, 2013)

Dependent: reported condom use last time had sex (subpop. no. of obs = 196)	Odds ratio	95 % CI	*p*
Intentions			
Condom use intent on next sexual intercourse (very likely/somewhat likely)	11.05	[3.78, 32.36]	0.000*
Skills			
Knows where to get pregnancy prevention method	17.16	[2.98, 98.68]	0.002*
It is uncomfortable to purchase condoms at a drugstore (completely agree/agree)	0.34	[0.12, 0.93]	0.036*
Attitudes			
Chances that I will get a sexually transmitted infection (could happen/very likely)	0.17	[0.02, 1.40]	0.097
Chances of getting pregnant or getting partner pregnant (could happen/very likely)	1.48	[0.44, 5.03]	0.522
Aspired educational level (high school or more)	5.75	[1.5, 22.02]	0.012*
Perceived norms			
Girls are more popular if they have sex (completely agree/agree)	0.96	[0.20, 4.71]	0.960
Boys are more popular if they have sex (completely agree/agree)	2.72	[0.87, 8.54]	0.084
People who use condoms have sex with many people (completely agree/agree)	0.89	[0.34, 2.32]	0.815
People should use condoms only with people they do not know (completely agree/agree)	4.24	[0.67, 26.81]	0.121
Other people my age have sex			
No	Reference		
Yes	0.04	[0.00, 0.62]	0.022*
Not sure	0.08	[0.01, 1.11]	0.059
Belief about mother's approval if I had sex (definitely/probably approve)	4.02	[0.6, 26.95]	0.147
Belief about friends' approval if I had sex (definitely/probably approve)	0.59	[0.13, 2.76]	0.495
Self-efficacy			
Efficacy-beliefs score	1.96	[1.05, 3.66]	0.035*
Distal variables			
Age (mean)	1.12	[0.69, 1.84]	0.639
Sex (male)	2.63	[0.79, 8.74]	0.111
Received HIV/AIDS info at health facility	2.33	[0.86, 6.33]	0.094
Received HIV/AIDS info at school	0.60	[0.18, 1.98]	0.389
Talked to doctor about sex	0.97	[0.16, 5.92]	0.975
Talked to parents about sex	0.48	[0.16, 1.44]	0.184
Talked to teacher about sex	0.18	[0.04, 0.83]	0.029*
Excessive alcohol consumption in last 30 days	1.31	[0.32, 5.28]	0.700

Prob $> F = 0.0000$

Link test: $p = 0.862$

Logistic regression results, odd ratios are survey-weighted

* $p < 0.05$

adolescents, including riding a car with a drunk driver, attempting suicide and using illicit drugs (Miller et al. 2007), and an increased risk of HIV infection (Baliunas et al. 2010). In addition, alcohol use is the leading risk factor for death for young people aged 15–19 and 20–24 years worldwide (Mokdad et al. 2016). Media campaigns and social norming strategies have been effective at reducing adolescent drinking (Atkin 2004), which could be tested in Costa Rica. Further research is necessary to understand drinking behaviors among Costa Rican adolescents to target messages adequately. Depending on findings, it may be necessary to influence other audiences to support adolescents—such as reducing alcohol sales to underage buyers. Students from poor backgrounds may face higher negative effects from alcohol abuse. Studies have shown that poor populations are more likely to live in areas with more alcohol sales outlets, are less likely to have access to adequate support, are more likely to face comorbidities including other substance abuse disorders (WHO 2014c). Policies to reduce adolescent drinking need to address and compensate for inequities in social determinants of health.

Table 5 Response rates compared with Canton survey responses and socio-demographic characteristics (Costa Rica, 2013)

Province	Canton	Response rate [1]	Sex [1]		Ever had sex [1]		Used condom last time had sex [1]		Poverty gap [2]	Gini Index [2]	Crude mortality rate [3]	Infant mortality rate [3]	Births of mothers under 15 years old [3]	Births of mothers under 18 years old [3]	Catholic marriages [3]
		% of potential informants	% Female	95 % CI	% Yes	95 % CI	% Yes	95 % CI	% Households	Ratio	Per 1000 people	Per 1000 live births	% of total births	% of total births	% of total marriages
Puntarenas	Buenos Aires	33.5 %	66.7 %	[58.3, 74.1]	84.6 %	[76.9, 90.1]	80.4 %	[54.3, 93.4]	18.9 %	0.543	2.8	10.1	1.34 %	10.9 %	38.1 %
Puntarenas	Corredores	30.0 %	66.2 %	[36.6, 87.0]	87.9 %	[74.5, 94.8]	66.6 %	[60.2, 72.4]	10.0 %	0.537	4.2	7.9	1.59 %	12.7 %	7.1 %
Puntarenas	Coto Brus	13.9 %	92.6 %	[54.1, 99.3]	95.1 %	[66.7, 99.5]	67.8 %	[67.8, 67.8]	16.3 %	0.551	3.7	14.1	2.44 %	13.1 %	40.5 %
Puntarenas	Golfito	31.5 %	61.7 %	[52.8, 70.0]	82.7 %	[53.8, 95.2]	72.2 %	[30.6, 93.9]	13.0 %	0.538	4.1	2.9	1.18 %	13.3 %	25.9 %
Puntarenas	Osa	36.4 %	78.4 %	[70.3, 84.7]	87.7 %	[72.5, 95.0]	84.5 %	[61.1, 95.0]	12.9 %	0.547	4.5	6.0	1.20 %	10.8 %	15.6 %
Limon	Guacimo	40.0 %	62.8 %	[51.1, 73.1]	72.2 %	[63.2, 79.8]	72.1 %	[72.1, 72.1]	10.9 %	0.461	3.3	11.2	0.75 %	11.2 %	5.8 %
Limon	Limon	24.1 %	59.4 %	[34.0, 80.6]	80.6 %	[63.4, 90.9]	27.5 %	[7.2, 65.0]	11.5 %	0.496	4.8	8.3	1.20 %	11.2 %	5.6 %
Limon	Matina	24.9 %	39.8 %	[18.2, 66.2]	78.9 %	[59.4, 90.5]	43.0 %	[14.0, 77.8]	12.5 %	0.440	3.2	13.4	1.09 %	11.4 %	5.5 %
Limon	Pococi	34.6 %	53.4 %	[45.8, 60.8]	60.6 %	[48.4, 71.6]	43.8 %	[32.6, 55.6]	11.5 %	0.481	3.4	11.5	0.94 %	10.4 %	14.7 %
Limon	Siquirres	19.0 %	53.9 %	[45.6, 62.0]	85.1 %	[70.3, 93.2]	67.5 %	[46.6, 83.2]	10.3 %	0.454	3.4	4.7	1.42 %	11.7 %	11.4 %
Limon	Talamanca	13.0 %	31.7 %	[15.3, 54.3]	63.6 %	[37.4, 83.6]	49.5 %	[8.8, 90.9]	20.2 %	0.508	3.2	14.0	1.51 %	16.2 %	3.1 %
Correlation with response rate			0.189		−0.124		0.358		−0.407	0.018	0.083	−0.332	−0.712*	−0.664*	−0.0290

Sources: [1] SMI response rates and sample; [2] poverty maps (INEC 2013); [3] demographic Indicators by Canton (INEC 2015)

On the other hand, poor Costa Rican students become sexually active early. At the national level, the median age of the first sexual intercourse for adolescent females is a year later, at age 16, and the same for males, at age 15 (Ministerio de Salud, Costa Rica 2011). Although we did not find a relationship between age and condom use, we did not analyze data from younger students. Even when younger students are less likely to be sexually active, those who are may be less informed and at increased risk of pregnancy. To be most effective, sexual education programs and interventions need to begin with preadolescents and continue through adolescence. Educational activities need to be delivered at regular intervals to achieve long-term and sustained behavior changes (Chandra-Mouli et al. 2015).

In terms of condom use, increased availability of contraceptives for adolescents is necessary. We found that one of every two sexually active students did not use a condom at their last intercourse. In comparison, prevalence of reported condom use in sexually active 15 year olds across 30 countries surpassed 65 %, which contributed with high levels of protection (Nic Gabhainn et al. 2009). Ideally, condoms should be easily available over-the-counter where adolescents do not need to request them from attendants. An important challenge is to ensure adolescents have access to contraceptives when and where they need them. Improving sexual education programs at schools and training teachers could help address student needs. The curricula should include components to develop students' skills and self-efficacy, particularly related to contraceptive use. It is also important to address school attendance and dropouts, which is particularly high in students from lower socioeconomic strata, who often have weak family structures, face financial and family stress, and may have greater barriers to access education (Espindola and Leon 2002).

Working with poor and underage populations entails challenges, which was reflected on our low response rate. Surprisingly, the response rate is higher in areas with higher adolescent pregnancy, which may bias results towards populations at higher risk of pregnancy. However, our response rate was not associated with survey responses, poverty levels or cultural measures across regions. Hence, we believe the study is representative of the population of interest. An important driver of the low response rate was that parents failed to return consent letters. Different strategies have to be explored to engage parents.

Our study also had other limitations. First, we defined sexual activity broadly, not including frequency or limiting the timeframe for sexual intercourse, which may limit our explanatory ability. Moreover, we did not ask about drug use. Our data was self-reported and subject to social desirability biases. In addition, our study was cross-sectional, so we could not determine causality. We focused on students, which may not be the group at higher risk for pregnancy or sexually transmitted infections. Studies have shown that adolescents who drop out from school are more likely to get pregnant (Vivo et al. 2012). We did not assess whether condoms were properly or consistently used. Finally, although the survey does not distinguish between heterosexual or non-heterosexual relationships, and our results apply to all students, we are unable to report differences due to sexual orientation.

Our analysis emphasizes that poor adolescents in Costa Rica begin sexual activities early and undertake behaviors that increase their risk for unwanted pregnancies and STIs. We realized that it is necessary to address gender differences in sexual and reproductive health programs targeting youth. Our findings also underline the need to ensure contraceptives are at reach to adolescents when needed. Moreover, we found the need to address alcohol abuse, a risky behavior performed by more than one-third of students in our sample. Promoting healthy behaviors in youth will promote healthy behaviors in adulthood. Investing in adolescent health yields high returns and should be prioritized.

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Compliance with ethical standards

Conflict of interest All authors declare that there are no conflicts of interest.

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Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent Informed consent was obtained from all individual participants included in the study.

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