

2010

Adolescent Pregnancy Prevention in San Jose, Costa Rica : Assessment of an Educational Intervention

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Adolescent Pregnancy Prevention in San Jose, Costa Rica:
Assessment of an Educational Intervention

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B.A., Stanford University, 2005

A Thesis

Submitted in Partial Fulfillment of the

Requirements for the Degree of

Master of Public Health

at the

University of Connecticut

2010

APPROVAL PAGE

Master of Public Health Thesis

Adolescent Pregnancy Prevention in San Jose, Costa Rica:

Assessment of an Education Intervention

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2010

Acknowledgements

I would like to thank a number of people for their contributions to this thesis:

- Prof. Judy Lewis, my major advisor, who inspired me to pursue global health research and who guided me each step of the way throughout my MPH work, both personally and professionally.
- Dr. Mario Tristan, Director of IHCAI, who works tirelessly to improve the health conditions of communities in Costa Rica and who welcomed me to his country, his foundation, and to his adolescent pregnancy prevention project.
- Marcelo Abarca, Yuri Baidal, Alba Vargas, and Julia Antich, the outstanding Spanish instructors who gave me the confidence and ability to speak Spanish and helped with official study translations.
- Diana Cordero and Pamela Valencia, my conscientious research assistants without whom this study would have no data to analyze.
- Jeanette Flores Vivas who cared for me every day at IHCAI.
- Margarita Chinchilla, Anabel Meza, and Lila Marin, my wonderful host mothers who welcomed me into their homes during my stay in Costa Rica.
- Dr. Steven Schensul and Dr. Stacey Brown, my associate advisors, for bringing their unique perspectives to this project.
- Barbara Case, for her helpfulness and unending patience with my repeated organizational questions over the last five years.

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Introduction

This thesis explores adolescent pregnancy in San Jose, Costa Rica and examines a school-based pregnancy prevention intervention. The relationships between school, gender and risk of adolescent pregnancy are also analyzed, and recommendations are made for effective pregnancy prevention programming.

The Purral region of Guadalupe on the outskirts of San Jose, Costa Rica, suffers a higher rate of adolescent pregnancy compared to the rest of the country. In response to this problem, the International Health Central American Institute (IHCAI) implemented a sexual health education program in two local secondary schools in 2006. Very little information about the program is available. It is known that the program was initially evaluated through assessments of the participants' knowledge before and after the educational sessions. There was no evaluation of the youth attitudes or behaviors, adolescent pregnancies, or long-term impact.

The author worked with IHCAI in San Jose, Costa Rica to perform an assessment of the longer term effects of this sexual health education program. They developed a questionnaire to evaluate the knowledge, attitudes, and behaviors surrounding sexual health of youth in the Purral community. Researchers at IHCAI later used this survey to collect data from adolescents who had participated in the educational intervention and those who had not. This thesis analyzes the data collected by IHCAI to assess the effectiveness of the

educational intervention and the influence of other factors on the knowledge, attitudes, and behaviors of adolescents in the Purral region.

The thesis begins with an overview of adolescent pregnancy, Costa Rica and the Purral region, and a description of the education intervention implemented by IHCAI. The research goal, logic model, and methods are then described. The results are reported, and the thesis then concludes with discussion of the results as well as study limitations and recommendations for future research and intervention. This thesis will be used to guide IHCAI's continuation and expansion of adolescent pregnancy prevention programming.

Background

Adolescent Pregnancy: The Problem

Childbearing during adolescence is a major issue in public health because of its consequences for young women, their children, their families, and society as a whole. Worldwide, pregnancy and childbirth related deaths are the leading killers of females between the ages of 15 and 19 years.¹ The physical process of pregnancy is more dangerous during adolescence than adulthood, with teenage mothers at an increased risk for preeclampsia as well as obstructed labor.² Prolonged labor can lead to death or permanent disability from obstetric fistula, and because adolescents are also less likely to have a skilled birth attendant present during delivery, the risk of these complications is further increased.³ In addition, over 2.2 million adolescents undergo illegal and unsafe abortions each year which puts them at risk for infection, future fertility problems, and death.⁴ Not only are the adolescents themselves at risk, but infants born to adolescent mothers have a higher risk for low birth weight, SIDS, accidents, and hospitalization in the first year of life.⁵

The social impact of childbearing during adolescence is also considerable, as these mothers are more likely to be single parents, to have greater numbers of children overall, and to earn less income and attain less education than women who delay childbearing until age 20 or later.⁶ Furthermore, adolescent mothers are at high risk for dysfunctional maternal-infant attachment, which puts the child at greater risk for long term psychological dysfunction.⁷ Carol Buvinic

found in her research in Chile, Barbados, Guatemala and Mexico that a dichotomy exists between poor and non-poor teenage mothers. Poor women who became pregnant during adolescence had lower income over their lifetime than poor women who delayed childbearing, yet no income difference exists for non-poor women regardless of when they first became pregnant. Adolescent pregnancy, therefore, serves to entrench poverty by limiting already poor women's incomes. Furthermore, low socioeconomic status is a known risk factor for adolescent pregnancy,⁸ creating a vicious cycle.

Global Epidemiology

Worldwide, the average rate of births per 1000 females age 15-19 years is 65.⁹ This figure varies significantly depending upon region; see Table 1 below for a list of selected regions and countries.

Table 1. Births per 1000 females age 15-19 years¹⁰

Sub-Saharan Africa	143
Middle East and Northern Africa	56
East/South Asia and Pacific	56
Latin America	78
Costa Rica	89
USA	60
Canada	24
Europe	25

Risk and Protective Factors

Many factors have proven to be associated with both increased and decreased rates of teen pregnancy. In a 2004 discussion paper on adolescent pregnancy, the World Health Organization described the following associations.¹¹ Poverty is universally related to higher rates of adolescent pregnancy. In the United States this translates to greater incidence of teen pregnancy in minority populations, as they are more often poor. In many countries young age at marriage is a determinant of adolescent pregnancy, however in other countries age at first intercourse is more important. Smoking tobacco, drinking alcohol, and use of other drugs are also associated with increased adolescent pregnancy. Education and urbanization are protective factors, associated with lower levels of adolescent childbearing. Another protective factor is an intact family, where both parents live with and support the adolescent.¹² In fact parental monitoring and social support have been found to be protective against all types of adolescent risk-taking behavior, including substance use.¹³

Pregnancy Prevention Programs

A variety of approaches have been used in attempting to decrease the rate of adolescent pregnancy in the United States and globally. In general most interventions fall into one of three categories;¹⁴ the first being interventions which aim to impart knowledge or influence attitudes. These interventions tend to take the shape of an educational curriculum, taught in schools or other community centers, and may be abstinence-only in focus or may cover all aspects of sexual

health and contraception. Another type of initiative in this category is the media campaign, which aims to disseminate information relevant to sexual health or to influence adolescents' attitudes towards risky sexual behaviors. The second category of prevention strategies are those which provide access to contraception, including school- and community-based family planning clinics and condom distribution programs. The final category encompasses programs which enhance life options, such as role model/mentoring programs, interventions focused on academic improvement, community service or employment programs, or religious support groups. Many interventions involve some combination of these three strategies.

Research on peer-led education initiatives has shown mixed results. In a study by Townsend et al. researchers trained adolescent "health promoters" to disseminate correct health information to their peers at schools and community centers, and to refer peers to professional counselors if they needed more information or to obtain contraceptives. In the area of Mexico where the study took place, contraceptive use rose 98% among those aged 15-19.¹⁵ Since many of the outcomes measured in HIV/AIDS prevention research (i.e., condom use, delaying onset of sexual intercourse) overlap with adolescent pregnancy prevention research, it is reasonable to look at some of these interventions as well. A study in Belize trained peer educators age 14-19 to teach a 7-lecture course on HIV/AIDS to their classmates at school. They used a standardized curriculum involving education on the facts of HIV transmission as well as teaching strategies for communication with partners and resisting peer pressure.

Students who were taught by peer educators had significantly higher levels of HIV-related knowledge, higher levels of condom use, greater intentions to use condoms at next sexual intercourse, and more positive attitudes toward condom use than controls.¹⁶ In 2006, the World Health Organization reviewed evidence from 80 HIV/AIDS prevention programs targeted towards young people (age 15-24) in developing countries in an effort to determine the most effective strategies. The review determined that there was excellent evidence in support of adult-led, curriculum-based educational interventions in schools, but not enough evidence to recommend for or against peer-led education interventions.¹⁷

While many education interventions have been associated with behavioral change, some have not been as successful. One study in Belize compared adolescents in high school classes exposed to a reproductive health education program with peers in classes not receiving the educational intervention. While those students who received the educational intervention did demonstrate greater knowledge of sexual and reproductive health at the end of the study, there was no difference in attitudes toward pregnancy prevention or behavioral intent to decrease risk of pregnancy and sexually transmitted infections between the intervention and control groups.¹⁸

Though there is tremendous variation among the educational interventions which have taken place all over the world, some have been studied rigorously and found to produce significantly longer delays in onset of adolescent sexual activity, decreased frequency of sexual activity, and increase in contraceptive use.¹⁹ A study comparing curricula of educational interventions found that those

which are effective at reducing unprotected sex have 10 distinguishing characteristics:

1. Focused on reducing one or more sexual behaviors that lead to unintended pregnancy or HIV/STD infection.
2. Based on theoretical approaches that have been demonstrated to be effective in influencing other health-related risk-taking behavior and on research that identified the important determinants of selected sexual behaviors
3. Gave a clear message about sexual activity and contraceptive usage and continually reinforced that message
4. Provided basic, accurate information about the risks of teen sexual activity and about methods of avoiding intercourse or using protection against pregnancy and STDs
5. Included activities that address social pressures that influence sexual behavior
6. Provided modeling and practice of communication, negotiation, and refusal skills
7. Employed a variety of teaching methods designed to involve the participants and have them personalize the information
8. Incorporated behavioral goals, methods, and materials that were appropriate to the age, sexual experience, and culture of the students
9. Lasted a sufficient length of time to complete important activities adequately
10. Selected teachers or peers who believed in the program they were implementing and then provided them with training.²⁰

Below three examples of successful teen pregnancy prevention programs are described and examined for how well they meet these ten criteria.

Breaking the Cycle

In the early 1990s Hartford, Connecticut, had one of the highest teen pregnancy rates of any city in the United States; nearly one-quarter of the city's

births were to teen mothers. In response to the crisis, city government, public schools, and a local planning and advocacy organization called the Hartford Action Plan on Infant Health established “Breaking the Cycle,” a citywide campaign to reduce teen pregnancy and increase educational and career opportunities for young people. Supported by local corporations, foundations, and community organizations, *Breaking the Cycle* is a comprehensive initiative that includes school curricula, public service advertising, parent and community education, and reproductive health services.²¹

Breaking the Cycle focuses on promoting two behaviors: abstinence or contraceptive use. Its broad range of initiatives is based on evidence of the important roles of parents, peers, and community in preventing teen pregnancy. It’s “Let’s Talk” program trains parents on how to talk with their children about sexuality in response to evidence that parents play a vital role in preventing adolescent pregnancy. Through its curricula for elementary, middle and high school students as well as parents, the *Breaking the Cycle* teachings are consistent in their message of promoting abstinence or contraception and provide accurate information about their importance. The program also employs a variety of interactive teaching methods including modeling of communication and refusal skills. Through its “Always on Saturdays” program which meets every Saturday morning, *Breaking the Cycle* gives youth a supportive place to spend their time outside of school, building self-esteem through community service and other skill-building exercises. *Always on Saturdays* also provides continuous reinforcement of prevention messages throughout the year. Finally, *Breaking the*

Cycle provides comprehensive training for adults who facilitate the *Always on Saturdays* and *Let's Talk*, and carefully selects and trains teen role models to teach "Postponing Sexual Involvement," a program designed for fifth graders across the city.²² *Breaking the Cycle* successfully meets all of the above ten criteria, and has shown success in improving Hartford's teen pregnancy rate. Therefore it may be a good candidate program to adopt in other locations where teen pregnancy rates are high.

Plain Talk

Plain Talk is an initiative of the Annie E. Casey foundation with a goal of reducing teen pregnancy and sexually transmitted infection in the United States. Its approach is two pronged; it promotes unambiguous messages from adults in the community about protecting sexually active teens, and also improves access to age-appropriate adolescent health services. Across the three sites in Atlanta, New Orleans, and San Diego where *Plain Talk* was instituted and rigorously studied between 1994 and 1998, pregnancy rates among sexually active girls declined from 54.5 percent to 33.6 percent, and the proportion of youth who had spoken with an adult about birth control, pregnancy or STDs rose from 61 percent to 70 percent. Sexually active youth in these communities who had discussed birth control with an adult were half as likely to create a pregnancy as peers who had no such communication.²³

Plain Talk sets a clear objective of promoting abstinence and contraception for youth who are sexually active, and consistently reinforces this

message. Its initiatives are based on evidence that youth want communication with and information from their parents on sex and sexuality. At the same time, parents want help in talking to their children about sex. *Plain Talk* provides training to adults in the community to facilitate discussions between youth and knowledgeable adults in order to provide youth with accurate information. *Plain Talk* focused on getting information to adolescents and improving their access to health services. It did not employ a variety of other teaching methods or use techniques such as overt modeling and practice of communication/negotiation skills or other organized activities. By targeting adults in the community to convey information to adolescents, *Plain Talk* provides a culturally appropriate intervention regardless of the area where it is implemented. It also creates a lasting influence in the community, where adults can continue to talk to youth about sex for many years, as opposed to an education intervention through the school which would need to be repeated yearly. While *Plain Talk* does not meet all ten of the above criteria for effective pregnancy prevention programs, it has proven successful in its goals of preventing teen pregnancy and sexually transmitted infection, and has also been adopted in multiple cities and ethnic groups.

Choose Life

Another example of a successful teen pregnancy prevention program is World Relief's "Choose Life," which was updated most recently by Food for the Hungry and was implemented in four countries with funding from USAID.²⁴ This

is a comprehensive curriculum designed to teach and guide youth leaders to educate their peers with the goal of protecting youth from pregnancy and sexually transmitted infection. Two curricula are available, one targeting students age ten to fourteen years, and the other for those age fifteen years or older. The curricula each contain at least twelve sessions on topics including self awareness and self worth, communication, changes during puberty, sexuality, communicating relationship boundaries, abstinence, and condoms. Each session is designed to be interactive and includes stories to help start a discussion, important facts for the leader to communicate, a life skills activity, and an optional biblical or Koranic passage that relates to the session topic. This curriculum has been successfully implemented in Haiti, Mozambique, Kenya, Sierra Leone, and Rwanda.

The Choose Life program emphasizes abstinence promotion in the curriculum for 10-14 year olds, and includes an option to teach about contraception to older students who are sexually active. Throughout the curriculum the program gives a clear message about delaying sexual activity and continually reinforces that message. It provides basic and accurate information, and includes various activities and teaching methods to address social pressure, improve communication skills, and encourage participant interaction and personalization of the information presented. It offers two curricula to ensure age-appropriateness. Lastly Choose Life provides teacher training and detailed curriculum guides for educators. The Choose Life program meets all ten of the above criteria and has been successfully implemented in multiple communities.

Due to its optional religious component, it may have to be modified to be culturally appropriate depending on the community of interest.

Effects of School Environment on Adolescent Risk-Taking Behavior

Adolescents spend a large portion of their time at school, and school is in most cases not just the academic center, but the social center of students' lives as well. This has prompted many researchers to target health interventions through schools in attempts to decrease risk-taking behavior (i.e., truancy, substance use, onset of sexual activity, unprotected sex) in adolescents. Several studies have shown that the characteristics of schools themselves may have more to do with student risk-taking behavior than the implementation of specific interventions. For example, Maes and Lievens found that schools with strong policies (defined as a consistent set of rules which was communicated clearly to students) had lower rates of tobacco and alcohol use among students. The presence or absence of a school health promotion program had no significant effect on student health behaviors.²⁵ Bisset, Markham and Aveyard created a "value-added education" score based on the level of support and control a school provided. They measured support by rates of academic success and control by rates of truancy, and created the score based on how those rates differed from what would be expected given the sociodemographic characteristics of each school. Schools with higher value-added education scores had lower rates of early initiation of alcohol use, heavy alcohol consumption, and regular illicit drug use.²⁶ Regenerus and Elder examined the impact of attendance at a Catholic

versus secular school on academic success, an outcome which is associated with avoidance of risky behavior such as truancy, substance abuse, and early sexual activity. The study found that religious involvement, whether through church attendance, personal religiosity, or attending a Catholic school, contributed to academic success for students in low-income areas.²⁷ Kliewer and Murrelle found that both school and religion were important protective factors for adolescent health, in that adolescents who reported a personal belief in God, parent religiosity, and positive student-teacher interactions had lower rates of substance use.²⁸

Costa Rica

Land and People

Costa Rica is a small country of 51,100 square kilometers (roughly the size of West Virginia) located in Central America. It is bordered by Nicaragua in the north, by Panama in the South, by the Pacific Ocean in the West and the Caribbean Sea in the East. It has a tropical climate with a dry season from December to April and a rainy season May through November. Costa Rica's geography varies from coastal planes to rugged mountains including four major volcanoes as well as rainforests.²⁹

Figure 1. Map of Costa Rica³⁰



In July 2008 Costa Rica's population was estimated to be almost 4.2 million people, with an estimated growth rate of 1.388 percent. Immigrants, mainly from Nicaragua and other Central American countries, make up about 10 percent of the population. The total fertility rate is 2.17 children per woman. Ninety-four percent of the population considers itself white, 3 percent black, 1 percent Amerindian, 1 percent Chinese, and 1 percent other. Roman Catholicism is the predominant religion making up 76.3 percent of the population, while the rest is divided between Evangelical (13.7 percent), Jehovah's Witnesses (1.3 percent), other Protestant (0.7 percent), other (4.8 percent), and none (3.2

percent). Spanish is the official language, although English is spoken by most medical professionals and those who work in the tourism industry.³¹

Political System

Costa Rica is a democratic republic with a history of uninterrupted democracy since 1949, making it the most stable government in Central America. The country is currently led by President Oscar Arias who was elected by popular vote to a four-year term in February 2006. In the 2010 presidential election held in February, Laura Chinchilla Miranda was elected the next president and will take office May 8th, 2010.³² The President serves as chief of state as well as head of government. The legislative assembly consists of 57 members elected by popular vote to four-year terms, and which is responsible for electing the 22 justices of the Supreme Court who each serve eight-year terms. Suffrage is universal and compulsory starting at age 18. Costa Rica has no standing military as it was abolished at the end of a 44-day civil war in 1948. Since then the country has suffered no significant violent conflicts.³³

Economy

Like its government, Costa Rica's economy is the most stable in the region and its people enjoy a relatively high standard of living with per capita income of U.S. \$5,800, 4.6 percent unemployment, and 16 percent of the population living below the poverty line. The economy is based on tourism, agriculture, and electronics exports. Its rich biodiversity and well educated population make it an ideal travel destination for ecotourists as well as

vacationers looking for a tropical getaway. Its fertile land and frequent rainfall are important resources that support the export of bananas, pineapples, coffee and other agricultural products. Important foreign investments include Intel, which employs almost 2,000 people at its microprocessor plant, and Proctor and Gamble which employs approximately 1200 people at its administrative center for the Western hemisphere.³⁴

Costa Rica's public infrastructure is extensive but suffers from inadequate maintenance and new investment. A 30,000 kilometer road network provides access to most areas of the country, however many roads have fallen into disrepair. Water contamination is a growing concern, as only 3.5 percent of the country's sewage is managed in sewage treatment facilities. The remainder is managed using septic systems, only 50 percent of which are estimated to function properly by the Water and Sewage Institute (AyA). The government has a monopoly on production of electricity, and its insufficient investment in maintenance and capacity resulted in nationwide blackouts in 2007 when a severe dry season limited hydroelectric resources.³⁵

Education

Education is a major priority for the government of Costa Rica, which dedicates 22.4 percent of total expenditures to funding public schools, universities, and libraries.³⁶ Primary school is offered to children throughout the country for 6 years and secondary school for 5 additional years. Although education is compulsory for 10 years in total, an estimated 87percent of children

of primary school age are currently enrolled in school. Enrollment in secondary school is much lower, with 37 percent of the total age group enrolled in secondary school; the largest enrollment drop-off occurs following the 3rd year of secondary schooling when 40 percent of enrolled students do not return to school for the 4th year.³⁷

In an effort to combat the drop in enrollment seen especially in secondary schools, the government of Costa Rica launched the AVANCEMOS program in 2006. Most of the students who fail to complete a secondary education leave school during adolescence so that they can work full time to earn money for their families. Students from poor families, therefore, are at higher risk of dropping out of school. As an incentive to remain in school, AVANCEMOS provides a monthly stipend to adolescents whose family income falls below the poverty line. Certain other groups of adolescents may also qualify for AVANCEMOS funding even if they do not meet the criteria for poverty, such as adolescents who are pregnant or have children, have physical or mental disabilities, or are members of the indigenous population of Costa Rica. Stipend amounts begin at 29 US dollars per month for a student in the 7th grade up to 87 US dollars per month for a student in the 11th grade. Out of the 130,000 adolescents from 80,000 families who currently qualify to receive such stipends, just over 63,000 were enrolled in the program at last report in June 2007.³⁸ Since the inception of AVANCEMOS in 2006, the rate of adolescents living in poverty who do not attend school was reduced from 26.3 percent to 20.9 percent.³⁹

In addition to primary and secondary schooling, 16 percent of the current population age 18-23 attends college.⁴⁰ Costa Rica has 4 publicly funded universities, the largest of which is the University of Costa Rica, which has a total enrollment of 35,000 students and is located in the capital city of San Jose. Numerous smaller private colleges also exist, from liberal arts to vocational training schools. Currently 14.9 percent of the labor force in Costa Rica has some college education.⁴¹

Health Care

Costa Rica's health care system is comprised of four major government structures. The Ministry of Health provides leadership for the system as a whole, overseeing public health surveillance and health promotion. The Costa Rican Social Security Fund (CCSS) delivers health care in the case of disease or maternity. The National Insurance Institute (INS) offers protection for work-related and traffic accidents, and the Institute of Water and Sewerage Systems (AyA) regulates the supply of potable water and wastewater management.⁴² Under this system Costa Rica achieves near-universal health coverage for its population. The CCSS, founded in the 1940s, provides mandatory coverage for all salaried workers, and unemployed, self-employed, or employers may voluntarily join to obtain coverage.⁴³ The program is financed primarily through payroll taxes, whereby the employer pays a 10% tax and the employee contributes 8 percent of wages.⁴⁴

The CCSS has developed a network of 670 clinics called EBAIS (Equipos Básicos de Atención Integral en Salud, or in English, comprehensive primary health care teams). EBAIS are located throughout the country, and can refer patients to a secondary level of care comprised of 10 clinics, 13 peripheral hospitals, and 7 regional hospitals. The tertiary level of care is made up of 6 specialized hospitals and 3 general hospitals which offer highly specialized care to the entire country.⁴⁵ Outside of the public system private clinics also exist which are utilized by wealthier citizens as well as tourists, and a common complaint is that preference for specialized care at hospitals is given to patients willing to pay extra.⁴⁶

In its most recent ranking of health systems by country in 2000, the WHO named Costa Rica 36th in overall performance, just edging out the 37th-ranked United States.⁴⁷ Life expectancy is 72 years for men and 79 years for women, and leading causes of death are comparable to developed nations: cardiovascular disease, malignant neoplasms, external causes such as accidents and violence, and respiratory disease. Infant mortality is 10.2 per 1,000 live births, and maternal mortality 19 per 100,000 live births. Ninety percent of deliveries occur in hospital settings attended by a physician or obstetric nurse.⁴⁸ Although often referred to as a developing nation, Costa Rica has achieved health status for its population that is equivalent to most developed countries.

IHCAI Foundation

The International Health Central American Institute (IHCAI) Foundation was created to foster opportunities in international health to encourage a transcultural exchange of knowledge and experience between Costa Rica and the rest of the world. It aims to improve the health of communities in Central America through research and community health development. IHCAI is also committed to providing medical education for students and residents from around the world through clinical clerkships and medical Spanish training programs. IHCAI's mission is to reduce the disproportionate burden of disease on the poor through research, education, and translation of medical knowledge into practice in the community setting, and to improve access to health information by health care professionals and consumers.

The IHCAI foundation is located in the barrio California of San Jose, Costa Rica. Dr. Mario Tristan is the Chairperson and General Director, who in 2001 was named coordinator of the Central American Branch of the Iberoamerican Cochrane Center, making IHCAI its head office. IHCAI has sent representatives to countries throughout Central America for development of health research sponsored by the Cochrane Collaboration.

Purral Region of Guadalupe, San Jose

Guadalupe is a district in the northeastern region of the San Jose metropolitan area, home to the University of Costa Rica. On the outskirts of Guadalupe lies the Purral region, a poor area of about 15,000 people served by the EBAIS Clínica Los Cuadros. Anecdotal reports from clinic leaders reveal that this population suffers a greater burden of social problems compared to other areas of San Jose, namely teen pregnancy, violence, and drug and alcohol abuse.⁴⁹ According to the 2000 Costa Rican census, 22 percent of births in Purral were to mothers between the ages of 12 and 18 years, compared to 15 percent in Costa Rica as a whole. Of the mothers who gave birth in Purral at age 18 or earlier, 65.2% were unmarried. In the Purral district the median age of marriage for females is between 21 and 22 years of age as shown in Table 2.

Table 2. Marriage rates in Purral region of San Jose

<u>Age</u>	<u>Percent of females who have been married</u>
15	5.1%
16	8.6%
17	17.7%
18	26.9%
19	33.2%
20	37.0%
21	43.0%
22	58.1%
25	71.4%

The 2000 census also highlighted several disparities between Purral and the rest of the country, including a greater proportion of homes constructed from refuse (6 percent in Purral versus 1.5 percent nationwide), greater percentage of female head of households (29 percent versus 23 percent), and fewer heads of household who attended university (9.5 percent versus 14 percent).⁵⁰

Education Initiative

To begin to address the local problem of adolescent pregnancy in the Purral region, researchers at IHCAI worked with providers at Clínica Los Cuadros to convene focus groups of adolescent mothers beginning in 2003. In addition to exhibiting a severe lack of sexual health knowledge, these teens expressed a frustration with clinicians at Los Cuadros. They stated that physicians and staff did not seem to listen to or care about their problems, and that their questions were met with resistance or apathy.⁵ As a result, few of their peers sought answers to their sexual health questions at the clinic. This is not a unique finding; a study in Nicaragua found that a significant obstacle for adolescents in accessing sexual health care and education is the paternalistic way many physicians treat them.⁵¹ Another study in Mexico quoted one physician who stated, “young adults rarely use public health facilities for obtaining information on sex education or contraception.”⁵² Since adolescents by and large were not seeking sexual health information from physicians and clinics, it was decided that creating formal peer education programs would be a reasonable alternative.

In 2005 researchers at IHCAI, working with clinicians at Clínica Los Cuadros, developed a peer-taught health education program for the Purral community. Fifteen adolescents, age 14 to 18 years, were recruited from the clinic's patient base to serve as "Adolescent Lay Leaders," or peer educators. This group participated in an education program at IHCAI where researchers gave lectures on contraception, sexually transmitted disease, healthy lifestyles and evidence-based medicine. Once the lay leaders demonstrated proficiency in subjects taught through written tests, the researchers worked with them to develop their own presentations which they would share with classmates. In 2006 the program was implemented in two local high schools which served the Purral region: Colegio Guadalupe and Colegio Piedad (names have been changed for this thesis). Each high school set aside one day where the lay leaders could give their presentations on each of the four subjects mentioned above to fellow students, as no other health curriculum existed at either school. Pre- and post- intervention tests given to the students showed a 15 percent increase in knowledge about contraception and sexually transmitted disease.⁵³ The education program continued during the 2007 school year when again one day was set aside at each school for the adolescent lay leaders to teach their classmates. However in 2008 the leadership at Clínica Los Cuadros went through some transition and the peer education program was not continued; consequently neither Colegio Guadalupe nor Colegio Piedad has had any sexual health education since 2007.

Research Goal

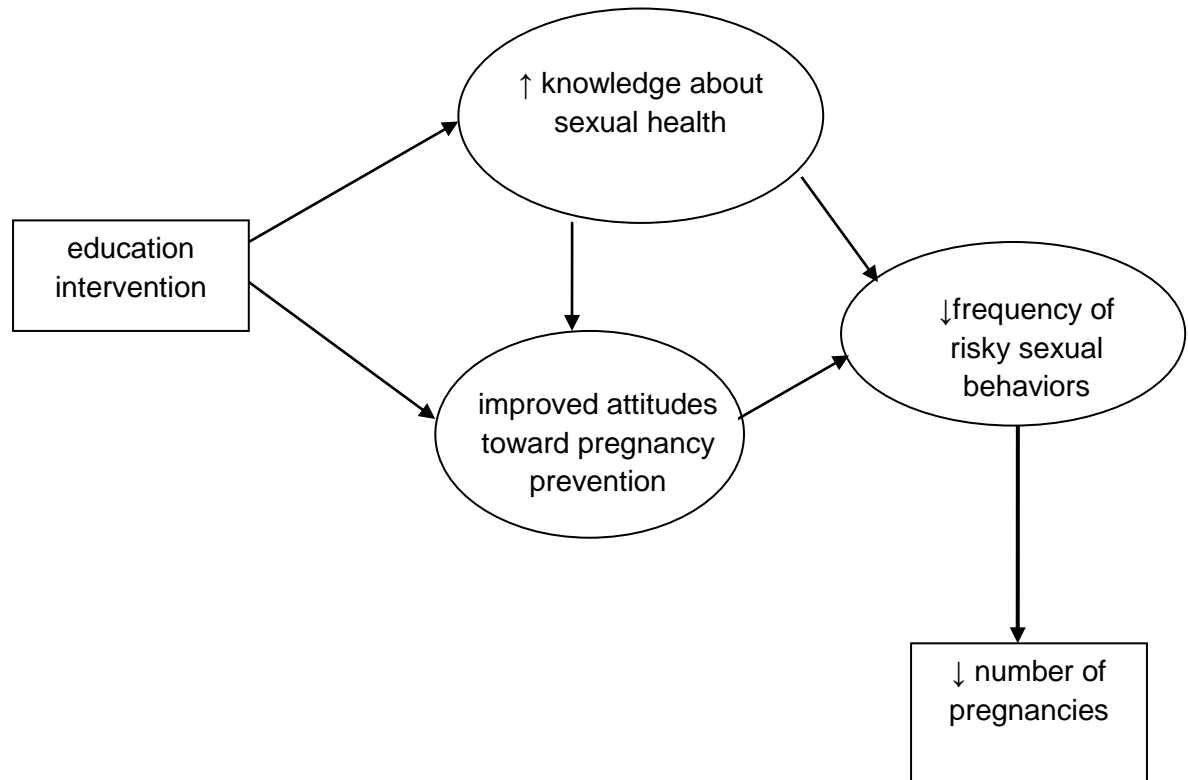
This was an analysis of survey data collected by IHCAI from adolescents in the Purral region of San Jose, Costa Rica. The overall purpose was to assess the impact of the educational intervention performed by IHCAI in 2006 and 2007 on the risk of pregnancy for adolescents in this community. Another goal was to define community-specific risk and protective factors for adolescent pregnancy.

Specific Aims

- To examine the relationships between participation in IHCAI's peer education initiative in 2006 and 2007 and level of reproductive health knowledge, attitudes toward sex and contraception, and frequency of risky sexual behaviors
- To examine the relationship between demographic variables such as age, gender, or school and knowledge, attitudes and behaviors surrounding reproductive health

Logic Model and Hypotheses

Figure 2. Logic Model



This analysis examines the relationship between the independent variable, participation in the education initiative of peer-led lectures on sexual health, and three dependent variables of knowledge, attitudes and behaviors related to sexual health. The research model hypothesizes that students who were exposed to the education intervention will have increased sexual health knowledge, improved attitudes toward contraception, and exhibit fewer risky sexual behaviors. In addition, it predicts that youth with greater knowledge will have better attitudes and fewer risky behaviors, and that adolescents with better

attitudes will have fewer risky behaviors. Finally the model posits that fewer risky sexual behaviors will correlate positively with fewer pregnancies.

Definitions

- *Adolescent*: person falling between the ages of 14 and 19
- *Educational intervention*: The program developed by researchers at the International Health Central American Institute (IHCAI) working through Los Cuadrados Clinic, which trained adolescents to serve as peer educators (known as “*adolescent lay leaders*”). The adolescent lay leaders delivered lectures on topics of evidence-based medicine, sexually transmitted diseases, contraception, and healthy lifestyles to their peers during dedicated class time at school.
- *Knowledge about sexual health*: The total percentage of questions answered correctly on the 12-item multiple choice section of the survey which assesses understanding of how pregnancy and sexually transmitted diseases occur and the methods by which they may be prevented.
- *Attitudes toward pregnancy prevention*: The reported likelihood that a respondent would discuss sex, pregnancy risk, and contraception with friends, parents, and/or sexual partners, would abstain from sexual intercourse, would use contraception, would feel comfortable obtaining contraceptives, or the respondent’s level of agreement with statements such as “having sex makes a boy popular.”

- *Risky sexual behavior*: Behaviors that can lead directly to pregnancy: participation in vaginal intercourse, frequency of vaginal intercourse over last two months, frequency of vaginal intercourse without a condom or hormonal contraceptives over last two months.
- *Pregnancy*: Has the respondent ever been pregnant if female or caused a pregnancy if male, regardless of the outcome of the pregnancy?

Methods

Study Population

The survey respondents in this study were students attending either of the two secondary schools targeted by the education intervention in 2006 and 2007. Colegio Guadalupe and Colegio Piedad are the two secondary schools which serve the Purral district on the outskirts of San Jose. The schools are less than a mile from each other and both are populated by students from all neighborhoods of the Purral district. Colegio Guadalupe is a public school with a total enrollment of 1600 students in grades one through five (corresponding to grades seven through eleven in the United States). Grades one through three each contain roughly 400 students, but by the fourth and fifth grades enrollment drops to 200 per class. 400 students are enrolled in the AVANCEMOS program, which has helped to keep students from dropping out following the third year of secondary school.⁵⁴

Colegio Piedad is a private secondary school supported by Fundacion Piedad, a Costa Rican non-governmental organization. Fundacion Piedad was created in 1983 with the mission of combating social problems such as crime, violence, substance abuse and delinquency by transforming the lives of young people. The foundation supports 6 elementary schools and 1 secondary school (Colegio Piedad) in low-income areas throughout Costa Rica. The foundation receives most of its financial support from donations by Evangelical organizations and individuals in the United States.⁵⁵ With this support it subsidizes tuition at the schools so that students at Colegio Piedad pay only 12,000 to 14,000 colones

(equivalent to 22 to 26 USD) per month. In addition to the basic academic curriculum offered in public secondary schools, students at Colegio Piedad also attend compulsory religious services daily. Colegio Piedad has a total enrollment of 350 students, with 90-100 students in each of grades one through three but only 40 students in each of grades four and five.⁵⁶

Recruitment

At Guadalupe, all students from grades one through five received a day of health lectures from adolescent lay leaders as part of the education intervention in both 2006 and 2007. Therefore in 2009 Guadalupe students in grades three through five had been exposed to the intervention. At Piedad, only students in grades four and five had been offered the peer-led health lectures in 2006 and 2007, therefore none of the students attending Piedad in 2009 had previously been exposed to the intervention. The intervention cohort was selected from the fourth and fifth grades at Guadalupe as these were the only students remaining in school who had been exposed to the education initiative. The control cohort was selected from the fourth and fifth grades at Colegio Piedad in order to have an age- and grade-matched cohort from the same geographical area who had not been exposed to the intervention under investigation.

The research team at IHCAI set goal of recruiting 50 students each to the control and intervention cohorts, and so 80 students were targeted for recruitment for each cohort in an effort to meet that goal. The 4th and 5th grades at Colegio Guadalupe contained a total of 169 students. The enrollment lists for

these grades were obtained from the school and divided by grade and gender. IHCAI research assistants who were blinded to the names of the students manually selected 20 students from each of the groups, assuring a balance between males and females as well as the 4th and 5th grades. The research assistants then visited 4th and 5th grade classrooms at Colegio Guadalupe, introduced the project and delivered parental permission forms to the selected students, instructing them to return the signed permission forms the following week when the research team would return to administer the written survey. On return one week later, 35 of the 80 students had obtained parental permission and were willing to participate in the survey. Informed consent was obtained privately from each participant, and then each was given a space in the school cafeteria, at least 3 feet apart from other students, to complete the anonymous written survey.

Colegio Piedad contained a total of 90 students in the 4th and 5th grades, therefore it was decided to recruit all students falling in those grades instead of selecting 80 students for recruitment. The IHCAI research assistants visited each 4th and 5th grade classroom where they introduced the project and delivered parental permission forms to each student, instructing them to return the signed forms the following week when the team would return to administer the written survey. On their return one week later, 38 of the 90 students possessed a signed parental permission form and were willing to take the survey. Informed consent was obtained from each student privately. Each participant was then given a

private desk in their classroom, separated from neighboring desks by at least 3 feet, at which to take the anonymous written survey.

Survey Instrument

The original survey instrument was developed by the author with the assistance of Dr. Mario Tristan, General Director at IHCAI. It contained a total of 79 questions divided into four main sections. Section A consisted of demographic information, including age, gender, school and household size, education and occupation. Section B contained questions to assess sexual health knowledge, derived from the questions used in the pre- and post-tests given to students during the education initiative in 2006 and 2007. The original questions were modified from open-ended to a multiple choice or true/false style in order to standardize survey responses. Section C consisted of questions concerning attitudes toward sexual health, such as how likely youth were to talk to their parents, friends, or partners about sex. Likert scales were offered as answer choices for questions in this section. Finally Section D contained questions regarding adolescents' behaviors, namely whether they had talked to parents, friends, or partners about sex, whether they had ever had sexual intercourse themselves and whether they had used contraceptive methods.

The original survey instrument was tested for clarity by two adolescent research assistants who were recent graduates of Colegio Guadalupe. The research assistants had both participated in the education intervention, one as an adolescent lay leader and the other as a student. Each was given the survey to

complete with no time limit; both finished within twenty minutes. Minor grammatical changes were made following suggestions from the research assistants to improve clarity, however the overall content of the original survey remained the same. See Appendix A for an English translation of the final version of the survey administered to students.

Permissions and Approvals

Dr. Mario Tristan received formal approval from IHCAI's Ad Hoc Bioethics Committee on February 26, 2009 to conduct this investigation of the effectiveness of the education intervention. He received letters of permission from the principals of both high schools to administer surveys during class time to students who obtained parental permission and gave informed consent.

The data collected by Dr. Mario Tristan with the help of research assistants at IHCAI contained no identifying information; the respondents were not asked for their names but were assigned an identification number at random so that their responses would not be able to be linked to their identities. This author's secondary analysis of the data was granted exempt status from the University of Connecticut Health Center Internal Review Board on November 11, 2009.

Statistical Methods

Data from the survey instrument were collected by IHCAI staff and recorded in a *Microsoft Excel* spreadsheet. This spreadsheet was delivered via

secure email to the author who downloaded the data into *SPSS version 17.0*. Frequencies and distributions were examined, and one respondent's data was removed due to inconsistent answers to questions (i.e., male participant responded that he had been pregnant 14 times and caused pregnancy in partner 3 times). Demographic data for the control and intervention groups were compared using Odds Ratios and Chi-square analysis for variables with distinct responses, and the Independent t-test for equality of means was used for continuous variables. The "Knowledge" portion of the survey was analyzed using Odds Ratios and Chi square analysis to determine the difference between the control and intervention groups for each question. Then a total score was calculated for each student equal to the percent of questions s/he answered correctly and the mean total scores for the control and intervention groups were compared using the independent samples t-test. In the "Attitudes" section of the survey, variables which had more than two response choices were converted to dichotomous variables for ease of analysis. Odds ratios and Chi square analysis were used to determine the difference between the control and intervention groups.

The following variables were assessed for reliability (Cronbach's Alpha .803) and combined to create a scale for perceived ability to discuss sex: could talk to friends about sex, could talk to friends about risk of pregnancy, could talk to friends about contraception, could talk to parents about sex, could talk to parents about risk of pregnancy, could talk to parents about contraception, could

talk to partner about sex, could talk to partner about risk of pregnancy, and could talk to partner about contraception.

In addition, the following variables were also assessed for reliability (Cronbach's Alpha .799) and combined to create a scale for substance use by friends and household members: believe more than half of friends have smoked a cigarette, believe more than half of friends smoke cigarettes regularly, believe more than half of friends have tried alcohol, believe more than half of friends drink alcohol regularly, believe more than half of friends have tried other drugs, believe more than half of friends use other drugs regularly, believe more than half of persons in household smoke cigarettes regularly, believe more than half of persons in household drink alcohol regularly, believe more than half of persons in household use other drugs regularly. The mean scores for participant groups on each scale were compared using the independent samples t-test. In the "Behaviors" section, a new variable was created called "Adequacy of contraception," which applied only to the respondents who reported having had sexual intercourse. Respondents were labeled "adequate" if they responded that they used *either* condoms OR oral contraceptives "Always;" any other response pattern was labeled "inadequate."

Results

Demographic Characteristics

Table 3 contains the demographic characteristics of the study population. The respondents from Guadalupe were gender balanced, with 50% male and 50% female participants while Piedad had a greater number of females than males (60.5% versus 39.5%, respectively); however this difference was not statistically significant. The mean age of respondents from both groups was similar (16.85 years for Guadalupe and 16.89 years for Piedad) as was the mean household size (3.85 persons for Guadalupe and 4.47 persons for Piedad). More students from Piedad came from less-educated households, with 31.6% not having reached secondary school compared to 5.8% in the Guadalupe group. This difference however was not found to be statistically significant. A greater number of respondents from Piedad live with both of their parents (68.4% compared to 52.9% in the Guadalupe group), but this difference was not statistically significant. Mothers of the adolescents from Guadalupe gave birth to them at a mean age of 28.59 years compared to 25.89 years at Piedad, which was not a statistically significant difference. Religion did show a statistically significant difference between the groups, with Guadalupe being predominantly Catholic (61.80%) and Piedad being predominantly Christian-other (65.80%).

Table 3. Demographic Characteristics

	Guadalupe	Piedad				
	N (%)	N (%)	OR (95% CI)	Chi square	df	p-value
Gender						
<i>Male</i>	17 (50%)	15 (39.5%)	.652 (.256-1.662)	0.805	1	0.37
<i>Female</i>	17 (50%)	23 (60.5%)				
	Mean (SD)	Mean (SD)		t-test	df	p-value
Age (years)	16.85 (.989)	16.89 (1.116)		-0.142	68	0.887
	N (%)	N (%)	OR (95% CI)	Chi square	df	p-value
Grade						
<i>4</i>	17 (50%)	17 (44.7%)	1.235 (.488-3.124)	0.199	1	0.655
<i>5</i>	17 (50%)	21 (55.3%)				
	Mean (SD)	Mean (SD)		t-test	df	p-value
Household size (number of persons)	3.85 (1.726)	4.47 (1.913)		-1.439	70	0.155
	N (%)	N (%)		Chi square	df	p-value
Highest level of education attained in household						
<i>Attended primary school</i>	1 (2.90%)	5 (13.20%)		8.805	5	0.117
<i>Completed primary school</i>	1 (2.90%)	7 (18.40%)				
<i>Attended secondary school</i>	9 (26.50%)	6 (15.80%)				
<i>Completed secondary school</i>	9 (26.50%)	9 (23.70%)				
<i>Attended university</i>	9 (26.50%)	5 (13.20%)				
<i>Completed university degree</i>	5 (14.70%)	6 (15.80%)				
	N (%)	N (%)	OR (95% CI)	Chi square	df	p-value
Lives with both parents						
<i>Yes</i>	18 (52.9%)	26 (68.4%)	1.926 (.738-5.029)	1.809	1	0.179
<i>No</i>	16 (47.1%)	12 (31.6%)				
	Mean (SD)	Mean (SD)		t-test	df	p-value
Mother's age at student's birth (years)	28.59 (6.459)	25.89 (6.739)		1.604	61	0.114
	N (%)	N (%)		Chi square	df	p-value
Religion						
Catholic	21 (61.80%)	11 (28.90%)		7.828	2	0.020
Christian-other	12 (35.50%)	25 (65.80%)				
None	1 (2.90%)	2 (5.30%)				

Knowledge

On the 12-item knowledge assessment section of the questionnaire, respondents from Guadalupe scored an average of 62% correct, while those from Piedad produced a mean score of 69%, a difference which was statistically significant.

Table 4. Mean Knowledge Scores

	Mean score	SD	t-test	df	p-value
Guadalupe	62.01%	0.123	-2.13	70	0.037
Piedad	68.64%	0.138			

Respondents scored best on questions B5 (*What do condoms protect against?*), B7 (*True/False: Pregnancy and delivery are more dangerous for females under 18 years*), B9 (*True/False: It is possible for a woman to become pregnant if a man ejaculates in her mouth*), and B10 (*True/False: You can tell if a person has HIV by looking at them*), each with 80% correct responses from both groups. B1 (*Which method is the most effective for preventing both pregnancy AND sexually transmitted infections?*) was the question with the fewest correct responses: less than 25% of students from both Guadalupe and Piedad answered correctly.

Respondents from Guadalupe showed a poorer performance which was statistically significant on questions B2 (*At what point in the menstrual cycle is a woman most likely to become pregnant?*), B6 (*True/False: It is possible for a woman to become pregnant from having sex even if the penis is removed from her vagina before ejaculation*), and B11 (*It is possible for a person to have an STI*

like chlamydia or gonorrhea without any symptoms). Table 5 displays the scores for each question in the knowledge section of the questionnaire.

Table 5. Correct responses to questions in the knowledge section

	%Correct	OR (95%CI)	Chi square	df	p-value
B1. Which method is most effective for preventing pregnancy AND STIs?					
Guadalupe	20.6%	0.972 (.311-3.039)	0.002	1	0.961
Piedad	21.1%				
B2. At what point in the menstrual cycle is a woman most likely to become pregnant?					
Guadalupe	23.5%	.277 (.100-.765)	6.395	1	0.011
Piedad	52.6%				
B3. At what point in the menstrual cycle is a women least likely to become pregnant?					
Guadalupe	64.7%	1.484 (.574-3.840)	0.665	1	0.415
Piedad	55.3%				
B4. For which type of woman is the rhythm method most effective?					
Guadalupe	67.6%	1.220 (.460-3.234)	0.16	1	0.69
Piedad	63.2%				
B5. What do condoms protect against?					
Guadalupe	91.2%	1.216 (.252-5.867)	0.059	1	0.808
Piedad	89.5%				
B6. T/F: It is possible for a woman to become pregnant from having sex even if the penis is removed from her vagina before ejaculation					
Guadalupe	44.1%	.211 (.75-.591)	9.288	1	0.002
Piedad	78.9%				
B7. T/F: Pregnancy and delivery are more dangerous for females under 18 years old than for those over 18.					
Guadalupe	91.2%	2.333 (.552-9.860)	1.382	1	0.24
Piedad	81.6%				
B8. T/F: If a woman uses the rhythm method correctly, it is impossible for her to become pregnant.					
Guadalupe	61.8%	1.454 (.568-3.722)	0.611	1	0.435
Piedad	52.6%				
B9. T/F: It is possible for a woman to become pregnant if a man ejaculates in her mouth.					
Guadalupe	91.2%	.574 (.090-3.660)	0.352	1	0.553
Piedad	94.7%				
B10. T/F: You can tell if a person has HIV by looking at them.					
Guadalupe	79.4%	.104 (.012-.898)	5.858	1	0.016
Piedad	97.4%				
B11. T/F: It is possible for a person to have an STI like chlamydia or gonorrhea without any symptoms.					
Guadalupe	35.3%	.397 (.153-1.029)	3.678	1	0.055
Piedad	57.9%				
B12. T/F: A person can contract an STI by having oral sex.					
Guadalupe	78.9%	.741 (.249-2.204)	0.292	1	0.589
Piedad	76.4%				

Attitudes

Greater proportions of students from Piedad responded that they could talk about sex, risk of pregnancy, and contraception with friends, parents, and partners compared to the students from Guadalupe. The groups differed most in response to the question “Could you talk to your parents (or an adult who lives with you) about sex?” with 81.6% of Piedad youths responding affirmatively compared to only 51.5% of adolescents from Guadalupe. When the nine questions concerning perceived ability to discuss sex, pregnancy and contraception were scaled however, there was no significant difference in the mean scores between the two schools.

Table 6. Perceived ability to discuss sex, pregnancy, and contraception

	Agree N (%)	Disagree N (%)	OR (95% CI)	Chi square	df	p-value
Could talk to friends about sex						
Guadelupe	30 (88.2%)	4 (11.8%)	1.406 (.361-5.477)	0.243	1	0.622
Piedad	32 (84.2%)	6 (15.8%)				
Could talk to friends about the risk of pregnancy						
Guadelupe	32 (94.1%)	2 (5.9%)	.889 (.118-6.681)	0.013	1	0.909
Piedad	36 (94.7%)	2 (5.3%)				
Could talk to friends about contraception						
Guadelupe	31 (91.2%)	3 (8.8%)	.886 (.166-4.713)	0.02	1	0.887
Piedad	35 (91.7%)	3 (7.9%)				
Could talk with parents about sex						
Guadelupe	17(51.5%)	16 (48.5%)	.240 (.083-.697)	7.289	1	0.007
Piedad	31 (81.6%)	7 (18.4%)				
Could talk with parents about risk of pregnancy						
Guadelupe	26 (76.5%)	8 (23.5%)	.394 (.107-1.454)	2.041	1	0.153
Piedad	33 (89.2%)	4 (10.8%)				
Could talk with parents about contraception						
Guadelupe	25 (73.5%)	9 (26.5%)	.421 (.125-1.412)	2.03	1	0.154
Piedad	33 (86.8%)	5 (13.2%)				
Could talk with partner about sex						
Guadelupe	30 (88.2%)	4 (11.8%)	.208 (.022-1.965)	2.223	1	0.136
Piedad	36 (97.3%)	1 (2.7%)				
Could talk with partner about risk of pregnancy						
Guadelupe	33 (97.1%)	1 (2.9%)		1.104	1	0.293
Piedad	37 (100%)	0 (0%)				
Could talk with partner about contraception						
Guadelupe	33 (97.1%)	1 (2.9%)		1.074	1	0.300
Piedad	36 (100%)	0 (0%)				

Table 7. Mean scores on scale for perceived ability to discuss sex

	Mean	SD	t	df	p-value
Scale: Could talk about sex, pregnancy and contraception					
Guadelupe	20.70	4.4894	-1.477	66	0.145
Piedad	22.34	4.6901			

All of the students from Piedad responded that they could tell their partner that they did not want to have sex, compared with 79.4% of Guadalupe respondents. Piedad and Guadalupe adolescents responded similarly that they could tell their partner to stop touching them sexually (86.5% and 85.3%, respectively), and a greater proportion of Piedad respondents stated they would insist on using contraception even if their partner did not want to (100% versus 90.9%). Both groups had similar rates of feeling embarrassed buying condoms (Guadalupe 41.2%, Piedad 39.5%) and birth control pills (Guadalupe 32.4%, Piedad 39.5%).

Table 8. Predicted behaviors regarding sex and contraception

	Agree N (%)	Disagree N(%)	OR (95% CI)	Chi square	df	p-value
Could tell partner that they did not want to have sex						
Guadalupe	27 (79.4%)	7 (20.6%)		8.451	1	0.004
Piedad	37 (100%)	0 (0%)				
Could tell partner to stop touching them sexually						
Guadalupe	29 (85.3%)	5 (14.7%)	.906 (.238-3.453)	0.021	1	0.885
Piedad	32 (86.5%)	5 (13.5%)				
Would insist on using contraception						
Guadalupe	30 (90.9%)	3 (9.1%)	.909 (.816-1.013)	3.607	1	0.058
Piedad	38 (100%)	0 (0%)				
Would not feel embarrassed buying condoms						
Guadalupe	20 (58.8%)	14 (41.2%)	1.073 (.418-2.756)	0.022	1	0.883
Piedad	23 (60.5%)	15 (39.5%)				
Would not feel embarrassed buying birth control pills						
Guadalupe	23 (67.6%)	11 (32.4%)	.733 (.278-1.933)	0.394	1	0.530
Piedad	23 (60.5%)	15 (39.5%)				

The groups differed significantly in agreeing that having sex makes a boy (Guadalupe 20.6%, Piedad 0%) or a girl (Guadalupe 23.5%, Piedad 0%) popular. Furthermore, students from Piedad responded significantly less frequently that

having sex was a common thing for a boy (38.2% versus 63.6% of Guadalupe respondents) or a girl (33.3% versus 60.6% of Guadalupe respondents) of their age to do.

Table 9. Attitudes about sexual activity in age group

	Agree N (%)	Disagree N (%)	OR (95% CI)	Chi square	df	p-value
Agrees that having sex makes a boy popular						
Guadalupe	7 (20.6%)	27 (79.4%)		8.666	1	0.003
Piedad	0 (0%)	38 (100%)				
Agrees that having sex makes a girl popular						
Guadalupe	8 (23.5%)	26 (76.5%)		10.059	1	0.002
Piedad	0 (0%)	38 (100%)				
Agrees that having sex is a common thing for a boy to do						
Guadalupe	21 (63.6%)	12 (36.4%)	2.827 (1.050-7.613)	4.323	1	0.038
Piedad	13 (38.2%)	33 (49.3%)				
Agrees that having sex is a common thing for a girl to do						
Guadalupe	20 (60.6%)	13 (39.4%)	3.077 (1.126-8.412)	4.927	1	0.026
Piedad	11 (33.3%)	22 (66.7%)				

The groups from Guadalupe and Piedad also showed differences in responses to questions about the behaviors of friends. Significantly more students from Guadalupe believed that greater than half of their friends have had sex (50% versus 18.4%), and a greater proportion believed more than half of their friends who have sex use contraception (Guadalupe 63.6%, Piedad 51.5%). Few respondents from either group believed that more than half of their friends have been pregnant or impregnated someone else (Guadalupe 14.7%, Piedad 8.1%). There were also significant differences between the groups regarding their friends' use of tobacco and alcohol. More Guadalupe students reported that greater than half of their friends have smoked a cigarette (82.4% versus 57.9%

from Piedad), and that greater than half of their friends smoke cigarettes regularly (44.1% versus 23.7%). A greater proportion of youths from Guadalupe also report that more than half of their friends have tried alcohol compared to Piedad (97.1% versus 71.1%), and a much greater proportion from Guadalupe report that more than half of their friends drink alcohol regularly compared to Piedad (79.4% versus 28.9%). Few respondents from either group reported that more than half of their friends have tried (Guadalupe 14.7%, Piedad 7.9%) or regularly use (Guadalupe 14.7%, Piedad 5.3%) other drugs. Small proportions from both groups reported that more than half of the persons in their household regularly smoke cigarettes (Guadalupe 8.8%, Piedad 0%), drink alcohol (Guadalupe 14.7%, Piedad 2.6%), or use other drugs (Guadalupe 2.9%, Piedad 0%).

Table 10. Behaviors of friends, household members

	Agree N (%)	Disagree N (%)	OR (95% CI)	Chi square	df	p-value
Believe more than half of friends have had sex						
Guadelupe	17 (50%)	17 (50%)	.226 (.078-.652)	8.053	1	0.005
Piedad	7 (18.4%)	7 (18.4%)				
Believe more than half of friends who have sex use contraception						
Guadelupe	21 (63.6%)	12 (36.4%)	.607 (.227-1.625)	0.992	1	0.319
Piedad	17 (51.5%)	16 (48.5%)				
Believe more than half of friends have been pregnant/impregnated partner						
Guadelupe	5 (14.7%)	29 (85.3%)	.512 (.113-2.327)	0.771	1	0.380
Piedad	3 (8.1%)	34 (91.9%)				
Believe more than half of friends have smoked a cigarette						
Guadelupe	28 (82.4%)	6 (17.6%)	.295 (.099-.878)	5.059	1	0.025
Piedad	22 (57.9%)	16 (42.1%)				
Believe more than half of friends smoke cigarettes regularly						
Guadelupe	15 (44.1%)	19 (55.9%)	.393 (.143-1.078)	3.372	1	0.066
Piedad	9 (23.7%)	29 (76.3%)				
Believe more than half of friends have tried alcohol						
Guadelupe	33 (97.1%)	1 (2.9%)	.074 (.009-.613)	8.738	1	0.003
Piedad	27 (71.1%)	11 (28.9%)				
Believe more than half of friends drink alcohol regularly						
Guadelupe	27 (79.4%)	7 (20.6%)	.106 (.036-.313)	18.336	1	<0.001
Piedad	11 (28.9%)	27 (71.1%)				
Believe more than half of friends have tried other drugs						
Guadelupe	5 (14.7%)	29 (85.3%)	.497 (.109-2.259)	0.843	1	0.359
Piedad	3 (7.9%)	35 (92.1%)				
Believe more than half of friends use other drugs regularly						
Guadelupe	5 (14.7%)	29 (85.3%)	.322 (.058-1.784)	1.823	1	0.177
Piedad	2 (5.3%)	36 (94.7%)				
Believe more than half of persons in house smoke cigarettes regularly						
Guadelupe	3 (8.8%)	31 (91.2%)	.912 (.821-1.012)	3.499	1	0.061
Piedad	0 (0%)	38 (100%)				
Believe more than half of persons in house drink alcohol regularly						
Guadelupe	5 (14.7%)	29 (85.3%)	.157 (.017-1.417)	3.425	1	0.064
Piedad	1 (2.6%)	37 (97.4%)				
Believe more than half of persons in house use drugs regularly						
Guadelupe	1 (2.9%)	33 (97.1%)		1.133	1	0.287
Piedad	0 (0%)	38 (100%)				

When the nine questions about substance use in respondents' friends and household members were scaled, youths from Piedad had a significantly lower mean score than those from Guadalupe (8.3421 versus 14.5000).

Table 11. Means scores on scale for substance use by close contacts

	Mean	SD	t	df	p-value
Scale: Substance use by friends and household members					
Guadalupe	3.59	1.4795	4.373	70	<0.001
Piedad	1.97	1.6355			

Respondents from both groups reported similar ages at which they wanted to become pregnant (or impregnate someone else) for the first time, with mean ages of 25.79 years for Guadalupe and 26.30 years for Piedad.

Table 12. Mean age desired at first pregnancy

	Mean age (years)	SD	t	df	p-value
Guadalupe	25.8	3.209	-0.479	68	0.633
Piedad	26.3	5.301			

Behaviors

Communication

Respondents from both schools reported similar rates of having talked with friends (Guadalupe 88.2%, Piedad 81.6%) or partners (Guadalupe 55.9%, Piedad 58.3%) about sex, but youths from Piedad had a higher rate of having talked with parents about sex (73% versus 61.8% for Guadalupe). In addition

students from Piedad reported feeling significantly more comfortable while talking to their parents about sex than Guadalupe students did (79.2% and 45.0%, respectively).

Table 13. Behaviors of study participants: talking about sex

	Yes N (%)	No N (%)	OR (95% CI)	Chi square	df	p-value
Have talked with friends about sex						
Guadalupe	30 (88.2%)	4 (11.8%)	.590 (.157-2.226)	0.614	1	0.433
Piedad	31 (81.6%)	7 (18.4%)				
If yes, felt comfortable talking with friends about sex						
Guadalupe	22 (78.6%)	6 (21.4%)	.611 (.152-2.456)	0.487	1	0.485
Piedad	24 (85.7%)	4 (14.3%)				
Have talked with partner about sex						
Guadalupe	19 (55.9%)	15 (44.1%)	1.105 (.429-2.85)	0.043	1	0.836
Piedad	21 (58.3%)	15 (41.7%)				
If yes, felt comfortable talking with partner about sex						
Guadalupe	15 (83.3%)	3 (16.7%)	.667 (.097-4.579)	0.172	1	0.679
Piedad	15 (88.2%)	2 (11.8%)				
Have talked with parents about sex						
Guadalupe	21 (61.8%)	13 (38.2%)	1.671 (.613-4.554)	1.016	1	0.313
Piedad	27 (73%)	10 (27.0%)				
If yes, felt comfortable talking with parents about sex						
Guadalupe	9 (45.0%)	11 (55.0%)	.215 (.057-.807)	5.503	1	0.019
Piedad	19 (79.2%)	5 (20.8%)				

Sexual Activity

Both groups of respondents showed high rates of reporting that they knew where to buy condoms (Guadalupe 94.1%, Piedad 100%) and oral contraceptives (Guadalupe 93.9%, Piedad 92.1%), however significantly more students from Guadalupe reported actually having bought condoms (27.3% compared to 2.7% of Piedad students). Few students from either school reported ever obtaining oral contraceptives (Guadalupe 5.9%, Piedad 2.7%).

Significantly more respondents from Guadalupe report having had sex (36.4% compared to 7.9% of respondents from Piedad). No student in either group reported ever having been pregnant or impregnating someone else.

Table 14. Behaviors of Study Participants: Sexual Activity

	Yes N (%)	No N (%)	OR (95% CI)	Chi square	df	p-value
Know where to buy condoms						
Guadalupe	32 (94.1%)	2 (5.9%)		2.299	1	0.129
Piedad	38 (100%)	0 (0%)				
Know where to buy oral contraceptives						
Guadalupe	31 (93.9%)	2 (6.1%)	.753 (.118-4.803)	0.091	1	0.763
Piedad	35 (92.1%)	3 (7.9%)				
Have bought condoms						
Guadalupe	9 (27.3%)	24 (72.7%)	.074 (.009-.623)	8.6	1	0.003
Piedad	1 (2.7%)	36 (97.3%)				
Have obtained oral contraceptives						
Guadalupe	2 (5.9%)	32 (94.1%)	.444 (.038-5.136)	0.443	1	0.506
Piedad	1 (2.7%)	36 (97.3%)				
Have had sexual intercourse						
Guadalupe	12 (36.4%)	21 (63.6%)	.150 (.038-.594)	8.59	1	0.003
Piedad	3 (7.9%)	35 (92.1%)				
Have ever been pregnant (females only)						
Guadalupe	0 (0%)	16 (100%)				
Piedad	0 (0%)	23 (100%)				
Have ever gotten someone pregnant (males only)						
Guadalupe	0 (0%)	17 (100%)				
Piedad	0 (0%)	15 (100%)				

Substance Use

The groups differed significantly in terms of substance use, with more adolescents from Guadalupe than Piedad reporting having smoked a cigarette (57.6% versus 28.9%), smoking cigarettes regularly (12.1% versus 0%), having tried alcohol (97% versus 60.5%), drinking alcohol regularly (42.4% versus

10.5%), and having tried other drugs (9.1% versus 0%). No respondents from either group reported using other drugs regularly.

Table 15. Behaviors of Study Participants: Substance Use

	Yes N (%)	No N (%)	OR (95% CI)	Chi square	df	p-value
Have smoked a cigarette						
Guadalupe	19 (57.6%)	14 (42.4%)	.300 (.112-.803)	5.933	1	0.015
Piedad	11 (28.9%)	27 (71.1%)				
Smoke cigarettes regularly						
Guadalupe	4 (12.1%)	29 (87.9%)		4.881	1	0.027
Piedad	0 (0%)	38 (100%)				
Have tried alcohol						
Guadalupe	32 (97%)	1 (3.0%)	.048 (.006-.389)	13.437	1	<0.001
Piedad	23 (60.5%)	15 (39.5%)				
Drink alcohol regularly						
Guadalupe	14 (42.4%)	19 (57.6%)	.160 (.046-.554)	9.496	1	0.002
Piedad	4 (10.5%)	34 (89.5%)				
Have tried other drugs						
Guadalupe	3 (9.1%)	30 (90.9%)		3.607	1	0.058
Piedad	0 (0%)	38 (100%)				
Use other drugs regularly						
Guadalupe	0 (0%)	33 (100%)				
Piedad	0 (0%)	38 (100%)				

Sexually Active Subset

A total of 15 out of 72 study participants responded affirmatively to the survey question, “Have you ever had sexual intercourse?” Compared those who have not had sex, these respondents differed with respect to some demographic characteristics. Significant differences were shown between the two groups in age (mean of 17.6 years in the sexually active group compared to 16.65 years in those who have never had sex) and in school (12 (80%) of the sexually active students attended Guadalupe, while only 3 (20%) were from Piedad).

Respondents who have had sex did not differ significantly in religion, living with both parents, or maternal age at their birth from those who had never had sex.

Table 16. Participant demographics: sexually active vs. not sexually active

	Have had sex N(%)	Never had sex N (%)	OR (95% CI)	Chi square	df	p-value
Gender						
Male	7 (46.7%)	25 (44.6%)	.922 (.294-2.891)	0.02	1	0.889
Female	8 (53.3%)	31 (55.4%)				
	N(%)	N (%)	OR (95% CI)	Chi square	df	p-value
Grade						
4	5 (33.3%)	29 (51.8%)	2.148 (.650-7.094)	1.614	1	0.204
5	10 (66.7%)	27 (48.2%)				
	Mean (SD)	Mean (SD)		t-test	df	p-value
Age						
(years)	17.6 (.737)	16.65 (1.031)		-3.339	67	0.001
	Mean (SD)	Mean (SD)		t-test	df	p-value
Household Size						
(#persons)	4.93 (1.831)	5.29 (1.846)		0.658	69	0.513
	N(%)	N (%)	OR (95% CI)	Chi square	df	p-value
Highest level of education attained in household						
Attended secondary school or less	6 (40.0%)	22 (39.3%)	.971 (.303-3.108)	0.003	1	0.96
Completed secondary school or more	9 (60.0%)	34 (60.7%)				
	N(%)	N (%)	OR (95% CI)	Chi square	df	p-value
Lives with both parents						
Yes	7 (46.7%)	37 (66.1%)	.449 (.142-1.427)	1.89	1	0.169
No	8 (53.3%)	19 (33.9%)				
	Mean (SD)	Mean (SD)		t-test	df	p-value
Mother's age at student's birth (years)						
	24.58 (5.807)	27.63 (6.820)		1.427	61	0.159
	N(%)	N (%)	OR (95% CI)	Chi square	df	p-value
Religion						
Catholic	8 (57.1%)	24 (44.4%)	.600 (.183-1.966)	0.72	1	0.396
Christian-other	6 (42.9%)	30 (55.6%)				
	N(%)	N (%)	OR (95% CI)	Chi square	df	p-value
School						
Guadalupe	12 (80.0%)	21 (37.5%)	.150 (.038-.594)	8.59	1	0.003
Piedad	3 (20.0%)	35 (62.5%)				

Study participants who reported having had sexual intercourse did not differ significantly in number of correct responses to questions on the knowledge portion of the survey compared to those who had never had sex.

Table 17. Knowledge scores: sexually active vs. not sexually active

	Mean Test Score (SD)	t-test	df	p-value
<i>Sexually active</i>	.66 (.142)	-0.235	69	0.815
<i>Never had sex</i>	.65 (.135)			

Respondents who have had sex and those who have not showed similar mean scores on the scale for perceived ability to discuss sex, pregnancy and contraception.

Table 18. Scores for perceived ability to discuss sex: sexually active vs. not sexually active

	Mean Score (SD)	t-test	df	p-value
Scale: could talk about sex, pregnancy, contraception				
<i>Sexually active</i>	22.2 (4.411)	-0.636	65	0.527
<i>Never had sex</i>	21.3 (4.759)			

There was no significant difference in the responses of students who had or had not had sex to the question, “Could you tell your boyfriend/girlfriend that you did not want to have sex with him/her?” However, fewer students who have had sexual intercourse reported that they would insist on using contraception even if their partner did not want to, with a p-value of 0.051. Finally respondents who have had sex predicted they would feel embarrassed buying condoms or birth control pills at a rate that was not statistically different from respondents who have never had sex.

Table 19. Predicted behaviors regarding sex and contraception: sexually active vs. not sexually active

	Agree N (%)	Disagree N (%)	OR	Chi square	df	p- value
Could tell partner that they did not want to have sex						
Sexually active	13 (86.7%)	2 (13.3%)	.650 (.113-3.739)	0.236	1	0.627
Never had sex	50 (90.9%)	5 (9.1%)				
Could tell partner to stop touching them sexually						
Sexually active	12 (80.0%)	3 (20.0%)	.583 (.131-2.596)	0.509	1	0.476
Never had sex	48 (87.3%)	7 (12.7%)				
Would insist on using contraception						
Sexually active	13 (86.7%)	2 (13.3%)	.120 (.010-1.431)	3.810	1	0.051
Never had sex	54 (98.2%)	1 (1.8%)				
Would not feel embarrassed buying condoms						
Sexually active	8 (53.3%)	7 (46.7%)	1.458 (.462-4.604)	0.416	1	0.519
Never had sex	35 (62.%)	21 (37.5%)				
Would not feel embarrassed buying birth control pills						
Sexually active	9 (60.0%)	6 (40.0%)	1.298 (.402-4.190)	0.191	1	0.662
Never had sex	37 (66.1%)	19 (33.9%)				

Significant differences in attitudes of respondents who have had sex compared to those who had not were revealed in the responses to questions about sexual activity in their age group; those who reported having had sex were significantly more likely to agree that having sex makes a boy or a girl popular and that it is a common thing for boys and girls their age to do.

Table 20. Attitudes about sexual activity in age group: sexually active vs. not sexually active

	Agree N (%)	Disagree N (%)	OR	Chi square	df	p-value
Agrees that having sex makes a boy popular						
Sexually active	4 (26.7%)	11 (73.3%)	6.424 (1.257-32.845)	6.045	1	0.014
Never had sex	3 (5.4%)	53 (94.6%)				
Agrees that having sex makes a girl popular						
Sexually active	5 (33.3%)	10 (66.7%)	8.833 (1.814-43.008)	9.262	1	0.002
Never had sex	3 (5.4%)	53 (94.6%)				
Agrees that having sex is a common thing for a boy to do						
Sexually active	12 (80.0%)	3 (20.0%)	5.714 (1.434-22.773)	6.988	1	0.008
Never had sex	21 (41.2%)	30 (58.8%)				
Agrees that having sex is a common thing for a girl to do						
Sexually active	11 (73.3%)	4 (26.7%)	4.487 (1.249-16.120)	5.796	1	0.016
Never had sex	19 (38.0%)	31 (62.0%)				

Compared respondents who had not had sex, those who have had sex had a significantly higher rate of reporting that more than half of their friends have had sex. The two groups did not differ significantly in their speculation about contraception use and history of pregnancy in their friends.

Table 21. Sexual behaviors of friends: sexually active vs. not sexually active

	Agree N (%)	Disagree N (%)	OR (95% CI)	Chi square	df	p-value
Believe more than half of friends have had sex						
Sexually active	10 (66.7%)	5 (33.3%)	6.615 (1.915-22.857)	10.200	1	0.001
Never had sex	13 (23.2%)	43 (76.8%)				
Believe more than half of friends who have sex use contraception						
Sexually active	11 (73.3%)	4 (26.7%)	2.538 (.712-9.055)	2.142	1	0.143
Never had sex	26 (52.0%)	24 (48.0%)				
Believe more than half of friends have been pregnant/impregnated partner						
Sexually active	2 (13.3%)	13 (86.7%)	1.256 (.227-6.969)	0.068	1	0.794
Never had sex	6 (10.9%)	49 (89.1%)				

Respondents who have had sex had significantly higher mean scores than those who have not had sex on the scale measuring substance use (tobacco, alcohol and other drugs) by friends and household members.

Table 22. Mean score on scale of substance use in friends and family: sexually active vs. not sexually active

	Mean (SD)	t-test	df	p-value
Scale: Substance use by friends and household members				
<i>Sexually active</i>	4.07 (1.7099)	-3.705	69	<0.001
<i>Never had sex</i>	2.34 (1.5757)			

No significant difference in age desired at first pregnancy was found between students who have had sex and those who have not.

Table 23. Mean age desired at first pregnancy: sexually active vs. not sexually active

	Mean (SD)	t-test	df	p-value
Mean age desired at first pregnancy				
<i>Sexually active</i>	25.6 (3.397)	0.462	67	0.645
<i>Never had sex</i>	26.2 (4.716)			

A significantly greater proportion of respondents who have had sex report having talked with their partner about sex compared to the rest of the respondents. In addition, youths who have had sex were significantly more likely to have bought condoms and oral contraceptives. Otherwise these groups produced similar responses in terms of having talked with friends and parents about sex, level of comfort talking about sex, and knowing where to buy condoms and oral contraceptives.

Table 24. Behaviors: sexually active vs. not sexually active

	Yes N (%)	No N (%)	OR	Chi square	df	p-value
Have talked with friends about sex						
<i>Sexually active</i>	15 (100%)	0 (0%)	.804 (.706-.915)	3.487	1	0.062
<i>Never had sex</i>	45 (80.4%)	11 (19.6%)				
If yes, felt comfortable talking with friends about sex						
<i>Sexually active</i>	14 (93.3%)	1 (6.7%)	4.065 (.469-35.252)	1.838	1	0.175
<i>Never had sex</i>	31 (77.5%)	9 (22.5%)				
Have talked with partner about sex						
<i>Sexually active</i>	14 (93.3%)	1 (6.7%)	16.240 (1.992-132.365)	10.569	1	0.001
<i>Never had sex</i>	25 (46.3%)	29 (53.7%)				
If yes, felt comfortable talking with partner about sex						
<i>Sexually active</i>	12 (85.7%)	2 (14.3%)	1.059 (.153-7.337)	0.003	1	0.954
<i>Never had sex</i>	17 (85.0%)	3 (15.0%)				
Have talked with parents about sex						
<i>Sexually active</i>	10 (66.7%)	5 (33.3%)	.973 (.289-3.270)	0.002	1	0.965
<i>Never had sex</i>	37 (67.3%)	18 (32.7%)				
If yes, felt comfortable talking with parents about sex						
<i>Sexually active</i>	7 (70.0%)	3 (30.0%)	1.444 (.316-6.598)	0.226	1	0.634
<i>Never had sex</i>	21 (61.8%)	13 (38.2%)				
Know where to buy condoms						
<i>Sexually active</i>	15 (100%)	0 (0%)	.964 (.917-1.014)	0.551	1	0.458
<i>Never had sex</i>	54 (96.4%)	2 (3.6%)				
Know where to buy oral contraceptives						
<i>Sexually active</i>	15 (100%)	0 (0%)	.911 (.839-.989)	1.441	1	0.230
<i>Never had sex</i>	51 (91.1%)	5 (8.9%)				
Have bought condoms						
<i>Sexually active</i>	7 (46.7%)	8 (53.3%)	15.167 (3.239-71.016)	16.347	1	<0.001
<i>Never had sex</i>	3 (5.5%)	52 (94.5%)				
Have obtained oral contraceptives						
<i>Sexually active</i>	2 (13.3%)	13 (86.7%)	8.308 (.699-98.773)	3.810	1	0.051
<i>Never had sex</i>	1 (1.8%)	54 (98.2%)				

Study participants who reported having sex were significantly more likely to report having tried cigarettes, smoking cigarettes regularly, and drinking alcohol regularly compared to other study participants. A greater proportion of those who have had sex also reported having tried alcohol and other drugs, however these differences were not statistically significant.

Table 25. Substance use: sexually active vs. not sexually active

	Yes N (%)	No N (%)	OR	Chi square	df	p-value
Have smoked a cigarette						
Sexually active	11 (73.3%)	4 (26.7%)	5.211 (1.460-18.595)	7.240	1	0.007
Never had sex	19 (34.5%)	36 (65.5%)				
Smoke cigarettes regularly						
Sexually active	3 (20.0%)	12 (80.0%)	13.500 (1.290-141.275)	7.231	1	0.007
Never had sex	1 (1.8%)	54 (98.2%)				
Have tried alcohol						
Sexually active	14 (93.3%)	1 (6.7%)	5.250 (.634-43.466)	2.838	1	0.092
Never had sex	40 (72.7%)	15 (27.3%)				
Drink alcohol regularly						
Sexually active	7 (46.7%)	8 (53.3%)	3.500 (1.043-11.744)	4.387	1	0.036
Never had sex	11 (20.0%)	44 (80.0%)				
Have tried other drugs						
Sexually active	2 (13.3%)	13 (86.7%)	8.308 (.699-98.773)	3.810	1	0.051
Never had sex	1 (1.8%)	54 (98.2%)				
Use other drugs regularly						
Sexually active	0	15 (100%)				
Never had sex	0	55 (100%)				

The responses to questions regarding sexual activity from each of the 15 participants who report having had sex are detailed in Table 26 and summarized in Figures 4-7. Respondents reported ages of onset of sexual intercourse between 12 and 17 years, with the majority occurring at age 16 years or later. All of the students from Piedad who reported having had sex did so at the age of 17. Most students reported having sex monthly or less, however this ranges up to three times per week or more. More youths reported condom use compared with oral contraceptives, and the rate with which either is used varied by individual. Adequacy of contraception, defined as a participant responding that he/she uses either condoms *or* oral contraceptives “Always,” was achieved by half of this group.

Table 26. Profiles of students who report having had sexual intercourse*

Subject	Gender	School	Frequency	Uses condoms	Uses OCPs	Contraception
7	F	Guadalupe	Twice per week	Always	Never	Adequate
12	F	Guadalupe	Once a month or less	Always	Never	Adequate
14	M	Guadalupe	2-4 times per month	Always	Always	Adequate
17	M	Guadalupe	Once a month or less	Most of the time	Never	Inadequate
18	M	Guadalupe	Once a month or less	Most of the time	Never	Inadequate
22	M	Guadalupe	3 times per week or more	Sometimes	Never	Inadequate
24	M	Guadalupe	2-4 times per month	Most of the time	Rarely	Inadequate
25	F	Guadalupe	Once a month or less	Always	Never	Adequate
26	F	Guadalupe	Once a month or less	Most of the time	Never	Inadequate
28	M	Guadalupe	Once a month or less	Always	Always	Adequate
30	M	Guadalupe	Twice per week	Most of the time	Never	Inadequate
34	F	Guadalupe	omitted	Always	Never	Adequate
39	F	Piedad	2-4 times per month	Always	Never	Adequate
40	F	Piedad	omitted	omitted	omitted	omitted
53	M	Piedad	Once a month or less	Sometimes	Never	Inadequate

*Adequate contraception defined as using either condoms OR oral contraceptives "Always"

Figure 3. Respondent age at first intercourse

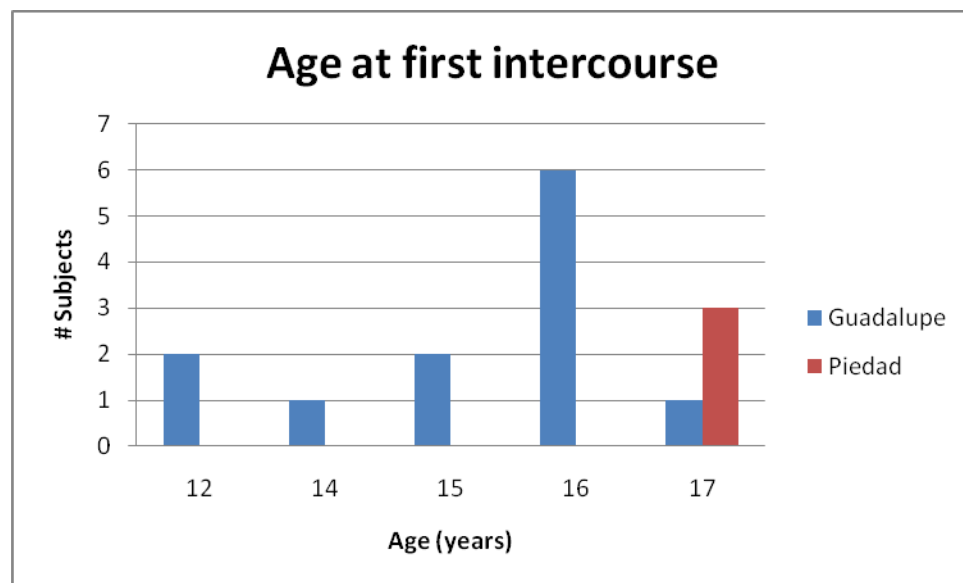


Figure 4. Frequency of sexual intercourse

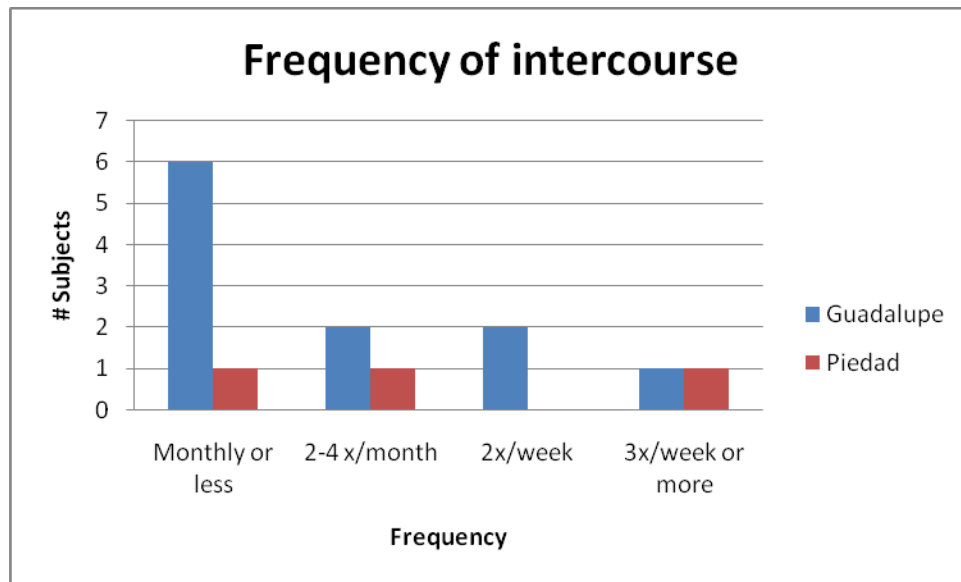


Figure 5. Adequacy of contraception use

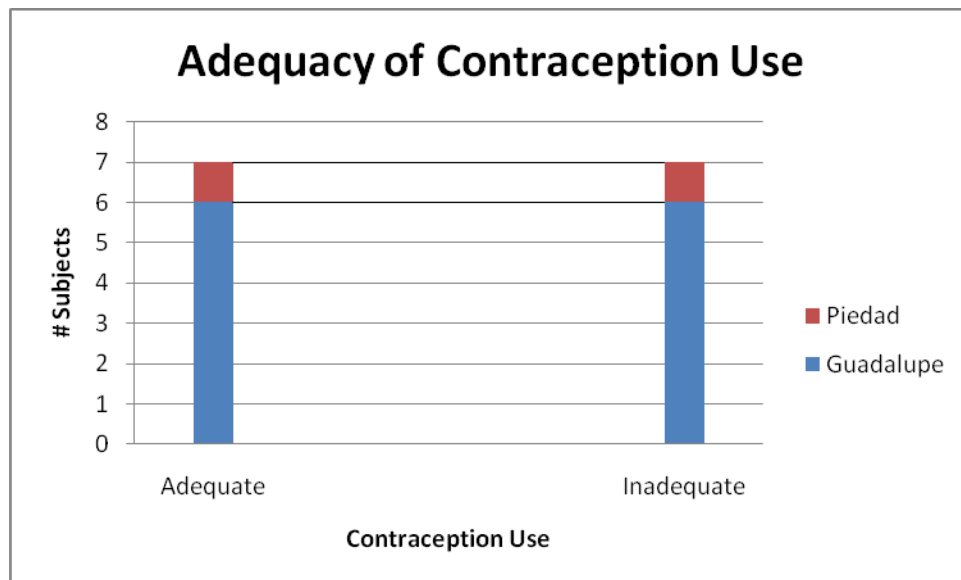
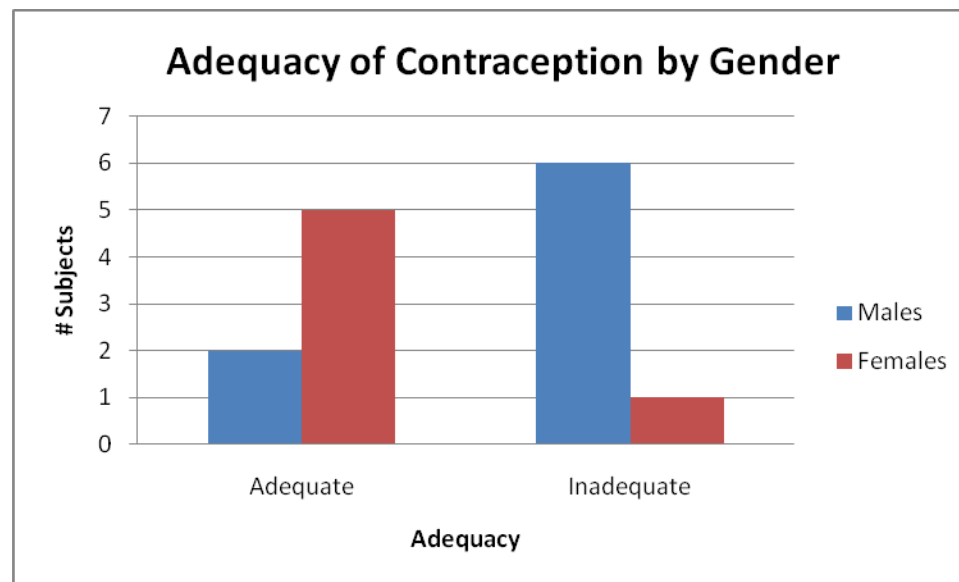


Figure 6. Adequacy of contraception use by gender



Gender Differences

Male and female participants exhibited several significant differences in survey responses. Although they had similar scores on the knowledge section as well as on the scale for perceived ability to talk about sex, pregnancy and contraception, males and females differed in other questions assessing attitude towards sex and contraception. Males showed significantly lower rates of being able to tell their partner they did not want to have sex or to stop touching them sexually, and to insist on using contraception. Males had a significantly higher rate of agreement that having sex makes a boy or girl their age popular. No significant differences were found between males and females rates of substance abuse by friends and family members or in their mean desired age at first pregnancy.

Table 27. Gender differences: Knowledge

	Mean (SD)	t-test	df	p-value
Mean knowledge test score				
<i>Male</i>	0.63 (.143)	1.257	70	0.231
<i>Female</i>	0.67 (.135)			

Table 28. Gender differences: perceived ability to discuss sex, pregnancy, and contraception

	Mean (SD)	t-test	df	p-value
Scale: could talk about sex, pregnancy, contraception				
<i>Male</i>	21.6 (4.499)	0.088	66	0.930
<i>Female</i>	21.5 (4.797)			

Table 29. Gender differences: Attitudes

	Agree N (%)	Disagree N (%)	OR (95% CI)	Chi square	df	p-value
Could tell partner that they did not want to have sex						
Male	25 (80.6%)	6 (19.4%)	9.360 (1.063-82.450)	5.583	1	0.018
Female	39 (97.5%)	1 (2.5%)				
Could tell partner to stop touching them sexually						
Male	23 (74.2%)	8 (25.8%)	6.609 (1.290-33.855)	6.248	1	0.012
Female	38 (95.0%)	2 (5.0%)				
Would insist on using contraception						
Male	29 (90.6%)	3 (9.4%)		3.818	1	0.051
Female	39 (100.0%)	0 (0%)				
Would not feel embarrassed buying condoms						
Male	20 (62.5%)	12 (37.5%)	1.232 (.476-3.190)	0.185	1	0.667
Female	23 (57.5%)	17 (42.5%)				
Would not feel embarrassed buying birth control pills						
Male	20 (62.5%)	12 (37.5%)	.897 (.341-2.359)	0.048	1	0.826
Female	26 (65.0%)	14 (35.0%)				
Agrees that having sex makes a boy popular						
Male	7 (21.9%)	25 (78.1%)		9.692	1	0.002
Female	0 (0%)	40 (100%)				
Agrees that having sex makes a girl popular						
Male	7 (21.9%)	25 (78.1%)	.092 (.011-.790)	6.757	1	0.009
Female	1 (2.5%)	39 (97.5%)				
Agrees that having sex at my age is a common thing for a boy to do						
Male	19 (63.3%)	11 (36.6%)	.395 (.147-1.063)	3.443	1	0.064
Female	15 (40.5%)	22 (59.5%)				
Agrees that having sex at my age is a common thing for a girl to do						
Male	17 (58.6%)	12 (41.3%)	.430 (.159-1.161)	2.819	1	0.093
Female	14 (37.8%)	23 (62.2%)				

Table 30. Gender differences: Mean score on scale of substance use by close contacts

	Mean (SD)	t-test	df	p-value
Scale: Substance use by friends, household members				
<i>Male</i>	12.1 (5.515)	1.141	70	0.258
<i>Female</i>	10.6 (5.688)			

Table 31. Gender differences: Age desired at first pregnancy

	Mean (SD)	t-test	df	p-value
Age desired at first pregnancy				
<i>Male</i>	26.77 (3.879)	1.215	68	0.228
<i>Female</i>	25.49 (4.773)			

Males and females differed in some behaviors as well. Males were significantly more likely to report having bought condoms or oral contraceptives compared to female respondents. Both genders had a similar rate of reporting having had sexual intercourse, with males reporting a lower age of onset compared to females; however this difference was not statistically significant. Females showed a significantly higher rate of practicing adequate contraception compared to males. Both genders had similar rates of trying cigarettes, alcohol, and other drugs, however males were significantly more likely to smoke cigarettes and drink alcohol regularly.

Table 32. Gender differences: Behaviors

	Yes N (%)	No N (%)	OR (95% CI)	Chi square	df	p-value
Know where to buy condoms						
Male	31 (96.9%)	1 (3.1%)	.795 (.048-13.224)	0.026	1	0.873
Female	39 (97.5%)	1 (2.5%)				
Know where to buy oral contraceptives						
Male	28 (87.5%)	4 (12.5%)	.184 (.020-1.739)	2.651	1	0.103
Female	38 (97.4%)	1 (2.6%)				
Have bought condoms						
Male	9 (29.0%)	22 (71.0%)	15.545 (1.844-131.031)	9.881	1	0.002
Female	1 (2.6%)	38 (97.4%)				
Have obtained oral contraceptives						
Male	3 (9.7%)	28 (90.3%)		4.042	1	0.044
Female	0 (0%)	40 (100%)				
Have had sexual intercourse						
Male	7 (21.9%)	25 (78.1%)	1.085 (.346-3.403)	0.02	1	0.889
Female	8 (20.5%)	31 (79.5%)				
Adequacy of contraception						
Male	2 (25.0%)	6 (75.0%)	.067 (.005-.970)	4.667	1	0.031
Female	5 (83.3%)	1 (16.7%)				

Table 33. Gender differences: Mean age at first intercourse

	Mean (SD)	t-test	df	p-value
Age at first intercourse				
<i>Male</i>	14.7 (2.138)	1.785	13	0.098
<i>Female</i>	16.1 (0.641)			

Table 34. Gender differences: Substance use

	Yes N (%)	No N (%)	OR (95% CI)	Chi square	df	p-value
Have smoked a cigarette						
Male	15 (48.4%)	16 (51.6%)	1.563 (.603-4.047)	0.848	1	0.357
Female	15 (37.5%)	25 (62.5%)				
Smoke cigarettes regularly						
Male	4 (12.9%)	27 (87.1%)		5.469	1	0.019
Female	0 (0%)	40 (100%)				
Have tried alcohol						
Male	26 (83.9%)	5 (16.1%)	1.972 (.605-6.433)	1.294	1	0.255
Female	29 (72.5%)	11 (27.5%)				
Drink alcohol regularly						
Male	11 (35.5%)	20 (64.5%)	2.593 (.864-7.777)	2.985	1	0.084
Female	7 (17.5%)	33 (82.5%)				
Have tried other drugs						
Male	2 (6.5%)	29 (93.5%)	2.690 (.233-31.109)	0.674	1	0.412
Female	1 (2.5%)	39 (97.5%)				

Discussion

Demographic Characteristics

In terms of the demographic information collected, the intervention group, which was exposed to the education initiative, and the control group which was not, are reasonably well matched. No significant variance was found between the two groups in gender, age, grade, average household size, household level of education, presence of both parents in the household, or average age of mother at participant's birth. There was a significant difference, however, in religion between the two groups; students from Guadalupe were predominantly Catholic, while students from Piedad were mainly non-Catholic Christians. This is an expected divergence given that Guadalupe is a public high school, representing the general population of a Catholic country, whereas Piedad is a private school sponsored by an Evangelical organization, thus more likely to draw a disproportionate amount of non-Catholic Christian students.

Although the two groups did not differ significantly in almost all demographic measurements, it is likely that the two groups had important differences at the outset which were difficult to measure objectively. Piedad is not only a private school, but a religious school with the expressed mission of combating social problems in Costa Rican youth. It therefore differed at baseline from Guadalupe in two ways. First, Piedad implements programs outside of traditional academics, including religious services, parental counseling, and providing free lunch for students. These are initiatives intended to decrease

problem behaviors such as truancy, violence, and substance use, and to encourage academic success; the comparative lack of such programs at Guadalupe creates the potential for a significant difference in students' behavior between the two schools. Second, given Piedad's mission and religious affiliation, it likely draws students from families who are more concerned with preventing social problems such as violence and delinquency in their children, and/or have a stronger connection to religion and wish it to be a part of their child's education. Therefore this population of students may be more protected from exhibiting high-risk behaviors compared to students attending public school.

As discussed earlier, research has shown that the culture of a school in terms of its policies and the support it provides students can be more powerful than directed interventions in shaping students' health-related behaviors. In addition, religion has also been shown to be a protective factor for adolescent health, linked to greater academic success and lower rates of early sexual activity and substance use. It is problematic, therefore, that the control group in this study consisted of students at a private Christian high school which likely had inherent differences compared to the intervention group from the public high school. Therefore this discussion will heretofore discontinue the comparison of these two groups as "control" and "intervention," because they cannot be described as such. However there is interesting information to be gleaned about the differences between these two groups of students coming from different environments and how they relate to the knowledge, attitudes and behaviors surrounding sexual health. This discussion will focus on those differences and

how they may be used to plan further adolescent pregnancy prevention programming.

Knowledge

The knowledge assessment section of the survey contained twelve questions drawn from the exam given to students who participated in the education intervention on topics covered during the lecture series. The original examination used open-ended questions, which for the purposes of data standardization, were converted to multiple choice in the survey tool. Students' responses on the original test given during the intervention were unavailable, so their level of knowledge at that time could not be assessed for the purposes of comparison in the present study. However it is known that the intervention group was, at the very least, exposed to the information necessary to correctly answer the questions on sexual health in the knowledge portion of the survey. The control group was not exposed to the education intervention, and also had no formal sexual health curriculum during school. However, it is not known what other sources of sexual health information any of the students did have.

The students from Piedad had a mean overall score of 69% correct on the knowledge portion of the survey, significantly higher than the Guadalupe's mean score of 62%. On only three out of the twelve questions did a greater proportion of Guadalupe students answer correctly than Piedad, and none of those three showed a significant difference between the groups. The remaining nine questions each revealed a greater percentage of youths from Piedad responding

correctly, with a significant difference compared to Guadalupe in four of those questions.

The poorest overall performance was in response to the first question, *“Which method is most effective for preventing pregnancy AND sexually transmitted infections?”* with 20.6% of respondents from Guadalupe and 21.1% from Piedad answering correctly. Most likely this had to do with confusing answer choices, as the correct response was “condoms AND oral contraceptives,” however “condoms” and “oral contraceptives” were each separate choices as well. While condoms alone would have been a reasonable response since they do protect against both pregnancy and STIs, the *most effective method* is the combination of condoms and oral contraceptives. Because this analysis only had access to the survey results, not the surveys themselves, it cannot be determined what answers the participants did choose, only whether or not they chose correctly. However, high numbers from both groups responded correctly to the question *“What do condoms protect against?”* (Guadalupe 91.2%, Piedad 89.5%), so it is reasonable to conclude that the respondents did understand that condoms protect against both pregnancy and STIs, however they did not seem to know that adding oral contraceptives would be more effective for pregnancy prevention than condoms alone.

Students from Guadalupe performed significantly poorer on the question *“At what point in the menstrual cycle is a woman most likely to become pregnant?”* (23.5%, versus Piedad 52.6%), but actually had slightly better performance on the related question, *“At what point in the menstrual cycle is a*

woman least likely to become pregnant?” (64.7% versus Piedad 55.3%).

Guadalupe students also slightly out-performed Piedad on the question,

“True/False: If a woman uses the rhythm method correctly, it is impossible for her to become pregnant,” (61.8% and 52.6%, respectively). The two groups

responded similarly to *“For which type of woman is the rhythm method most effective?”* (Cornado 67.6%, Piedad 63.2%). It is concerning that young people

lack a thorough understanding of the underlying physiology and appropriate use of the rhythm method of contraception. Perhaps most concerning is that almost

half of all participants responded that the rhythm method, if used properly, is guaranteed to prevent pregnancy. First of all, most respondents indicated in the earlier questions that they would not be able to properly implement this method.

Secondly, even when it is used correctly this method results in a higher rate of pregnancy in adolescent populations compared to using condoms or oral contraceptives. Students clearly need to be better educated about the rhythm method.

Participants had varied responses to questions assessing what actions can result in a pregnancy. Guadalupe students scored significantly lower than

Piedad on the question, *“True/False: It is possible for a woman to become pregnant from having sex even if the penis is removed from her vagina before ejaculation,”* (44.1% and 78.9%, respectively). This is worrisome because it is

important for young people to understand that coitus interruptus is not an

effective method of contraception. Students from both schools had excellent

rates of correct responses to *“True/False: It is possible for a woman to become*

pregnant if a man ejaculates in her mouth,” (Guadalupe 91.2%, Piedad 94.7%).

This demonstrates that the students understand some details about sex and conception, mainly that pregnancy will not occur unless sperm is deposited in the vagina. However many students miss important details, in this case the fact that sperm can be released prior to ejaculation, making coitus interruptus an ineffective method of contraception.

Participants from both groups had similar high rates of correct responses to the question, *“True/False: Pregnancy and delivery are more dangerous for females under 18 years of age than for those who are older,”* (Guadalupe 91.2%, Piedad 81.6%). It is important that adolescents understand that teen pregnancy not only causes a variety of social difficulties, but also carries physical risks compared to delaying childbearing until adulthood.

Students from Piedad exhibited significantly superior knowledge about sexually transmitted infections compared to students from Guadalupe. In response to *“True/False: You can tell if a person has HIV by looking at them,”* 97.4% of respondents from Piedad answered correctly, compared to only 79.4% from Guadalupe. Only 35.3% of Guadalupe students answered the following correctly: *“True/False: It is possible for a person to have an STI like gonorrhea or Chlamydia without any symptoms,”* compared to 57.9% of Piedad students. Both groups performed similarly in response to the final question: *“True/False: A person can contract an STI by having oral sex,”* (Guadalupe 78.9%, Piedad 76.4%). Overall a sizable portion of participants believed that they would be able to tell if another person, or they themselves, had a sexually transmitted infection.

This belief is not only incorrect but dangerous if it leads the adolescent to falsely judge their risk of contracting or spreading an STI.

There are many possible explanations for the findings that students from Piedad performed better on the knowledge portion of the questionnaire than students from Guadalupe. Perhaps the two groups had different baseline levels of knowledge about sexual health. Although no formal sexual health education exists at either school, it is possible that students have other sources of information such as parents, siblings, friends, magazines, and the Internet. Participants were not questioned about their sources of sexual health information, so whether or not the either group had greater access to or use of such information could not be determined. It is possible that the students at Piedad are simply more adept at taking multiple choice tests. A known difference between the groups was that the students from Guadalupe participated in IHCAI's peer health education initiative two to three years earlier, however if this were the only major difference between the two groups one would expect Guadalupe to have the better performance. Unfortunately this analysis did not have access to the students' test results from the time of the intervention, so it is impossible to assess whether the education intervention itself impacted students' knowledge.

An important finding overall is the general lack of basic knowledge about sexual health across all respondents. In order to prevent adolescent pregnancy, young people must be given proper tools, and a necessary tool is the knowledge about how pregnancy occurs and what methods can be employed to avoid it.

Understanding the causes and risks of STI transmission are equally important in preserving adolescent health. The results of this section of the survey indicate that there is a need for further education to improve the sexual health knowledge of students at both schools studied.

Attitudes

An important aspect of teen pregnancy prevention is providing pathways for youth to obtain accurate information and sound advice about sexual health. In order to do so they must be able to talk about topics of sex, pregnancy and contraception with people in their life. Survey respondents were asked whether they could discuss these subjects with parents, friends, and significant others to assess the availability of such pathways to information. The survey data revealed no significant difference between the schools in response to questions asking if they would be able to discuss sex, risk of pregnancy, or contraception with friends, parents, or partners. There was one notable exception: significantly more students from Piedad responded that they could talk about sex with their parents (81.6%) than did students from Guadalupe (51.5%). This could indicate that students at Piedad come from families in which there is more open communication between parents and children. It may be that families with such communication styles are more likely to send their children to Piedad, or that the services Piedad offers to families have helped to facilitate that communication.

Overall the majority of participants responded that they would be able to discuss sex, pregnancy and contraception with friends, parents or partners.

Respondents were more likely to report being able to discuss risk of pregnancy and contraception than sex, and a greater number responded that they could discuss such topics with friends and partners than with parents. This is reassuring information as it is important for adolescents to be able to discuss these topics in order to obtain information that will aid them in making decisions about their own sexual activity. While parental support and involvement is undoubtedly important in encouraging safe sexual health practices, these data show that adolescents feel more comfortable discussing sexual health with their peers. This finding supports the peer-led sexual health education model as a way to provide adolescents with accurate information to help them make good decisions surrounding sex.

All participants from Piedad responded that they could tell their partner they did not want to have sex, and that they would insist on using contraception even if their partner did not want to (compared to Guadalupe 79.4% and 90.9%, respectively). This pattern of responses indicates the presence of strong values of standing up for oneself in sexual decision making in the Piedad group. Respondents from both groups had similar rates of reporting that they would feel embarrassed buying condoms and birth control pills, ranging from 30-42%. This is an important obstacle to consider in encouraging adolescents to practice safe sex.

The dramatic difference in students' attitudes about sexual activity in their age group illustrates a significant difference in the culture and values of the two schools. No students from Piedad agreed that having sex makes a boy or a girl

popular, compared to 20.6% and 23.5%, respectively, of students from Guadalupe. The difference between groups was equally significant in those who agreed that having sex is a common thing for a boy or a girl their age to do; 38.2% and 33.3%, respectively, of Piedad students agreed compared to 63.6% and 60.6% at Guadalupe. Furthermore, 50% of Guadalupe respondents believed more than half of their friends have had sexual intercourse, compared to 18% of those from Piedad. Piedad seems to be an environment where no one believes that having sex will lead to popularity, and few believe that others their age are having sex anyway. Such a culture likely encourages adolescents to delay onset of sexual activity.

Participants were asked about the behaviors of their friends and household members to better understand their environmental influences. Students from Guadalupe reported having more friends who have smoked a cigarette, tried alcohol, and who smoke or drink regularly compared to Piedad. Few youth from either group reported having friends who have tried other drugs or use drugs regularly. Guadalupe respondents also report greater numbers of household members who smoke cigarettes and drink alcohol regularly compared to those from Piedad. These data further illustrate the difference in environment between the two groups; students from Piedad are exposed to less substance use in their daily lives through friends and family than are students from Guadalupe. This environment likely contributes to an expectation of making healthy life choices, including delaying onset of sexual activity and using safe sexual practices once they do begin having sex.

The final question in the survey section on attitudes toward sexual health asks participants what age they would like to be when they become pregnant, or cause their partner to become pregnant, for the first time. The groups produced very similar mean ages of about 26 years of age. It is important to know that overall the students do not desire pregnancy during adolescence, which is an essential part of preventing teen pregnancy. The goals of an intervention, therefore, can be focused on helping these young people to avoid pregnancy before their ideal age, rather than changing their minds about what age is ideal for a pregnancy.

Behaviors

Respondents from Guadalupe and Piedad reported similar rates of having talked about sex with their friends (88.2% and 81.6%, respectively) and partners (55.9% and 58.3%, respectively). The lower rate of talking about sex with partners may be due to the fact that the survey did not account for adolescents who have never had a boyfriend or girlfriend, and thus those who responded that they have *not* talked with their boyfriend/girlfriend about sex may simply have never had a boyfriend/girlfriend. The groups also differed in reporting having talked with their parents about sex: 61.8% from Guadalupe compared to 73% from Piedad. A significantly greater number of Piedad students also reported that they felt comfortable discussing sex with their parents: 79.2% versus only 45% of Guadalupe students. These data adds to the evidence that youth from Piedad have a different family environment with increased communication compared to those from Guadalupe. Despite the educational intervention at Guadalupe which

may have encouraged students to discuss the sexual health topics taught with friends, partners, and parents, there seems to be a greater difference in family environment between students at the two schools which allows those from Piedad to be more open with their parents specifically.

Significantly more students from Guadalupe report having had sexual intercourse (36.4%) compared to Piedad (7.9%). This is not surprising as the students at Piedad have fewer risk factors for early onset of sexual activity, such as substance use, and exhibit more protective factors, namely communication with parents. Any pregnancy prevention intervention should focus on delaying the onset of sexual activity and encouraging contraceptive use following its onset.

Significantly greater numbers of respondents from Guadalupe report having bought condoms compared to Piedad (27.3% and 2.7%, respectively) and a slightly greater number also report having obtained oral contraceptives (5.9% and 2.7%, respectively). This is to be expected as a greater number of students from Guadalupe have had sex, and thus would have reason to acquire these methods of contraception. It is concerning that within each group, fewer students have obtained either method of birth control than have had sexual intercourse. One could argue that it is possible that their sexual partners have been the ones to obtain contraceptives instead of the respondents themselves; however it is more likely that many are simply having unprotected sex. Fortunately, no respondents from either group reported ever having been pregnant or

impregnated their partner, so up until this point they have avoided one harmful consequence of inadequate contraceptive use.

Substance use is a major risk factor for early onset of sexual activity and for adolescent pregnancy, so it was important to assess rates of substance use in the study population. Participants from Guadalupe had significantly higher rates of substance use compared to Piedad: more students have smoked a cigarette (57.6% versus 28.9%), smoke cigarettes regularly (12.1% versus 0%), have tried alcohol (97% versus 60.5%), drink alcohol regularly (42.4% versus 10.5%), and have tried other drugs (9.1% versus 0%). The prevalence of alcohol use, whether regular or not, is quite high in the Guadalupe group where nearly all respondents have at least tried it. Again a significant difference is evident between the two groups, as Piedad students continue the trend of making healthier lifestyle choices compared to those from Guadalupe.

Sexually Active Subset

The participants who reported having had sexual intercourse were analyzed as a group to determine what characteristics they shared that may be related to early sexual activity. As discussed earlier, respondents who have had sex were more likely to attend Guadalupe than Piedad. In addition, they had a significantly higher mean age compared to respondents who had not had sex, which is to be expected as rates of sexual activity increase with age. Participants who had not had sex showed slightly higher rates of living with both parents and identifying as non-Catholic Christian, characteristics which were also linked to

attending Piedad. As for the rest of the demographic measurements, no significant difference in household level of education, household size, or maternal age at student's birth was apparent between respondents who have had sex and those who have not.

The sexually active students showed no difference in their scores on the knowledge portion of the survey compared to other respondents, each with a mean score around 65%. One would hope that young people engaging in sexual activity would have adequate knowledge about sexual health, including understanding proper methods of contraception. It would make sense, also, that students who are sexually active would be more likely to seek out such knowledge and would therefore have higher scores compared to other students on the knowledge section. Unfortunately both groups displayed a fundamental lack of understanding in some or all areas of sexual health information, an important study finding that should motivate educators to seek ways to improve students' knowledge of the subject.

Sexually active respondents reported a similar mean age desired at their first pregnancy as the rest of respondents (about 26 years), indicating that although they are sexually active they do not want or intend to become pregnant during adolescence. Interestingly, participants who have had sex differed from those who have not by responding at a lower rate that they would insist on using contraception even if their partner did not want to (86.7% and 98.2%, respectively). For the purpose of preventing adolescent pregnancy, it is most important for the students who do have sex to insist on using contraception. The

fact that fewer of these adolescents would insist is concerning, and perhaps reflects a more idealized perception of respondents who have not had sex about how easy it would be to insist on using contraception. Those who have been in the situation where a partner refuses may recognize that it can be quite difficult to be adamant about using contraception. This reality reinforces how important it is to not only teach young people information about sexual health, but also to give them the tools they need to stand up for themselves in sexual situations. In implementing an effective pregnancy prevention program for adolescents, it will be necessary to go beyond lectures giving information and to incorporate other skill-building exercises to empower students.

Sexually active students showed significantly different attitudes toward sexual activity in their age group; these adolescents were much more likely to agree that having sex makes a boy or a girl popular and is a common thing for boys and girls their age to do. They were also much more likely than other respondents to report that they believed more than half of their friends have had sex. These findings could be a result of differences in peer groups; sexually active youths are more likely to be friends with other sexually active youth, and thus projecting from their own peers they may assume that sexual activity is common in all people their age. These adolescents may also be more likely to believe that sexual activity is linked to popularity; whether this was an influence which encouraged them to become sexually active or if their own sexual activity led to this belief is not known.

Sexually active respondents showed similar rates as others of having talked about sex with friends and parents, but significantly higher rates of having talked to their partner about sex. This is not surprising since the sexually active adolescents must have a partner to talk to, whereas the other respondents may have a lower rate since some have never had a significant other. It is important to note that about two-thirds of both groups have talked with their parents about sex, leaving one-third in need of other sources of information. It is therefore important to provide other pathways to information about sexual health. The peer-taught education program is a good option for this group which seems more comfortable discussing sex with people their own age.

Substance use in respondents themselves and in their family and friends was significantly higher for students who have had sex than for those who have not. This comes as no surprise since substance use is a known risk factor for early onset of sexual activity. This raises the point that it would be prudent to incorporate substance use prevention as part of an adolescent pregnancy prevention initiative.

The fifteen respondents who reported having had sex were examined in more detail to evaluate their risk for adolescent pregnancy. The students varied substantially in age at onset of intercourse, from 12 to 17 years. About half of the group began having sex at age sixteen or later, and notably all three sexually active students from Piedad began at age seventeen. Sexually active respondents also had a wide range of frequency of intercourse; about half reported having sex monthly or less, and the other half ranged from two times

per month to three times per week or more. Condoms were the most frequently used method of contraception, with oral contraceptives used only by a few respondents. Adequacy of contraception was assessed by looking at each individual's use of condoms and/or birth control pills; adequate contraception was defined as using either condoms or oral contraceptives "Always," as these are the most effective ways to prevent pregnancy. Using both condoms and oral contraceptives "Most of the time," "Sometimes," "Rarely," or "Never" was considered inadequate. Of the fourteen participants who responded to the questions about contraceptive use, only seven met the criteria for adequate contraception. Therefore 50% of the sexually active adolescents in this study are putting themselves at risk for pregnancy, a finding that is quite concerning. Equal proportions of students from Guadalupe and Piedad fell into each category, so despite the inherent differences between the groups and the exposure of Guadalupe students to the education intervention, they both face the same problem of inadequate contraception. However, since Piedad has fewer students who are sexually active, overall this group has a lower risk of adolescent pregnancy despite inadequate contraceptive use. These findings illustrate the need for behavior modification to increase adequate contraception in order to decrease the risk of adolescent pregnancy.

Gender Differences

Males and females exhibited some interesting differences in their responses to the survey questions. They produced similar scores on knowledge, and predicted similar rates of being able to discuss sex, pregnancy, and

contraception. They did differ significantly, however, in the ability to stand up to a sexual partner. Males reported significantly lower perceived ability to tell their partner they did not want to have sex, to ask a partner to stop touching them sexually, and to insist on using contraception even if their partner did not want to. These findings are likely influenced by the Latin American culture of machismo which puts pressure on males to behave in a traditional masculine way, and turning down sex would not be considered very masculine. This rationale is consistent with the fact that significantly more males than females in the study agreed that having sex makes a boy or a girl popular. These findings make it clear that pregnancy prevention programs must focus on helping males as well as females in building the skills to stand up for themselves to make healthy choices in sexual situations.

Males and females also differed in their behaviors. Males were much more likely to have obtained condoms and oral contraceptives than females (interestingly enough, no females had ever obtained birth control pills whereas 9.7% of males had). Males therefore seem to be the ones in charge of obtaining the means for adequate contraception. Pregnancy prevention programs thus should focus on impressing upon these males the importance of contraception as they seem to almost play the role of gatekeeper, but the programs also should seek to remove social barriers for females to obtain contraceptives themselves.

Although it was largely males in the study group who obtained contraceptives, females clearly had methods of ensuring contraceptive use because they had significantly higher rates of adequate contraception (using

either condoms or birth control pills “Always”) compared to males. Females also had a higher mean age of onset of sexual activity, 16.13 years compared to 14.71 years for males. Not surprisingly, males also showed higher rates of smoking cigarettes and drinking alcohol regularly, known risk factors for earlier onset of sexual activity.

Study Limitations

The most important limitation in this study was the overall retrospective cohort study design. Since the aim of the study was to assess the effectiveness of the peer-led sexual health education intervention from 2006 and 2007, it would have been ideal to use a prospective cohort study design implemented during the intervention period. By looking back at the intervention, important questions could not be answered, such as the level of knowledge prior to the intervention, and how that level changed during and after the intervention. Similarly, the baseline attitudes and behaviors of the students are unknown, so assessing their current attitudes and behaviors cannot determine whether or not these changed in response to the intervention. Finally, the limited nature of the intervention itself makes it difficult to detect its effects two to three years after it took place.

To compensate for the adolescents' unknown baseline prior to intervention, a control group of youth, matched by age and geography but who had not been exposed to the intervention, was chosen for the purposes of comparison. Unfortunately the adolescents in the control group differed in an important way from those in the intervention group: they attended a private Evangelical school, whereas the intervention group came from a public school. The groups likely had different values surrounding sexual health at baseline as well as different risk factors for adolescent pregnancy; thus the presence or absence of the educational intervention could not be the only factor responsible for the differences between the two groups found in this study.

Selection bias may have also been present as only students who returned a signed parental permission form were permitted to take the survey. Therefore motivated and responsible students would be more likely to be included in the respondent group than students who are less motivated and/or responsible. Also, students whose parents are more available and involved in the education may be more likely to return the permission forms. In ethical research with adolescent participants, this is an unavoidable limitation.

Recommendations

Although this study was unable to accurately assess the effectiveness of IHCAI's peer-led educational intervention in 2006 and 2007, it did identify several areas where prevention efforts are needed. Adolescents from both the control and intervention groups displayed a lack of important knowledge about contraception and sexually transmitted infection, demonstrating a need for an education program. Attitudes that having sex makes a boy or girl popular were fairly prevalent, indicating that efforts to change the youth culture that supports such beliefs would be valuable. Many youth professed an uncertainty that they would be able to "say no" to sex or to insist on using contraception, displaying a need for skill building as part of a pregnancy prevention program. Only half of the sexually active participants were found to use adequate contraception, thus demonstrating a significant risk of pregnancy in this population. It is clear that these young people are in need of some sort of program to address this risk. Even though the exact impact made by IHCAI's intervention in 2006 and 2007 is unknown, areas for improvement can still be identified, and the program should be reinstated with those improvements.

IHCAI has provided a good foundation from which to build an effective adolescent pregnancy prevention program. First, it has developed relationships with schools in the community and identified adolescent leaders. In addition, it has developed a curriculum of important information that needs to be communicated to adolescents. Finally, with this study it has also laid the groundwork for continuous assessment of the program's effectiveness.

Earlier in the *Background* chapter under the section *Pregnancy Prevention Programs*, ten qualities of effective programs were listed. The initiative by IHCAI met many of these criteria, including training peers who believed in the program they were implementing, giving a clear message about sexual activity and contraceptive usage and continually reinforcing that message, and providing basic, accurate information about the risks of teen sexual activity and about methods of avoiding intercourse or using protection against pregnancy and STDs. If this program is to be reestablished, it should be improved so that it meets these ten criteria. The program should be focused on reducing one or more risky sexual behaviors, as this would provide an overall goal and promote consistency in programming. In addition to lectures, this program should employ a variety of teaching methods designed to involve the participants and have them personalize the information. In addition to providing information, the program should include activities that address social pressures that influence sexual behavior and should provide modeling and practice of communication, negotiation, and refusal skills. It should also be based on research that identifies the important determinants of risky sexual behavior, such as substance use, and targets those determinants as well. Lastly, the program duration needs to be a sufficient length of time to complete activities adequately. In the past, peer educators spent one day a year giving lectures at each of the schools; this is not an adequate amount of time for the program to really be effective. It would be preferable to spread program time out through the school year, perhaps meeting

once per month, to ensure consistent reinforcement of the information and skills provided through the program.

Out of the three successful pregnancy prevention programs discussed in the *Background* chapter, the one which meets all ten criteria for an effective program and would be best implemented in the Purral community is *Choose Life*. This program would fill in the gaps in IHCAI's original initiative, most notably because it would provide at least twelve lessons. This lengthened program would assure reinforcement of the teachings over the course of the year, instead of only offering information once each year. *Choose Life* also incorporates a variety of teaching methods including storytelling, group discussion, and skill-building activities in addition to lectures. It provides opportunities for students to practice communication, negotiation, and refusal skills to prepare them to deal with social pressures.

Choose Life has not yet been adapted in a Spanish-speaking country, so if it is to be used in the Purral community it will need to be translated into Spanish. In addition some other modifications of the stories or activities may be required to adapt it to Costa Rican culture. Programmers would also need to decide whether or not to incorporate the biblical passages and religious teaching, which are an optional piece of the *Choose Life* curriculum. Since IHCAI has already established relationships with the schools of Purral, so much of the work for implementing a new program is complete. The next steps, if they so choose, would be to modify the *Choose Life* program for use in the Purral community and then train the youth leaders to teach the lessons.

Finally, in preparing to reinstate a pregnancy prevention program in the Purral community, it will be important to plan for future assessment of the program's efficacy so that it can be continually improved to meet the community's needs. Organizers should plan a standardized assessment of the students' knowledge, attitudes, and behaviors prior to initiation of any programming. The questionnaire used in this study could be an effective tool for this task. Such assessments should be repeated during the intervention and following the program's completion to determine what effect the program has had and how it may need to be modified.

Conclusions

The original hypothesis, that students exposed to the peer-led sexual health education intervention would have increased sexual health knowledge, more positive attitudes toward healthy sexual practices, and would exhibit fewer risky behaviors than controls, was not borne out by the results of this study. In fact, the group from Piedad which had not been exposed to the intervention under investigation exhibited greater sexual health knowledge, more positive attitudes toward healthy sexual practices, and fewer risky behaviors. These findings indicate inherent differences between the control and intervention groups aside from exposure to the educational intervention. In addition, the education intervention was limited in its scope, taking place for only one day in each the years 2006 and 2007, two to three years prior to data collection in 2009. These factors make it impossible to assess the exact impact of the intervention itself.

Despite the inability to assess the education intervention, this analysis did reveal valuable information about adolescents in the Purral region. Students overall exhibited a lack of understanding of important sexual health information, such as the efficacy of coitus interruptus and the rhythm method, and the ability to detect sexually transmitted infections. Specific groups of students, notably males and sexually active adolescents, expressed uncertainty in their ability to tell a partner they did not want to have sex or to insist on using contraception. Finally, half of sexually active adolescents do not use adequate contraception, thus putting themselves at high risk for pregnancy. These findings will help to

guide planning for future adolescent pregnancy prevention programs in this region.

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Appendix A

Questionnaire administered to participants: English translation

A. Demographics

A1. What is your date of birth?

__ __ / __ __ / __ __ __ __
Day Month Year

A2. What is your gender?

__ Male __ Female

A3. Which school do you attend?

__ Cristiano __ Coronado

A4. Which level of secondary school are you in right now?

__ First
__ Second
__ Third
__ Fourth
__ Fifth

A5. In which neighborhood do you live?

A6. Where were you born?

In Costa Rica:

__ San Jose
__ Heredia
__ Cartago
__ Alajuela
__ Guanacaste
__ Puntarenas
__ Limon

In another country:

__ Nicaragua
__ Colombia
__ El Salvador
__ Panama
__ Other (write which one: _____)

A7. Where was your mother born?

In Costa Rica:

☐ San Jose

☐ Heredia

☐ Cartago

☐ Alajuela

☐ Guanacaste

☐ Puntarenas

☐ Limon

In another country:

☐ Colombia

☐ El Salvador

☐ Panama

☐ Other (write which one: _____)

A8. Where was your father born?

In Costa Rica:

☐ San Jose

☐ Heredia

☐ Cartago

☐ Alajuela

☐ Guanacaste

☐ Puntarenas

☐ Limon

In another country:

☐ Nicaragua

☐ Colombia

☐ El Salvador

☐ Panama

☐ Other (write which one: _____)

A9. What is your religion?

☐ Catholic

☐ Evangelical

☐ Other (write which one: _____)

A10. Other than you, how many people live in your house?

_____ people

Who are they?

Person #1: Relationship_____ Age_____

Person #2: Relationship_____ Age_____

Person #3: Relationship_____ Age_____

Person #4: Relationship_____ Age_____

Person #5: Relationship_____ Age_____

Person #6: Relationship_____ Age_____

Person #7: Relationship_____ Age_____

Person #8: Relationship_____ Age_____

If there are others, write them down here:

A11. Your parents (or the adults with whom you live), how far did they get in school?

Adult #1: Relationship_____

___ Never attended school

___ Some Primary School

___ Completed Primary School

___ Some Secondary School

___ Completed Secondary School

___ Some college

___ Completed college

Adult #2: Relationship_____

___ Never attended school

___ Some Primary School

___ Completed Primary School

___ Some Secondary School

___ Completed Secondary School

___ Some college

___ Completed college

Adult #3: Relationship_____

___ Never attended school

___ Some Primary School

___ Completed Primary School

___ Some Secondary School

___ Completed Secondary School

___ Some college

☐ Completed college

Adult #4: Relationship_____

☐ Never attended school

☐ Some Primary School

☐ Completed Primary School

☐ Some Secondary School

☐ Completed Secondary School

☐ Some college

☐ Completed college

A12. What are your parents'(or the adults who live with you) occupations?

Adult #1: Relationship_____Occupation: ☐ Don't Know

☐ Stays at home

☐ Construction

☐ Self-employed

☐ Sales

☐ Government work

☐ Private company

☐ Other(explain:_____)

Adult #2: Relationship_____Occupation: ☐ Don't Know

☐ Stays at home

☐ Construction

☐ Self-employed

☐ Sales

☐ Government work

☐ Private company

☐ Other(explain:_____)

Adult #3: Relationship_____Occupation: ☐ Don't Know

☐ Stays at home

☐ Construction

☐ Self-employed

☐ Sales

☐ Government work

☐ Private company

☐ Other(explain:_____)

Adult #4: Relationship_____Occupation: ☐ Don't Know

☐ Stays at home

☐ Construction

☐ Self-employed

☐ Sales

☐ Government work
☐ Private company
☐ Other(explain:_____)

A13. Did you attend the talks given by the Los Cuadros Clinic in which other people from the community presented information on reproductive health in 2006 and 2007?

☐ Yes ☐ No

B. Knowledge

Now we will ask you questions about your knowledge, but it is NOT an exam that will count toward your grades in school, so please respond to the questions but do not worry if you do not know the correct answer.

Please mark the correct answer for the following questions:

B1. Which of the following contraceptive methods is the most effective for preventing pregnancy and sexually transmitted diseases?

- ☐ Condom
- ☐ Birth Control Pills/Patch
- ☐ Condom + Birth Control Pill/Patch
- ☐ Rhythm Method
- ☐ Spermicidal cream or jelly
- ☐ Diaphragm
- ☐ Withdrawal ("pulling out")

B2. When during the menstrual cycle is a woman most likely to get pregnant?

- ☐ During her period
- ☐ 7 days after the first day of her period
- ☐ 13-16 days after the first day of her period
- ☐ 20-32 days after the first day of her period

B3. When during the menstrual cycle is it least likely for a woman to get pregnant?

- ☐ 0-7 days or 20-32 days after the first day of her last period

☐ 8-19 days after the first day of her last period

B4. For which kind of women is the rhythm method most effective?

☐ Adolescent women

☐ Women with irregular periods

☐ Women with regular periods with 26 to 32 day cycles

B5. What do condoms protect against?

☐ Pregnancy

☐ Sexually transmitted diseases

☐ Pregnancy and Sexually Transmitted Diseases

Please state whether the following statements are true or false:

B6. It is possible for a woman to get pregnant even if the man pulls his penis out of her vagina before he ejaculates.

☐ True

☐ False

B7. Pregnancy and delivery are more dangerous for a woman younger than 18 years than for a woman over age 18.

☐ True

☐ False

B8. It is impossible to get pregnant if a woman uses the rhythm method correctly.

☐ True

☐ False

B9. A woman can get pregnant if a man ejaculates in her mouth.

☐ True

☐ False

B10. You can tell if someone has HIV by looking at them.

☐ True

☐ False

B11. It is possible for a person to have a sexually transmitted disease like chlamydia or gonorrhea, without having any symptoms.

☐ True

☐ False

B12. A person can catch a sexually transmitted disease from having oral sex.

☐ True

☐ False

C. Attitudes

Now we will present you with a series of questions, and we would like you to give your opinion using the letters “a” through “d” corresponding to the following scale:

Answer Choices, Q1-14:

- a. Definitely yes
- b. Probably yes
- c. Probably not
- d. Definitely not

C1. Could you talk about sex with your friends?

___a ___b ___c ___d

C2. Could you talk with your friends about the risk of becoming pregnant from having sex?

___a ___b ___c ___d

C3. Could you talk about using contraception with your friends?

___a ___b ___c ___d

C4. Could you talk about sex with your parents or the adult(s) you live with?

___a ___b ___c ___d

C5. Could you talk with your parents or the adult(s) you live with about the risk of becoming pregnant from having sex?

___a ___b ___c ___d

C6. Could you talk with your parents or the adult(s) you live with about contraception?

___a ___b ___c ___d

C7. Could you talk about sex with your boyfriend/girlfriend?

___a ___b ___c ___d

C8. Could you talk with your boyfriend/girlfriend about the risk of becoming pregnant from having sex?

___a ___b ___c ___d

C9. Could you talk about using contraception with your boyfriend/girlfriend?

___a ___b ___c ___d

C10. Could you tell your boyfriend/girlfriend that you don't want to have sex with him/her?

___a ___b ___c ___d

C11. Could you tell your boyfriend/girlfriend to stop touching you sexually?

___a ___b ___c ___d

C12. Would you insist on using contraception during sexual intercourse, even if your partner did not want to?

___a ___b ___c ___d

C13. Would you be embarrassed to buy condoms?

___a ___b ___c ___d

C14. Would you be embarrassed to buy birth control pills?

___a ___b ___c ___d

For questions 15-18, choose how much you agree with each statement using the following scale:

- a. Strongly agree
- b. Agree
- c. Disagree
- d. Strongly disagree

C15. Having sexual intercourse makes a boy popular.

___a ___b ___c ___d

C16. Having sexual intercourse makes a girl popular.

___a ___b ___c ___d

C17. Having sexual intercourse at my age is a “cool” thing for a boy to do.

___a ___b ___c ___d

C18. Having sexual intercourse at my age is a “cool” thing for a girl to do.

___a ___b ___c ___d

Please respond to the questions 19-30 using the following scale:

- a. None
- b. A few
- c. About half
- d. Most
- e. All

C19. How many of your friends do you think have sexual intercourse?

___a ___b ___c ___d ___e

C20. How many of your friends who have sexual intercourse, do you think use contraception?

___a ___b ___c ___d ___e

C21. How many of your friends who are under age 18 have been pregnant (if they are girls) or have gotten someone else pregnant (if they are boys)?

___a ___b ___c ___d ___e

C22. How many of your friends have ever smoked a cigarette?

___a ___b ___c ___d ___e

C23. How many of your friends smoke cigarettes regularly?

___a ___b ___c ___d ___e

C24. How many of your friends have ever drank alcohol?

___a ___b ___c ___d ___e

C25. How many of your friends drink alcohol regularly?

___a ___b ___c ___d ___e

C26. How many of your friends have every tried other drugs such as marijuana, cocaine, crack, ecstasy, or LSD?

___a ___b ___c ___d ___e

C27. How many of your friends use drugs regularly?

___a ___b ___c ___d ___e

C28. How many people in your household smoke cigarettes regularly?

___a ___b ___c ___d ___e

C29. How many people in your household drink alcohol regularly?

___a ___b ___c ___d ___e

C30. How many people in your household use drugs such as marijuana, cocaine, crack, ecstasy, or LSD regularly?

___a ___b ___c ___d ___e

Please respond to the following questions by circling the letter of your choice from the options below.

C31. How old are most of your friends?

- a. Younger than me by 3 or more years
- b. 1-2 years younger than me
- c. My age
- d. 1-2 years older than me
- e. Older than me by 3 or more years

C32. How old are most of your boyfriends/girlfriends?

- a. Younger than me by 3 or more years
- b. 1-2 years younger than me
- c. My age
- d. 1-2 years older than me
- e. Older than me by 3 or more years
- f. I have never had a boyfriend/girlfriend.

C33. How old would you like to be when you become pregnant or get someone else pregnant for the first time?

____years old

D. Behaviors

D1. Have you ever talked to your friends about sex?

__Yes __No

If yes, how comfortable do you feel talking to them about sex? Please mark your choice below.

- __Very Comfortable
- __Somewhat Comfortable
- __Somewhat Uncomfortable
- __Very Uncomfortable

D2. Have you ever talked to your boyfriend/girlfriend about sex?

__Yes __No

If yes, how comfortable do you feel talking to them about sex? Please mark your choice below.

- __Very Comfortable
- __Somewhat Comfortable
- __Somewhat Uncomfortable

☐Very Uncomfortable

D3. Have you ever talked to your parents, or the adult(s) you live with, about sex?

☐Yes ☐No

If yes, how comfortable do you feel talking to them about sex? Please mark your choice below.

☐Very Comfortable

☐Somewhat Comfortable

☐Somewhat Uncomfortable

☐Very Uncomfortable

D4. Do you know where to go to buy condoms?

☐Yes ☐No

D5. Do you know where to go to buy birth control pills?

☐Yes ☐No

D6. Have you ever gotten condoms for yourself or your partner?

☐Yes ☐No

D7. Have you ever gotten birth control pills for yourself or your partner?

☐Yes ☐No

D8. Have you ever had sexual intercourse?

☐Yes ☐No

8a. If yes, how old were you the first time you had sexual intercourse?

____ years old

D9. How often do you have sexual intercourse?

☐ I have never had sexual intercourse

☐ About once a month or less

☐ 2-4 times per month

☐ Twice a week

☐ 3 times a week or more

D10. How often do you use a condom when you have sexual intercourse?

☐ I have never had sexual intercourse

☐ Always

☐ More than half the time

☐ About half the time

☐ Less than half the time

☐ Never

D11. How often do you (or your partner) use birth control pills as protection against pregnancy when you have sexual intercourse?

☐ I have never had sexual intercourse

☐ Always

☐ More than half the time

☐ About half the time

☐ Less than half the time

☐ Never

D12. In the last 2 months, how many times have you had sexual intercourse?

times

D13. If you have had sexual intercourse in the last 2 months, how many of those times did you or your partner:

use a condom?

times

use the birth control pill?

times

D14. In the last 2 months, have you used any of the following methods to prevent pregnancy? Check all that apply.

☐ I have not had sexual intercourse in the last 2 months.

☐ Condoms

☐ Birth Control Pills

☐ Birth Control Patch

☐ Spermicidal cream or jelly

☐ Diaphragm

☐ Rhythm method

- ☐ Intrauterine device (IUD)
- ☐ Withdrawal ("pulling out")
- ☐ Emergency Contraception
- ☐ I have not used any method of birth control

D15a. Girls: have you ever been pregnant?

☐ Yes ☐ No

If Yes, how old were you the first time you got pregnant?

_____ years old

If Yes, how many times have you been pregnant?

_____ times

15b. Boys: have you ever gotten someone else pregnant?

☐ Yes ☐ No

If Yes, how old were you the first time you got someone else pregnant?

_____ years old

If Yes, how many times have you gotten someone else pregnant?

16. Have you ever smoked a cigarette?

☐ Yes ☐ No

17. Do you smoke cigarettes regularly?

☐ Yes ☐ No

18. Have you ever tried drinking alcohol?

☐ Yes ☐ No

19. Do you drink alcohol regularly?

☐ Yes ☐ No

20. Have you ever tried using other drugs such as marijuana, cocaine, crack, ecstasy, or LSD?

☐ Yes ☐ No

21. Do you use any drugs regularly?

☐ Yes ☐ No

21b. If yes, which drug(s)?
