

**STUDENT HEALTH AND WELLNESS AT A STATE UNIVERSITY IN RIOBAMBA,
ECUADOR: AN EXPLORATORY STUDY OF SEXUAL HEALTH, BEHAVIOR AND
SUBSTANCE USE**

by

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ABSTRACT

Objective: Decisions made from the ages of 19 to 24 are important to the future health and wellness of the individual. Nowhere is this truer than in the education system, where a mistimed or uninformed decision can have lifelong repercussions. The aim of this study is to explore the health and wellness of the student body at the Escuela Superior Politécnica De Chimborazo (ESPOCH), a state run university in Riobamba, Ecuador.

Methods: A survey tool was created in partnership with the wellness department at the ESPOCH. The “Sexual Health Survey of 2013” consisted of 35 questions in five domains: demographics, sexual health, tobacco use, drug use, and alcohol use. A proportional sampling frame was used to collect data from students in 30 classrooms at the ESPOCH.

Results: Six hundred and forty-five participants of a student population of approximately 12,300 were surveyed. The response rate was 88%, with one refusal and 87 students absent the day of sampling. Analysis was conducted for differences in gender and ethnicity. The variation between the two ethnicities in the region, Indigenous and Mestizo, are mostly associated with behavioral differences instead of demographic factors. An analysis of males and females found differences across the spectrum of variables, including both demography and behavior. Three behavioral areas were analyzed within gender, comparing ‘users’ and abstainers: tobacco use, alcohol use, and sexual experience. Though each area had multiple significant differences, the analysis of sexual

experience yielded the most significant variation between comparison groups. However, males and females differed substantially in each of the three areas.

Conclusion: Though there are many similarities between the variables analyzed, there were sufficient differences to warrant population specific programming. Specifically, there are marked differences between males and females that do not exist between ethnicities. Among the gender analysis, behaviors varied much more than demographic information suggesting that outside influences such as culture and family influences are influencing the students decisions more than immutable characteristics. This should inform future health programming done for the student population. By focusing resources on populations that engage in risky behavior (alcohol use, tobacco use, and unsafe sexual activity), the ESPOCH can maximize its impact on student health.

Public Health Significance: Alcohol use, tobacco use and sexual experience are often found in groups within the sample of students at the ESPOCH. A student who has consumed alcohol is much more likely to be sexually active and to have used drugs and tobacco. It can be concluded, then, that the students who have sought out help for a substance use issue would be good candidates for other programs. By recognizing that risky behaviors could be linked in the population as a whole, and knowing the association between behaviors, the wellness department can make well-informed decisions for health interventions and programs.

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PREFACE

The data source “Sexual Health Survey of 2013” is a culmination of a two year volunteer opportunity that formed part of my Peace Corps Master International program. I served in the Peace Corps from June of 2011 to July of 2013, working with the Wellness Department (*Departamento de Bienestar Politécnico*) of the Escuela Superior Politécnica De Chimborazo (ESPOCH). The survey was conducted in partnership with the *Bienestar Politécnico*.

To all the members of the *Bienestar Politécnico*: the three full time employees Mayra Barreno, Tatiana Pérez, and Rosanna Villacres; the student interns Paola García, Valeria Bermeo, Norma Maji; and finally the director Dr. Silvia Veloz. Without your help, support, and guidance this project would have never been possible.

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1.0 INTRODUCTION

Health is a multi-faceted complex issue whose improvement often requires a profound knowledge of both potential solutions as well as the current epidemiological information for the population of interest. Without the indicators and current information to guide potential policies or programs eventual impact and program effectiveness cannot be rigorously measured.

Measuring health in a specific population often has many challenges, especially in resource poor settings such as Riobamba, Ecuador. Much of the current focus on data collection and analysis is on the younger cohorts of the population. Adolescence has become the time to intervene in Ecuador, and the new family planning and adolescent pregnancy prevention government policy ENIPLA as well as the funding focus of organizations such as UNFPA and the World Bank exemplify this. Though the adolescent years from 14 to 19 are a very important age, young adults aged 19 to 24 also are a high-risk population for many of the same health outcomes. In addition, because of their intermediate ages, many health indicators are not available for this population. In Ecuador youth is defined as being from 16 to 29 and adolescence as 10 to 19, leaving young adults in a grey area without much focus.

The aim of this study was to provide much needed health information about young adults to the wellness department of a state funded university in Riobamba. Specific areas were: sexual health and wellness, alcohol use, tobacco use, and drug use. Each of these areas corresponds to focal points for health campaigns in the university, the city of Riobamba, and across Ecuador.

Sexual health, especially among adolescents and young people, has become a focus of national attention, and currently there are multiple projects associated with this area.^[1, 2] Despite this attention there are still wide disparities between ethnicities, social economic classes, and places of residence.^[3-6]

Little is known about substance use in the population. Drug use, as it is illegal, is not often quantified at a national level. The diverse geography makes the few reports that are available of questionable relevance to Riobamba as well. Chimborazo, the province where Riobamba is located, is one of the biggest agricultural producers in the country.^[7] Much of the land in the province is set aside for planting and herding by the local Indigenous peoples that have lived in the land for generations. Because of this, studies done on the coast or in major cities in the Andean region of Ecuador often do not apply to the situation in Riobamba; it is unique in the country. This study was an effort to fill the void of rigorous scientific work upon which future interventions and programs can be based for young adults.

This thesis will begin with a review of the literature, looking at each of the specific areas of interest to the university. Little is known about the health of young adults, so proxies such as adolescents or national level data were used to help describe the situation in Ecuador. It goes on to describe the methodology of the survey, the setting and participants, and the measures of the survey. It describes the protocol details for the survey sample, and how the data was analyzed. Next the thesis displays the results of analysis, and interprets the results in the discussion section. A manuscript was prepared using the data, and is presented in the next section. Focused on the attributes of condom use at last intercourse, the manuscript presents the analysis and results of those data. Finally, the conclusion provides recommendations and implications drawn from the data.

2.0 BACKGROUND

2.1 ECUADOR COUNTRY PROFILE

Ecuador is a South American country that is bordered by Colombia to the north and northeast, Peru to the south and southeast, and the Pacific Ocean to the west. A 2013 estimate for the population of the country was 15,439,429. Ecuador has a birth rate of 19.23 births/1,000 population, and a fertility rate of 2.29 children per woman in 2014.^[8] It also has one of the highest rates of adolescent pregnancies in the region; about 20% of adolescents aged 14 to 18 will become pregnant during that time period.^[2] This keeps Ecuador a young nation with 41% of the population under the age of 18.^[9] Spanish is the official language of Ecuador and is spoken by 95% of the population. However, there are 26 Indigenous groups and 12 distinct languages. This includes the Shuar language and cultural group in the Amazonian basin and Quichua cultural group and corresponding Kichwa language in both the highlands and the Amazonia region.^[8] As in the majority of Latin America, Ecuador is a heavily Roman Catholic country with 95% of the population identifying with this religion.^[8] This often has implications for sexual and reproductive health issues and policies surrounding controversial sexual health practices such as abortion and contraceptive access. Ecuador is indicated on the insert in Figure 1. The study area, Riobamba, is indicated with a pin on the main map.^[10]



Figure 2.1. Map of Ecuador^[10]

Ecuador has a long history of turmoil, first with the Incan invasion in the late 1400s, and followed by the Spanish a short 100 years after. After the fall of the Incan empire, the Spanish ruled Ecuador for nearly 300 years.^[8] Quito, the current capital, was the first city in South America to call for independence from Spain in 1809. After Ecuador's full secession from the Spanish rule in 1822 and a brief participation in the Republic of Grand Colombia, Ecuador became an independent country in 1830.^[8]

Since its independence Ecuador has had periods of political instability, the last of which resulted in three presidents being ousted mid-term between 2000 and 2006.^[8] With the democratic

election of the current president Rafael Correa in 2006 and the new constitution of 2008, the 20th since its independence, stability has again come to Ecuador.^[8] Despite this, Ecuador is still ranked as a “repressed” state, according to the Heritage Foundation’s Economic Freedom Index in 2013, coming in 159th out of the 177 evaluated countries.^[11] This ranking takes into consideration four factors for each country: rule of law, government influence, regulatory efficiency, and open markets. Ecuador, though it has been making steady improvements in labor freedom and the reduction of corruption, recently has been limiting investment freedom and increasing government spending without the necessary income increases.^[11] President Correa has been an instrumental figure in these changes in the last six years. He is most notable for coming out strongly against corruption.^[12] His policies on economics, however, are focused on the quality of life for Ecuadorian citizens instead of trade capital and gain, which has limited Ecuador’s involvement in some international open trade agreements.^[13]

In 2000 Ecuador dollarized its economy, linking the monetary system to the United States dollar.^[8] This, along with political stability since 2006, has paved the way for the recent economic growth and income redistribution that has happened over the last 10 years.^[9] The Gini Coefficient measures the frequency of distribution of factors relevant to inequality, such as income distribution, where a zero is perfect equality.^[9] Ecuador has seen a improvement in its score, decreasing from 54 to 48 between 2006 and 2012.^[9] This change has come hand in hand with an increase in the number of citizens in the middle class and substantial gains in income for the poorest quintile of Ecuadorians.^[9]

2.2 ECUADOR HEALTH PROFILE

The health situation in Ecuador has improved steadily over the last 30 years. The life expectancy has increased substantially from 68.2 years in 1980 to 76.1 years in 2013.^[8, 14] The percentage of its population in poverty has also decreased dramatically, from 44.6% in 2004 to 27.3% in 2012.^[15] This included a drop in extreme poverty, defined by the World Bank as income less than US\$1.25 a day, from 16.9% to 11.2% in the same time frame.^[9] Ecuador is currently experiencing a transition of mortality related to its economic progress and poverty reduction. In the last 30 years the main causes of death have transitioned from communicable disease and childbirth-related complications to mainly non-communicable diseases such as diabetes, coronary heart disease and stroke.^[16] Of all causes of death, non-communicable diseases were responsible for 65% of the total in 2010.^[16] A comparison of this rate to two other countries at opposite ends of the spectrum of development, the United States and Niger, suggests that development is closely tied to non-communicable disease mortality. The United States attributes 87% of its mortality to non-communicable diseases, while Niger only 16%.^[16]

Despite the obvious gains in the health and wellbeing of Ecuadorians, there also have been some setbacks. Youth pregnancy, decreasing from 126 per 1000 in 1965 to 91 per 1000 in 1980, is now on the rise again, and today sits around 99 pregnancies per 1000 adolescent females.^[1, 14] Nationally this means that about 20% of adolescent females will get pregnant before the age of 20, with 60% of these pregnancies unplanned or unwanted.^[1, 17] One possible explanation for this high prevalence is the low preference for condom use by males, at 4%, one of the lowest in the region (Peruvian males are at 10%).^[18] Other methods are available, and provided for free at any government health clinic. The most popular method is the pill, closely followed by injections.

Adequate nutrition and access to balanced diet are also problems among the poor of Ecuador, whose staple foods are rice and potatoes. Both these foods are high in carbohydrates but low in other nutrients.^[19] Malnutrition, both protein energy and micronutrient, is a pervasive problem. In the countryside about 23% of children under five are stunted and 5% are underweight.^[19] This presents a problem for the future economic development of Ecuador, as undernourished children fall sick more easily, have a greater severity of disease, and are much more likely to die from an illness than their nourished peers.^[16] Nutrition is also a problem in cities where 24% of children under five are overweight. This number increases in the 15 plus age range where 50% of the populous is overweight and 14% obese.^[19] A diet rich in refined carbohydrates, saturated fats and sugars that comes with city life and higher disposable income has been commonly cited as a possible root cause.^[19] Unplanned pregnancies often bring children into a world not prepared for them, which may increase the likelihood they will suffer from malnutrition. Promoting contraceptive methods and responsible sexual practices has been seen to decrease the number of unplanned pregnancies, and may eventually be one way to decrease malnutrition.^[20, 21]

2.3 STUDY SITE: RIOBAMBA

Riobamba, the study site, is located in the central highlands in the province of Chimborazo. Though the eighth smallest province in terms of size, it has the ninth largest population of the 23 provinces with 458,581 people in 2013.^[22] Almost half of this population lives in Riobamba, with a parish population of 225,741.^[4] Chimborazo had the highest illiteracy rate in the country in 2010 at 13.5%, and one of the higher percentages of Indigenous populations, 38%.^[4] This particularly affects the reproductive health of Chimborazo, as the Indigenous community is often

disenfranchised when it comes to contraceptive use. In 2004 it was found that although 48% of Indigenous females wanted to use a contraceptive method in the last year, only 18% had actually used one. Those rates contrast sharply with 56% wanting to use and 59.9% actual use in the white population.^[23] Both price and access could be reasons behind the difference. Contraceptive use may have changed since 2004, a potential shift that would be supported by some current sexual health indicators. In Chimborazo, the human immunodeficiency virus (HIV) incidence in 2009 for was 13, down from 18 in 2008, suggesting an increase in responsible sexual practices.^[24]

These disparities have not gone unnoticed. The World Bank is invested in the province of Chimborazo, with two of its four projects focused specifically on the province.^[9] This is also true of the United Nations Population Fund (UNFPA), which has one of the three province offices in Riobamba, the capital of Chimborazo, and allocates funding for many programs and workshops focused on youth and reproductive health.^[25]

2.4 PARTNER ORGANIZATION: ESCUELA SUPERIOR POLITÈCNICA DE CHIMBORAZO

The study took place at the Escuela Superior Politécnica De Chimborazo (ESPOCH); its campus is situated in the northeast outskirts of Riobamba. It was founded in 1972 as a trade school with four different disciplines, later expanding to include three more for the current total of seven: Science, Veterinary Science, Business Administration, Public Health, Computers and Electronics, Natural Resources, and Mechanics.^[7] Within each discipline there are specific majors, with students being able to get either “Licensed” in a four-year degree or become an “Engineer” with a

five-year degree. Currently there are 12,279 students at the ESPOCH, with the majority of them majoring in medicine and accounting.^[26]

In 2011 the ESPOCH and all institutions of higher education went through an evaluation process to critically judge how well they served the students and the worth of their education. Of the 66 total universities and trade schools in Ecuador, ESPOCH was one of the ten that received a top score.^[7]

The University Wellness Department (*Departamento de Bienestar Politécnico*) is an entity of every higher education institution supported by the Organic Law of Higher Education of 2010 in Article 86.^[27] It states that:

Higher education institutions will maintain an administrative unit of Student Affairs to promote vocational and professional guidance, as well as to facilitate obtaining credits, incentives, financial aid and scholarships, and provide care services determined in the regulations of each institution. This unit will also be responsible for promoting a climate of respect for the rights and the physical, psychological and sexual wellness of the student population in an environment free from violence (pg. 16).

According to the 2010 higher education law, each of the state-funded universities must have at least 10% of the student body on scholarship, the administration of which falls to the *Bienestar*.^[27] State-funded institutions are already low-cost, as students pay only registration and graduation fees averaging about \$40.00 a semester. This law hopes to encourage lower socio-economic status populations to apply by providing a \$75.00 monthly stipend and covering the registration costs. The proposal (10% on scholarship) has been difficult to achieve for the ESPOCH as it does not receive extra income from the government after operational costs. Because of this limitation there are currently only 278 students on scholarship, falling far short of the 1,200 needed for 10%.^[7]

3.0 REVIEW OF LITERATURE

Currently there is little sexual health literature focused on Ecuador. This is especially true for young adult (ages 19 to 24) sexual health, the focus of this paper. Young adults aged 20 to 24 account for roughly 1.3 million people, one of the larger groups in Ecuador.^[8, 28] In Ecuador youth, or young adults, are defined as anyone from the ages of 15 to 29, an adolescent as anyone from the age of 10 to 19.^[22] Because of these definitions it is very hard to get disaggregated data on the population aged 19 to 24.

Six different areas of health are presented. The first is a sexual health overview, paying attention to the variables that were measured by the Survey on Sexual Health conducted in the ESPOCH. The second is sexual health in the adolescent (ages 14 to 19) population in Ecuador. In the third section current knowledge of sexual health in Ecuadorian young adults (19 to 24) is displayed. The fourth section addresses the manuscript topic by addressing the correlates of condom use in various populations. The fifth concerns Indigenous sexual health in Ecuador. Substance use is described in the next section, and finally, the seventh section addresses the health of the student body at the ESPOCH.

3.1 OVERVIEW OF SEXUAL AND REPRODUCTIVE HEALTH IN ECUADOR

In Title II, Article 32 of the 2008 constitution the citizens of Ecuador are guaranteed the right to health, and this is promoted by providing “access to programs, actions and services promoting and

providing integral healthcare, sexual health, and reproductive health” (pg. 29)^[29]. From its passing in 2008, this law has influenced many of the policies and programs that exist today in Ecuador.

HIV infection, though with relatively low prevalence of .04, is starting to increase, and the number of deaths from AIDS has increased from 181 in 1998 to 678 in 2008.^[24] This is just a small percentage of the total population living with HIV, estimated to be around 35,000 in 2011.^[28] New cases of HIV are concentrated in the 25 to 49 age range, with the highest number reported in the 25 to 29 year range.^[30] The actual numbers may actually be higher in reality, according to a local HIV/AIDS organization in Guayaquil. It found that in Guayaquil only one of every four people who are positive for HIV know it.^[30]

In key populations such as men who have sex with men (MSM), an 11% prevalence of HIV was recorded in Quito, Ecuador. The same study found that 14% were also positive for herpes simplex virus 2, and 5.5% for syphilis.^[31] It was found that among MSM only 57% of participants had taken a test to determine their HIV status and less than half had adequate knowledge of HIV as defined by UNAIDS. This definition requires participants to correctly respond to all five questions on HIV and AIDS knowledge on a convenience based sample of 416 MSM aged 15 plus..^[31]

Sexually transmitted infections (STIs) are also present and sometimes more visible than HIV. In 2009 there were 2,308 cases of gonorrhea, or 16.5 per 100,000 population, and 1,697 cases of genital herpes.^[32] These numbers capture only the reported numbers, as for many of the STIs more than 50% of the cases are asymptomatic.^[33]

Many of the rates of HIV and STIs are driven by the infrequent condom use among Ecuadorian males. For males in unions between the ages of 18 and 45, preference for condoms as

a contraceptive method is 4%.^[18] Correct condom use has been shown to decrease HIV/STI infection, as well as be effective to decrease unwanted pregnancies.^[34-37]

Total fertility rate in the decade from 1994 to 2004 stabilized, creating a situation that is unique for Ecuador compared to other Latin American countries. During that time contraceptive use increased substantially, from 56.8% in 1994 to 72.7% in 2004.^[3] In the last decade the total fertility rate has again began to decrease, with an estimated 2.3 child per woman in 2013.^[8] It has been suggested that this stabilization occurred because of the mean ideal number of children wanted by Ecuadorean women remained more or less stable as well, moving down only 0.1 of a child to 2.6 total children in that decade.^[3]

3.2 ADOLESCENT HEALTH IN ECUADOR

Adolescence is currently the focus of many of the national policies and strategies surrounding sexual and reproductive health.^[1, 2] A plethora of data exists to support this focus, especially the high rate of teen pregnancy. Deviating from the general trend of the Andean region where adolescent pregnancies have mostly declined, the rate of adolescent pregnancy in Ecuador has actually increased in the last 10 years.^[38] There has been a 74% increase in incidence of pregnancies between the ages of 10 to 14, and a 9% increase for the ages of 15 to 19.^[1] A potential factor in this increase is the low condom use; 50% of adolescents surveyed in 2002 reported they had never used a condom during sex.^[37]

Adolescent pregnancy, wanted or not, has negative effects for the scholastic future of adolescents. Forty one percent of pregnant high school dropouts on a national level in Ecuador leave school due to pregnancy, with another third leaving because of marriage.^[39] Upon leaving

the school system, often for good, the futures of young mothers dim considerably, as 45% of pregnant adolescents do not study or work.^[23] Lack of an education can hamper the future of young mothers and can result in poor health outcomes for their child.^[40]

Risks for a future are even more pronounced for the child; perinatal deaths are 50% higher among babies born to mothers under the age of 20 compared to mothers aged 20 to 29 years. Babies born to adolescent mothers also are more likely to be underweight, a risk factor for poor health during childhood years.^[40] Additionally, maternal mortality is the leading cause of death and disability among 15 to 19 year old women in emerging economies, of which Ecuador is one. Additionally, perinatal maternal mortality contributes to about 15% of total maternal deaths worldwide.^[40]

Education is one of the most important and powerful tools to combat unwanted adolescent pregnancies. In Latin America, fertility rates have been found to decline 5 to 10% for each additional year of schooling.^[41] Additionally, adolescence without pregnancy has been positively correlated in the literature to higher education levels in the parents and current enrollment for the adolescent.^[41, 42]

The same high incidence seen for adolescent pregnancies is not seen in other sexual health areas, especially HIV. Of the 4,041 new cases of HIV in Ecuador in 2009, only 278 or 7% of them were adolescents aged 15 to 19.^[24] Some of the factors associated with a negative status are high self-efficacy for condom use among adolescents, as well as skills to refuse unsafe sex.^[37] However, as condom use is low in this population in Ecuador other factors could be at play.

Kirby et al. (2007) and Kirby et al. (1997) have reviewed multiple studies in the United States that have analyzed the known facilitators and barriers to healthy adolescent sexual behavior. The findings suggest that of all the known factors, an adolescent's sexual belief, value, attitude,

and intention have the biggest impact.^[43, 44] How an adolescent views and navigates sexuality is modified by a large number of factors that have both positive and negative influences. Some positive factors include “greater connectedness to school, higher educational aspirations and plans for the future, greater confidence in ability to demand condom use, and more positive attitudes towards condoms and other forms of contraception” (pg. 58)^[43] to name a few. Negative influencing factors can include “sexually active peers, peers’ pro-childbearing attitudes or behavior, and being behind in school or having problems in school” (pg. 56).^[43] Though the studies were conducted in the United States, many of the same factors influence adolescents in Ecuador, and potentially have similar connections.

3.3 YOUNG ADULT HEALTH IN ECUADOR

A pregnancy survey from 2004 reveals the differences in the importance of sexual and reproductive health for the 20 to 24 age range compared to younger cohorts. In the 15 to 19 range, 68.4% of the pregnancies were wanted. This is four percentage points higher than in the 20 to 24 range. Unwanted pregnancies are also almost double in the 20 to 24 range compared to the younger cohort, and mistimed pregnancies comprised one fifth of all pregnancies for the 20 to 24 range in 2004 as well.^[3]

HIV rates, one of the only thoroughly reported statistics for this age range, is perhaps a wake-up call for future work to be done. In 2009 there were 743 new reported cases of HIV in the 20 to 24 age range, which represent 18% of the total and the second largest group.^[24]

3.4 CORRELATES OF CONDOM USE

Condom use has been studied internationally in various settings, with the majority of the focus on sub-Saharan Africa. One of the most commonly found correlates of condom use and consistency of use is education, especially education in sexual and reproductive health.^[36, 43-45] A study in South Africa found that the odds of condom use were lower if participants were older (20 to 24 years), knew their HIV status, or if they reported having sex with their first partner because of physical force.^[35] These findings could have serious repercussions in Ecuador if a similar association is found, as one in four women has been a victim of sexual violence, with 40% of those cases before the age of 17.^[5]

Improved condom use and knowledge are important in sustaining the recent improvements in the sexual and reproductive health in Ecuador. However, only a few studies examine potential facilitators to condom use among sexually active populations in Ecuador. One of these studies, conducted in the Highland and Amazon regions of Ecuador, found associations of consistent condom use to be self-efficacy and the ability to refuse unsafe sex.^[37]

Another study, conducted with men who have sex with men (MSM) in Quito, found a strong correlation between condom use and condom price.^[46] The results came from an analysis that controlled for socio-economic status, moving the issue from absolute cost of condoms to relative cost for each person. The study looked at a subset of the Ecuadorian population. However, general themes can be drawn and expanded to the population level for further investigation. Only 16% of the study population knew where to get free condoms, the lack of that knowledge is another barrier to use.^[46] In the last two years the government of Ecuador has rolled out a large-scale plan to make contraceptive methods, especially condoms, more accessible to the general population.^[2]

As of 2013 there were condom distributors in the majority of hospitals and various clinics where patients could anonymously receive free condoms.^[2]

Condom use has been estimated before in Ecuador. Only 25% of respondents in a study of MSM in Quito had used a condom with the last three partners, and 55% had never used a condom in the same time frame.^[46] In the Amazon region of Ecuador, only 34% of the adolescent females had used a condom before, despite 84% having heard of it.^[21] Finally, only 4.3% of women aged 15 to 43 in a consensual union reported using condoms as a contraceptive method within their relationship.^[3]

Questions surveying condom use at last intercourse have been shown in the literature to correlate with condom use in the last 60 days. Participants who responded positively to using condoms at last intercourse have been found to have a higher mean percentage of condom use in the past 60 days compared to those not using condoms at last intercourse.^[47] Similarly, 52% of those who used a condom at last intercourse were consistent condom users in the last 60 days. For those who reported not using a condom at last intercourse, only 7% were consistent condom users.^[47]

3.5 INDIGENOUS POPULATIONS IN ECUADOR

Indigenous groups represent about 12% of the total population of Ecuador. A disproportionate number, close to 88%, lived below the poverty line in 2006.^[48] Since then, the total percent of households in Ecuador living in poverty has declined, going from 37.6% in 2006 to 27.3% in 2012.^[9] The decline was not attributed to one ethnicity, but as such a high percentage of Indigenous populations live in poverty there is little doubt that this change did not affect them. In addition to

poverty, Indigenous populations are also disproportionately found to be illiterate, representing about 20.6% of the total illiterate population of Ecuador, twice as high as the second group. Of the total Indigenous population, around 6.8% were illiterate in 2010, with 8% of females and 6% of males.^[6] If these percentages, 8% (females) and 6% (males), are calculated with the total population of 9,955,074 in 2010, it is found that 81,257 Indigenous females and 59,688 Indigenous males were illiterate.

One of the many challenges that Indigenous communities in Ecuador face is their remoteness from services and urban centers. In 2006 only 18% of self-identifying Indigenous peoples lived in urban centers, with the remaining 82% living in rural areas.^[22] This affects education, basic health services, and even accessibility of clean water and nutritious food. In some remote areas maternal mortality hovers around 250 deaths per 100,000 live births, twice the national average of 130 in 2006 when these data were gathered.^[48]

Levels of education are also remarkably different between rural and urban areas. In the province of Chimborazo, where the ESPOCH is located, the average years of schooling for an urban resident was 9.54 compared to a rural resident of 5.10 in 2010, representing the lowest average of all provinces in Ecuador, lower than the closest by 0.2 years.^[49] Without education many residents of the rural areas, mainly Indigenous, do not have the knowledge to navigate the system of social support or governmental policies.

Education greatly affects sexual health. It has been found that pregnancy rates correspond with levels of education in adolescents.^[1] The population with less than elementary education has the highest percentage of pregnancy, 43%. The percentage drops to 34% for those with elementary education and decreases to only 11% of total adolescent pregnancies for those with secondary education.^[1] When adolescent pregnancies are looked at in the aggregate, the poorest quintile has

28% of the pregnancies, while the richest quintile has only 11%.^[11] A study conducted among Indigenous populations in the Amazon region of Ecuador found that 73.7% of women reported having had at least one unintended pregnancy.^[17] In 2006 Indigenous women averaged nearly five children per woman, a substantial difference from the 3.3 for the country as a whole.^[48] Risk factors for teen pregnancy were found to include being young, single, Indigenous, and having low access to education in the Amazonian region.^[17]

Much has changed since the early 2000s, and many conditions that kept Indigenous peoples in poverty have started to improve. However, there is still a need for Indigenous women to have increased access to and knowledge of methods of contraception and sexual navigation.^[23] A household survey of maternal health found that although only 18.4% of Indigenous women have used a contraceptive method, and 48% wanted to use one. This contrasts sharply with the *blanco* population, with 59.8% having used a method and only 56% desiring to use one.^[23]

3.6 SUBSTANCE USE IN ECUADOR

Tobacco use in Latin America has grown in recent years, though it is still not as pressing a concern as other health problems. As seen in the United States 50 years ago, the educated, higher SES population mainly drives cigarette consumption. Of the educated women, those with seven or more years of education, 15.8% smoke.^[50] Among those with no education the rate is relatively low, 6.7%. This difference can be explained by various factors, such as disposable income or availability of tobacco products.^[50]

The national trend of drug use in youth has stayed fairly low in recent years, with only 4.2% of youth aged 12 to 17 using cannabis.^[51] In the population over 12 in the United States that

number is 9.4%.^[51] The rate seen in Ecuador has remained low despite a large spike in the amount of drugs being seized in Ecuador, increasing 18% from 2010 levels to 2011 and 9% from 2011 to 2012.^[51]

Alcohol consumption is part of daily life in Riobamba, and in the country in general. Ecuador ranks fourth in the Americas for the liter per capita consumption of pure alcohol, falling only behind Haiti, the United States and Honduras. Over 60% of Ecuadorians have drunk alcohol at least once in their lifetime, with 28% drinking in the last month.^[52]

3.7 STUDENT HEALTH AT THE ESCUELA SUPERIOR POLITÈCNICA DE CHIMBORAZO

Health surveying had been done before in the ESPOCH, and the author was able to gain access to a thesis that was presented in 2010. That survey explored a total of 23 areas, some of which were vehicle safety, housing, and income. Only two of them align with the 2013 Sexual Health Survey on which this thesis is based. Completing the 2010 survey was an online requirement for the entire student body before they could register for classes. Of the 13,342 surveys completed by the student body, a sample of 354 responses was chosen. A proportional sampling frame was used, resulting in a sample distribution according to the disciplines at the ESPOCH. The analysis was only done with 374 of the responses, the individual surveys being chose by willingness to participate. The thesis states: “The criteria of inclusion of the individuals was given principally by choice to participate” (pg. 41).^[53] The other methods of selection were not explained.

One of the limitations of this study is that the responses to the majority question were qualified with three choices: always, sometimes, and never. These limited responses make it hard

to quantify questions measuring use. The findings are most often broken down by sex, with a few other variables present occasionally. Statistical association was not measured; so all comparisons were presented in percentages and raw numbers.^[53]

The first area of the 2010 thesis is substance use, which included questions about tobacco and alcohol use. The thesis found that 64% of the total sample drinks “sometimes”; however, there was considerable of variation between sexes. The most common response for males was “sometimes” 81% of the time, and for females “never” at 52% of the time. The data for cigarette use are “always,” “sometimes,” and “never” and divided by male and female. In total 67% of the students smoke “always” with 27% never smoking. The differences between genders are not large in this category with 77% of males smoking “always” and a lower 57% of females smoking “always.”^[53]

The second similar area was sexual activity, with questions about condom use and sexual activity. Of the sample of 374, the survey found that 97% of males and 91% of females were sexually active for a total of 351. Condom use rates are also surprisingly high, with 94% of the males and 91% of females reporting they “always” use condoms. Only 2% of the students admitted they “never” used condoms.^[53] The survey asked this question of both sexually experienced and abstaining participants, and so phrased the question as a “would you ever” instead of examining behavior which could be a reason for the high rate of condom use in the survey.

4.0 METHODOLOGY

This thesis is based on a survey developed specifically for this research. A total of 35 questions were chosen with input both from the author and from the *Departamento de Bienestar Politécnico*. Of these, 32 were fixed response questions and three were open-ended questions designed to allow the students to express their perceptions and beliefs about specific topics. The aim of the survey was to describe the health behaviors of the sample and create a baseline of health data for the *Departamento de Bienestar Politécnico*. The survey included four areas of interest: sexual health, drug use, alcohol use, and tobacco use. The main focus of the survey, however, was sexual and reproductive health with 19 of the questions in this area. Additionally, the following exploratory research questions were developed post hoc and will be tested.

1. Are there significant differences between those students who are sexually experienced and those who are not among the student population at the ESPOCH?
 - a. If so, what are they and
 - b. What are the correlates of sexual experience?
2. Are there behavioral factors associated with condom use at last intercourse among the sexually experienced sample?
 - a. If so, what are they and
 - b. What are the factors associated with condom use at last intercourse?

4.1 SETTING AND ACCESS TO THE COMMUNITY

All data collection was performed at the ESPOCH, a public university that is located in Riobamba, Chimborazo. Riobamba is a city of around 200,000 and lies roughly 190 kilometers south on the Pan Americana, a transnational highway, from the nation's capital Quito.^[7, 10] The ESPOCH is a large campus of 12,279 students and includes seven different disciplines with 30 majors.^[26] It was

chosen as the investigation site as the author already had *entrée* to the student body and the support of the department responsible for the health of the students, the *Departamento de Bienestar Politécnico*. To access the student body the author engaged in a series of *oficios* with the school dean Romeo Rodríguez and Silvia Veloz, the director of *Bienestar Politécnico*.

Oficios are written physical memos that are provided upon receipt of any formal communication. They are a societal norm in Ecuador and are used for almost any type of formal exchange. *Oficios* are used to thank volunteers, propose plans, and in this case to request information and access to the student body. They are extremely verbose and polite, generally with the first half composed of the greeting and describing the organization. The second half contains the reason for the communication and outlines the further actions to be taken. One example is in Appendices A (Spanish) and B (English).

4.2 PARTICIPANT SELECTION

The original intent was to get a random single sample of the population of students. The author requested a list of classes from the academic office from which to randomly select the sample. The academic office was unable to provide a specific class list, however, as that information was not available. In the ESPOCH each specific faculty is responsible for the scheduling of classes. To have access to every classroom list would have been difficult in this setting, especially because many classes meet outside of their designated times and rooms as the year progresses. The document available from the general academic secretary was the Report on the Enrollment Numbers for the Academic Period from the 4 March to 3 June, 2013. The report breaks down the total student population of 12279 on two major characteristics:^[26]

Gender. The report made available the number of female and male students in each semester, as well as overall gender breakup for majors. For example, the health promotion major has 771 students enrolled, 541 females and 230 males.

Discipline/Major. The total number of students for each discipline and each semester is also displayed. Two thousand two hundred and thirty nine students are enrolled in the discipline of Public Health. Each of the majors in the school also has its total numbers displayed, again divided by gender.

These data were used to determine the total number of surveys needed to have proportional representation of each of the faculties. This was found by dividing the total number of students in the ESPOCH by the number of students in a particular faculty to get a percentage. The discipline of Public Health, which has a total of 2239 students, represents 18.4% of the student body. The biggest discipline was that of Business Administration, with 22.4% of the student body, while the smallest was Natural Resources with 6.31% of the student body.

Original estimates indicated a required sample size of 400 to 600 students. Assuming a random draw, this would allow the author to estimate population parameters with a 5% margin of error and a 95% CI. Given the limitations of the available information mentioned in preceding sections, a proportional design was later implemented where students were sampled according to discipline. This design would ensure that students from each major would be represented as a correct proportion and the sample would thus achieve self-weighting. There is less variability in a proportional design than in a random sample.^[54] Therefore, proportional sampling designs are considered equivalent to simple random sampling for sufficient sample size. The original number of 600 samples drawn was deemed appropriate and sufficient in this situation despite the change of sample methods.

4.3 SURVEY COMPONENTS

The survey consisted of six sections (see Appendices C and D). It was created in conjunction with the *Bienestar Politécnico* and represents the interests of both the department and the author. The survey received an “exempt” status from the University of Pittsburgh Internal Review Board as it did not collect any identifying information. The survey began with a brief script informing participants about the survey and what risks they had in completing it. The introduction also briefly stated what the data would be used for, and what participation in the survey would mean. The sections and their rationale are explained below.

4.3.1 Component One: Demographics

The demographics section is essential to any type of survey, especially those that will be used to inform decisions on the departmental level or policy level. In the 2013 survey the basics such as age and gender were included, as well as place of birth and major. By collecting demographic data, the author was able to stratify the population and analyze subpopulations.

4.3.2 Component Two: HIV/STI

This section included one of the three open-ended questions. It asked the students, “What is the main sexual health problem you see in your peers at the ESPOCH today?” The section also

included general questions to gauge how knowledgeable the student body was about condoms and the extent of their protection. The questions originated from material the ESPOCH had used in earlier health promotion activities.

4.3.3 Component Three: Sexual Health and Sexual History

There were two domains in this section. The first was sexual history, which included questions about sexual activity and condom use. It also asked the length of time from last intercourse and current partner status, both in terms of dating and for sexual relations. These questions were included to measure the sexual behaviors of the student body. The author was particularly interested in what proportion of the student body had experienced same-sex attraction or encounters. Four questions were included to get a general overview of the subject. Condom use at last intercourse was asked, to determine prevalence of this protective behavior in this population.

The second part was about knowledge and perceptions of sexual health. The other two open-ended questions were in this section, asking “What do you think of condom use?” and “What is the role of sexuality in our lives?” The *Bienestar Politécnico* had done various campaigns to normalize condom use and promote healthy sexuality, so both of these questions were to monitor their progress in these fields.

4.3.4 Component Four: Tobacco Use

The survey had two questions to determine tobacco use, one to discern if the student had ever smoked and the second to discern the frequency. Both were basic prevalence questions that were created by the author. To find overall prevalence the survey asked, “Do you currently smoke a

tobacco product such as cigarettes, cigars or pipes?” The survey participants had a choice between “Yes, every day,” “Yes, but not every day,” and “No, not at all.”

4.3.5 Component Five: Drug Use

The three questions that dealt with drug use were added to examine the prevalence at the ESPOCH and were created by the author. For students drug use can be a sensitive subject. Though there was doubt as to whether the students would answer truthfully, these questions were deemed valuable enough to include. The questions addressed usage and dependency, asking how often the students used drugs, and if they found themselves thinking about their next drug use.

4.3.6 Component Six: Alcohol Use

The final four questions were dedicated to alcohol use, a problem that was identified by the *Bienestar Politécnico* as being relevant to the campus. The department has dealt with alcohol-related student issues more than those related to other substances, and believes it should be a priority issue for the coming years. These questions were structured similarly to the drug use questions to discern use and dependency. Two questions asked about use and amount of alcohol, while the second two explored the prevalence of two common alcohol related problems in the student population at the ESPOCH. These related to over-indulgence of alcohol and cultural norms. Among students it was perceived normal to continue drinking in the morning after staying up until 5 or 6 in the morning. The *Bienestar Politécnico* wanted to find out if this perception was true. The second problem was financial, asking if the student had experienced financial difficulties

from drinking. The alcohol use prevalence questions were the author's contribution, while the *Bienestar Politécnico* suggested the questions concerning the perceived problems.

4.4 PROTOCOL DETAILS

The sampling was to be done at different times of the day, as well as different days of the week to ensure a more random selection of classrooms. The author estimated that around 30 classrooms of 20 students would be required to reach around 600 students.

The convenience sample would be drawn from the different classes by going to a discipline specific building and entering classes that were occupied after gaining permission from the classroom instructor. The director of the *Bienestar Politécnico* had provided a letter introducing the project and aims to present at each sample draw. This letter allowed entrance to each classroom and is included in Appendices A (Spanish) and B (English). There was going to be no systematic prior contact with the professor or students, so refusal was a possibility depending on the professor. The letter of introduction was drafted to help counter this possibility.

Upon entering each classroom the author explained the survey, its aims, and what was expected of the participants as well as what the risks of participation were. After this brief introduction and receiving verbal consent the survey was handed to the students. Once the entire class was finished, the author thanked them, asked for questions, and notified the class of the health services available *Bienestar Politécnico*.

4.5 DATA ANALYSIS

The data were analyzed with the statistical program SAS 9.3 after being entered into an Excel spreadsheet and coded. Only one of the open-ended questions was coded for this study, “What do you think about condom use”? This was coded according to the general perceptions of condom use, with six different non-mutually exclusive options available for each response. There were three positive perceptions, and three negative perceptions. Once each of the answers was placed in its corresponding category it was then coded again in a new column to get the general perception: negative, positive, or both. Further coding was done throughout the data analysis, including questions from the sections of alcohol use, sexual history, and demographics.

5.0 RESULTS: STUDENT HEALTH

A total of 645 valid surveys were collected over 14 different days, which spanned the entire month of June 2013. Each of the seven disciplines was represented in the results; the gender ratios were within 10% of the true value as established by the university enrollment office in all of the faculties except Business Administration which had a 22% difference. Table 5.1 depicts the true distribution of the student body and the sample distribution.

Table 5.1. Results of Proportional Sampling

Discipline	# students enrolled in discipline	% total of ESPOCH* population (n=12163)	% respondents from discipline surveyed (n=645)	% male in discipline (total)	% respondents male (sample)
Business Administration	2960	22.4	24.8	36.84	58.76
Science	1723	14.5	13.64	38.09	43.18
Veterinary Science	733	6.32	5.89	53.69	50
Computer and Electronic	1968	16.5	16.74	66.62	64.82
Mechanics	1809	15.2	14.41	89.17	98.9
Natural Resources	731	6.31	6.04	50.89	43.59
Public Health	2239	18.7	17.52	34.48	32.74
<i>Total</i>	12163	100	100		

* Escuela Superior Politécnica De Chimborazo

Of the total number of students surveyed, only one potential participant declined. Thirteen surveys had to be removed from the sample because of incomplete data. “Incomplete data” was defined as not answering at least 10 questions, with age, gender, and ethnicity being essential. The survey collection started 30 May and continued until 1 July 2013, with 14 days of data collection in total. This averaged 2.14 classes per collection day, with the highest being eight and the lowest one. Class size varied, with the smallest containing seven students and the largest 35 students. The average number of students in each classroom was 21.4 students. Three professors did not grant access to their students. This was a potentially biasing factor that was discussed with the

Bienestar Politécnico before collection. The total population surveyed was 658 students, representing around 5% of the student body.

The author was able to record the total number of students enrolled in each class, as well as the total number present during surveying. Of the 30 classrooms surveyed, only eight had every enrolled student present. Of the other 22 classes, 17 had four or fewer students missing on the day of data collection. The remaining five classes had more than five students missing, with four of those classes comprised of more than 30 enrolled students. The number of students enrolled in the class seemed to have some relation with the number of absent students. The larger the class size the more students were absent. The response rate of present students to absent students was 86.4%, which was calculated using only the valid surveys as the numerator. If the invalid surveys are used, it increases the response rate to approximately 88%.

Survey respondents varied in age from 18 to 36 and came from every province in the country with a slight majority coming from outside Chimborazo. They also represented each of the major ethnic groups in Ecuador. Mestizos were the vast majority of respondents (573 [88%] of the 645 respondents). Indigenous students made up the next biggest group with 54 (8%) total respondents, and Afro-Ecuadorian and White were the smallest sample sizes, with eight (1%) and six (1%) respectively. The intersection of these variables will be discussed in more depth in the following sections.

Table 5.2 presents the sample's demographics and behaviors broken down by ethnicity. As seen in the table, there were few differences between Mestizo and Indigenous ethnicities. African-Ecuadorians and Whites were removed for comparison because of their small number (n=14). One of the more notable differences is that drug use (20% versus 8%) is almost entirely

concentrated in the Mestizo population, a significant finding. The other significant differences by ethnicity with Mestizos holding the higher percentages are alcohol use and a positive perception of masturbation. The demographics of the two groups were very similar in the five demographic variables measured: age, gender, birthplace, semester of study, and current partner.

Table 5.2. Demographic Differences by Ethnicity

Domain and Predictor	Ethnicity		p*
	Mestizo % (n=573)	Indigenous % (n=54)	
Demographic			
Age, y			.672
18-19	21.5 (123)	18.5 (10)	
20 to 22	55.9 (320)	53.7 (29)	
23 to 36	22.7 (130)	27.8 (15)	
Gender			.493
Male	52.5 (301)	57.4 (31)	
Female	47.5 (272)	42.6 (23)	
Birth Place			.075
Capital/Urban (>50,000)	82.1 (464)	72.2 (39)	
Rural	17.9 (101)	27.8 (15)	
Semester of Study			.259
1 through 3	38.8 (142)	50 (26)	
4 through 6	47.7 (182)	36.5 (19)	
6 through 10	13.7 (66)	13.5 (7)	

*Bivariate chi-squared test of significance

Note: Significant *p*-values (*p*<.05) are in bold

Figure 5.1 and 5.2 displays a graphical representation of the attitudes and behaviors measured in the survey according to ethnicity.

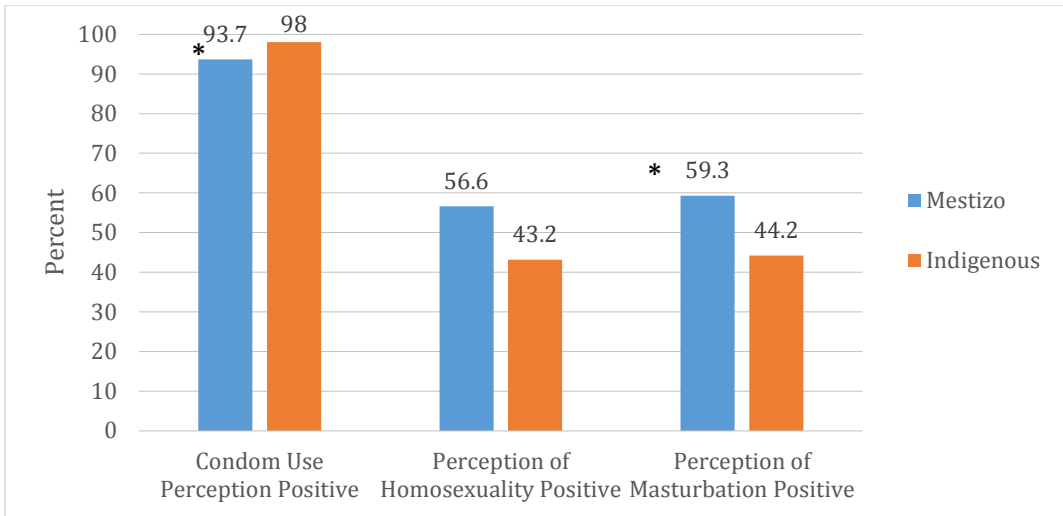


Figure 5.1. Attitudes by Ethnicity

* Denotes statistically significant finding

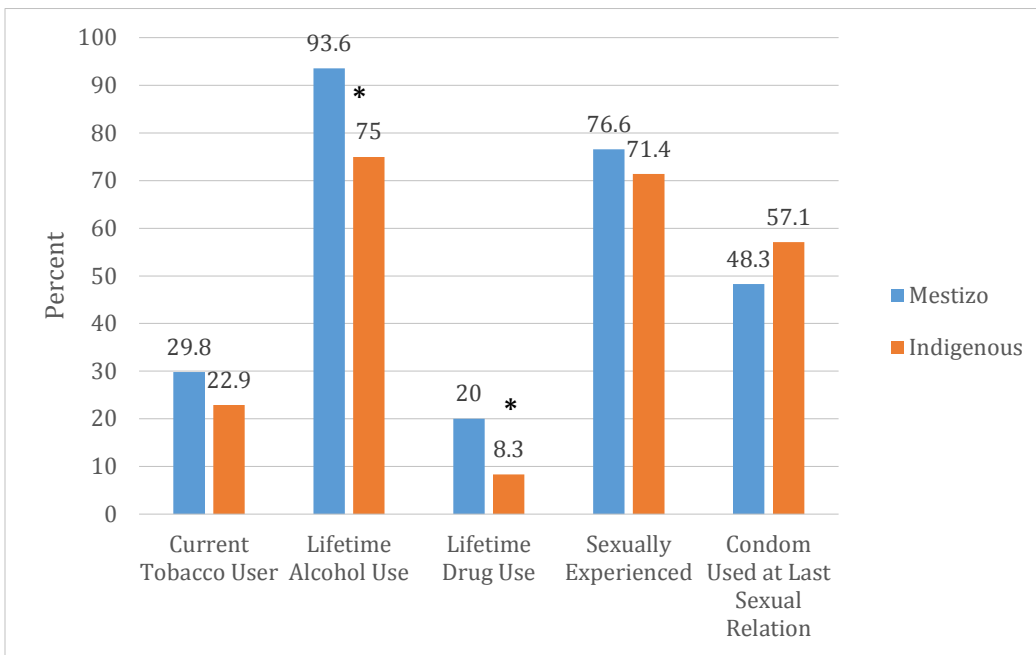


Figure 5.2. Behaviors by Ethnicity

* Denotes statistically significant finding

Table 5.3 depicts the same variables but compares gender. The differences between genders are substantial in many of the behavior indicators. Almost every behavior was found to be significantly different for males and females, with the exception of tobacco use. The same distribution was not found among the demographic information.

In the sample there were significant differences between males and females in the number of tobacco users (44.8% of males versus 12% of females) well as drug use (31% of males versus 5% of females). Past sexual experience was also found to be significant with 87% of males reporting sexual experience compared to 64% of females. Of those who had engaged in past sexual relations, a higher percentage of males reporting using condoms than females among the sexually experienced, 53.9 and 41.7% respectively

Table 5.3. Socio-Demographic Differences by Gender

Domain and Predictor	Gender		p*
	Male % (n=337)	Female % (n=301)	
Demographic			
Age, y			.080
18-19	20.2 (69)	22.4 (68)	
20 to 22	52.5 (179)	57.9 (176)	
23 to 36	27.3 (93)	19.7 (60)	
Ethnicity			.699
Mestizo	89.3 (301)	90.2 (272)	
Indigenous	9.2 (31)	7.6 (23)	
Birth Place			.929
Capital/Urban (>50,000)	81.5 (274)	81.3 (243)	
Rural	18.5 (62)	18.7 (56)	
Semester of Study			.252
1 through 3	42.2 (137)	36.1 (100)	
4 through 6	43.7 (142)	50.2 (139)	
6 through 10	12.2 (46)	13.7 (38)	

*Bivariate chi-squared test of significance

Note: Significant p-values ($p < .05$) are in bold

Figure 5.3 and 5.4 displays a graphical representation of the attitudes and behaviors measured in the survey according to gender.

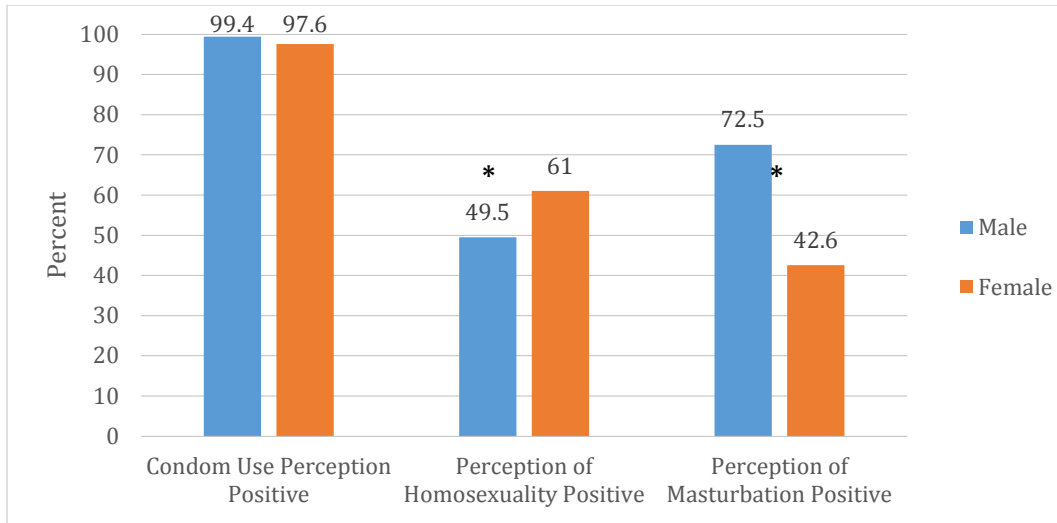


Figure 5.3. Attitudes by Gender

* Denotes statistically significant finding

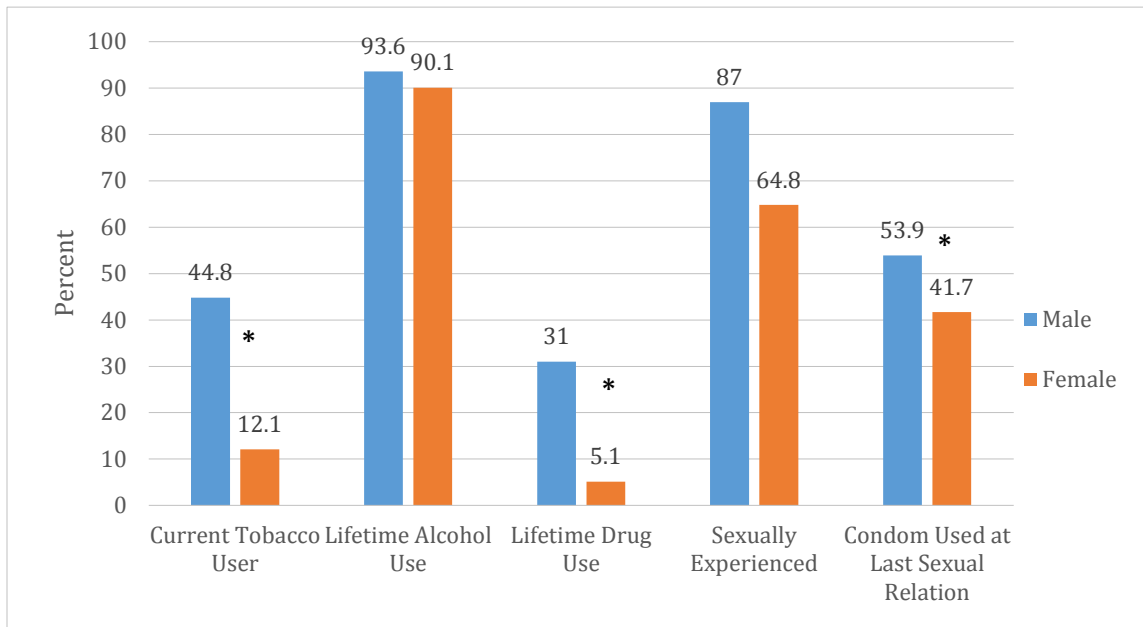


Figure 5.4. Behaviors by Gender

* Denotes statistically significant finding

A major focus of the survey was to collect base level health information on the student body and discern what behaviors were similar and different between those who engaged in said

behavior. Table 5.4 is divided by sexual experience, comparing non-sexually experienced males with sexually experienced males and the same comparison for females. A question for lifetime sexual experience was used to distinguish this, asking participants if they had ever had sex, with the answers ‘yes’ and ‘no.’

The gender division of the results reveals there are more differences among females concerning sexual experience than males. While only 42 males, or 13% of the total, never had engaged in sexual relations, 35% of the females (n=101) had never had sex.

Table 5.4. Socio-Demographic Differences in Sexual Experience Stratified by Gender

Domain and Predictor	Overall Sample % (n=645)	Female Respondents		p*	Male Respondents		p*
		No Sexual Experience % (n=101)	Sexual Experience % (n=186)		No Sexual Experience % (n=43)	Sexual Experience % (n=288)	
<i>Demographic</i>							
Age, y				.007			.002
18-19	20.9 (129)	29.7 (30)	16.1 (32)		32.5 (14)	18.4 (53)	
20 to 22	54.9 (339)	58.4 (59)	58.1 (108)		60.5 (26)	50.7 (146)	
23-36	24.3 (150)	11.9 (12)	24.7 (46)		7 (3)	30.9 (89)	
Birth Province				.027			.054
Chimborazo	46.1 (285)	59.4 (60)	45.7 (85)		55.8 (24)	40.3 (116)	
All Others	53.9 (333)	40.6 (41)	54.3 (101)		44.2 (19)	59.7 (172)	
Semester of Study				<.001			.353
1 through 3	39.2 (226)	47.4 (45)	28.7 (48)		48.8 (20)	41.2 (113)	
4 through 6	46.4 (268)	47.4 (45)	51.5 (86)		49.3 (18)	43.4 (119)	
6 through 10	14.4 (83)	5.2 (5)	19.8 (33)		7.3 (3)	15.3 (42)	
<i>Attitudes</i>							
Positive Perception of:							
Masturbation	58.7 (347)	32.6 (31)	48.0 (86)	.014	52.4 (22)	75.6 (208)	.001
Condom Use	98.5 (585)	97.9 (93)	98.4 (179)	.208	100 (41)	98.6 (272)	.583
Homosexuality	54.1 (323)	52.1 (50)	64.8 (118)	.039	47.6 (20)	48.7 (135)	.893
<i>Behavior</i>							
Relationship Status				<.001			.004
Married	8.5 (52)	1 (1)	17.7 (33)		2.33 (1)	6.0 (17)	
Dating	59.4 (365)	45.5 (46)	64.0 (119)		41.9 (18)	63.9 (182)	
Single	32.2 (198)	56.5 (54)	18.3 (34)		55.8 (24)	30.2 (86)	
Lifetime Drug Use	19.57 (110)	1.1 (1)	7.8 (13)	.022	1.8 (2)	35.9 (94)	<.001
Current Tobacco User	29.7 (172)	6.3 (6)	15.6 (28)	.024	14.6 (6)	50.0 (132)	<.001
Lifetime Alcohol Use	91.7 (535)	77.9 (74)	96.5 (165)	<.001	79.1 (34)	95.6 (262)	<.001

*Bivariate chi-squared analysis

Note: Significant p-values (p<.05) are in bold

Table 5.5 shows results by alcohol use and stratified by gender. The question addressing lifetime use of alcohol, and asked, “Have you ever consumed drinks containing alcohol (such as beer, wine)?” The answers were again “yes” or “no,” with abstainers skipping the next three questions about use patterns. Alcohol use was the final domain of the survey and consisted of the last four questions, which may explain why there was not 100% response rate for this section. Out of the 645 surveys, 610 (94%) had answers to questions about alcohol use. Alcohol use was found to be high among both the females and males, with 90.5% of females having ever used alcohol and 91.9% of the male respondents having ever used alcohol.

Among the alcohol abstaining women (n=28), over 70% of them are from the province of Chimborazo. For males this number is lower, with 10 males abstaining or around 47.6% of the total abstainers. Additionally, a much higher percentage of the respondents self identify as Indigenous who abstain from alcohol, representing a fourfold increase in the percent of the total abstainers when compared to alcohol users (21 to 5% of females and 31 to 7% of males respectively). This was found to have a significant *p* value within both the male and female comparison and represents one of the two measures where both genders have significant differences. Finally, there was more variation in the analysis of alcohol use between males than there was between females. This is the opposite of sexual experience that was examined in Table 5.4 where the majority of the differences were seen in females.

Table 5.5. Socio-Demographic Differences in Alcohol Use Stratified by Gender

Domain	Overall Sample % (n=645)	Female Respondents		p*	Male Respondents		p*
		No Alcohol Use % (n=28)	Alcohol Use % (n=255)		No Alcohol Use % (n=21)	Alcohol Use % (n=306)	
<i>Demographic</i>							
Age, y				.935			.805
18-19	20.1 (128)	25.0 (7)	22.0 (56)		19.1 (4)	19.9 (61)	
20 to 22	55.9 (341)	57.1 (16)	59.6 (152)		57.6 (10)	53.3 (163)	
23-36	23.1 (141)	17.9 (5)	18.4 (47)		33.3 (7)	26.8 (82)	
Birth Province				.027			.710
Chimborazo	47.4 (289)	71.4 (20)	49.4 (126)		47.6 (10)	43.4 (133)	
All Others	52.6 (321)	28.6 (8)	50.6 (129)		52.4 (11)	56.5 (173)	
Ethnicity				.001			<.001
Mestizo	91.9 (546)	78.6 (22)	94.8 (235)		68.4 (13)	92.2 (276)	
Indigenous	8.1 (48)	21.4 (6)	5.2 (13)		31.6 (6)	7.7 (23)	
<i>Attitudes</i>							
Positive Perception of:							
Masturbation	98.8 (594)	100 (28)	98.0 (247)	.452	95.0 (19)	99.7 (300)	.010
Condom Use	55.6 (336)	57.1 (16)	63.0 (158)	.548	42.9 (9)	50.3 (153)	.508
Homosexuality	58.6 (351)	21.4 (6)	44.8 (111)	.018	50.0 (10)	73.9 (224)	.020
<i>Behavior</i>							
Lifetime Drug Use	18.9 (111)	0	5.8 (14)	.189	4.8 (1)	32.8 (95)	.007
Current Tobacco User	29.1 (179)	3.6 (1)	13.2 (33)	.139	5.3 (1)	47.6 (139)	<.001
Have Had Sexual Relations	73.0 (445)	21.4 (6)	64.7 (165)	<.001	57.1 (12)	85.6 (262)	<.001
Sexually Experienced							
Subsample	(n=445)	(n=6)	(n=165)		(n=12)	(n=262)	
Condom Used During Last Intercourse	48.5 (229)	20.0 (1)	42.5 (68)	.315	66.7 (8)	53.1 (137)	.357

*Bivariate chi-squared analysis

Note: Significant *p*-values (*p*<.05) are in bold

Table 5.6 presents data that examines behavioral and demographic differences in tobacco use. The question on the survey asked, “Do you currently smoke a tobacco produce such as cigarettes, cigars, or pipes?” Users were grouped together regardless of the amount. Even with this combination the number of female tobacco users was still small (n=35) and represented only 12% of the female sample. In males, however, the rates are much higher with 44.8% of the male respondents currently using some form of tobacco.

Table 5.6. Socio-Demographic Differences in Tobacco Use Stratified by Gender

Domain and Predictor	Overall Sample % (n=645)	Female Respondents		p*	Male Respondents		p*
		No Tobacco Use % (n=255)	Tobacco Use % (n=35)		No Tobacco Use % (n=174)	Tobacco Use % (n=141)	
<i>Demographic</i>							
Age, y				.657			.089
18-19	26.1 (131)	23.5 (60)	17.1 (6)		22.4 (39)	18.4 (26)	
20 to 22	54.9 (332)	57.7 (147)	60.0 (21)		46.6 (81)	58.9 (83)	
23-36	23.5 (142)	18.8 (48)	22.9 (8)		31.0 (54)	22.7 (32)	
Birth Province				.995			.977
Chimborazo	29.1 (176)	51.4 (131)	51.4 (18)		43.1 (75)	43.3 (61)	
All Others	70.9 (429)	48.6 (124)	48.6 (17)		56.9 (99)	56.7 (80)	
<i>Attitudes</i>							
Positive Perception of:							
Condom Use	98.5 (588)	97.2 (224)	100 (35)	.372	98.3 (162)	100.0 (140)	.199
Homosexuality	55.8 (334)	61.8 (155)	62.9 (22)	.899	47.7 (83)	53.2 (74)	.330
Masturbation	58.6 (348)	41.7 (103)	51.4 (18)	.277	67.4 (116)	79.3 (111)	.019
<i>Behaviors</i>							
Lifetime Drug Use	18.9 (108)	2.3 (8)	18.2 (6)	<.001	17.4 (28)	47.5 (66)	<.001
Lifetime Alcohol Use	92.0 (541)	88.9 (216)	97.1 (33)	.139	89.5 (153)	99.3 (139)	<.001
Had Sexual Experience	76.4 (442)	62.7 (151)	82.4 (28)	.024	79.0 (132)	95.7 (132)	<.001
<i>Sexually Experienced</i>							
<i>Subsample</i>	(n=442)	(n=151)	(n=28)		(n=132)	(n=132)	
Condom Used During Last Intercourse	47.5 (207)	37.8 (56)	53.9 (14)	.131	61.5 (80)	43.1 (56)	.003

*Bivariate chi-squared analysis

Note: Significant p-values (p<.05) are in bold

Tables 5.7 and 5.8 present the odds ratio (OR) of condom use at last intercourse among different variables. Condom use was higher than what is found in the literature; about 48% of the sexually active population used a condom at last intercourse. In the overall sample there was a higher condom at last intercourse usage rate among males (53.9%) than among females (41.7%). This difference is statistically significant. Between ethnicities there was no significant difference, with 48.3% of Mestizos using condoms compared to 57.1% of Indigenous. Tables 5.7, 5.8 and 5.9 are not stratified by gender or ethnicity; the sample is used as a whole to increase power.

Analysis shows that both age and gender had a significant correlation with condom use. Because of this, both variables were controlled in the following analysis to limit any potential confounding of the results. Any significant difference found would not be attributable to the influence of gender or age.

Table 5.7. Bivariate Logistic Regression Results Showing Demographic Factors Associated With Condom Use at Last Intercourse

Demographic Variable	OR (95% CI)	p*
Age, y		
18-19	2.27 (1.3, 4.0)	.005
20 to 22	1.01 (.7, 1.5)	.966
23-36 (Ref)	1.00	
Gender		
Female (Ref)	1.00	
Male	1.65 (1.1-2.4)	.009

*Bivariate Logistic Regression

Note. CI = confidence interval OR = odds ratio, significant p-values (p<.05) are in bold

Table 5.8 shows the results of a multivariate logistic regression of social factors controlling for age and gender. Of all the indicators analyzed only the differences of condom use when compared to relationship status had significant results. A respondent who was single had an OR of 3.11, meaning that they were 2.11 times more likely to use a condom when compared to the reference group of married respondents. Whether the participant had experienced financial difficulties from drinking was also found to be significant, with an OR of 1.8. A few of the factors analyzed also had marginal findings, meaning that they were very close to significance.

Table 5.8. Multivariate Logistic Regression Results Showing Social Behavior Factors Associated with using a Condom at Last Intercourse

Behavior Variable	OR (95% CI)	p*
Relationship Status		
Single	3.11 (1.5, 6.4)	.002
Dating	1.84 (1.0, 3.5)	.070
Married (ref)	1.00	
Current Tobacco User		
Yes (ref)	1.00	
No	1.48 (1.0, 2.3)	.071
Length of Tobacco Use		
1 to 3 years (ref)	1.00	
4 to 10 years	1.96 (1.0, 3.9)	.056
Lifetime Drug Use		
Used (ref)	1.00	
None	1.55 (1.0-2.5)	.069
Amount of Drug Use in Past 30 Days		
1 to 5 times (ref)	1.00	
6 or more	2.69 (.9, 8.4)	.089
Lifetime Alcohol Use		
Used	1.02 (.4, 2.6)	.975
None (ref)	1.00	
Financial Difficulty from Alcohol Use		
Yes (ref)	1.00	
No	1.83 (1.1, 2.9)	.011

*Multivariate Logistic Regression Controlling for Gender and Age

Note. CI = confidence interval OR = odds ratio, significant p-values (p<.05) are in bold

Sexual behavior variables were also analyzed. The strongest relation was observed when differentiating between current sexual partners. For analysis, the author used those respondents who were married as the reference group. The sample that had a girlfriend or boyfriend as their current sexual partner had an OR of 2.87 of condom use at last intercourse and those who had multiple sexual partners an OR of 4.12 of condom use at last intercourse.

The survey asked participants where they had received the majority of their sexual and reproductive health (SRH) information. As multiple respondents checked more than one option the analysis was conducted comparing each variable to not learning the same information in that area. For example, those who learned SRH information at home were compared to those who did

not. Of all the variables, learning SRH information at home (OR 1.50) and in the university (OR 1.60) was found to be significant.

Table 5.9. Multivariate Logistic Regression Results Showing Sexual Behavior Factors Associated with Condom Use at Last Intercourse and Sexual Experience

Behavior Variable	Condom Use at Last Intercourse (n=228)		Sexual Experience (n=474)	
	OR (95% CI)	p*	OR (95% CI)	p**
Relationship Status				
Single	3.11 (1.5, 6.4)	.002	1.00 (ref)	
Dating	1.84 (1.0, 3.5)	.070	3.57 (2.3, 5.5)	<.001
Married	1.00 (ref)		16.53 (2.7, 73.8)	<.001
Current Tobacco User				
Yes	1.00 (ref)		4.48 (2.3, 8.7)	<.001
No	1.48 (1.0, 2.3)	.071	1.00 (ref)	
Length of Tobacco Use				
1 to 3 years	1.00 (ref)		1.00 (ref)	
4 to 10 years	1.96 (1.0, 3.9)	.056	3.04 (0.4, 25.7)	.308
Lifetime Drug Use				
Used	1.00 (ref)		8.64 (2.6, 15.9)	<.001
None	1.55 (1.0-2.5)	.069	1.00 (ref)	
Lifetime Alcohol Use				
Used	1.02 (.4, 2.6)	.975	7.8 (3.8, 15.9)	<.001
None	1.00 (ref)		1.00 (ref)	
Financial Difficulty from Alcohol Use				
Yes	1.00 (ref)		5.84 (2.0, 16.7)	.001
No	1.83 (1.1, 2.9)	.011	1.00 (ref)	

*Multivariate Logistic Regression Controlling for Gender and Age

** Multivariate Logistic Regression Controlling for Gender, Age, and Birth Province

Note. CI = confidence interval OR = odds ratio, significant p-values (p<.05) are in bold

6.0 DISCUSSION

The aim of this analysis was to discover the differences between the population of users and abstainers in various health behaviors. With this information, the ESPOCH will be able to target specifically the populations at risk or the behaviors of interest. Table 6.1 compares the findings to rates found in the literature for Ecuador, with the specific population noted. The population in the sample is aged 18 to 36, with a median age of 22.

Table 6.1. Comparison of Study Rates and Literature Rates for Populations in Ecuador

Behavior	Behavior Prevalence Found in the Sample (ages 18 to 36)	Behavior Prevalence found in the Literature	Studied Population in the Literature (all in Ecuador)
Sexual Experience	76.7%	86% ^[55]	Aged 10 to 19
Current Tobacco Use	29.1% (12.1% female)	13.1% ^[50]	Females 15 to 49
Lifetime Drug Use	18.9%	4.2% ^[51]	Aged 12 to 17
Lifetime Alcohol Use	92%	60% ^[52]	Aged 18 plus

As seen in Table 6.1, there are a few large differences between what is found in the literature and what is present in the sample. One difference is in drug use, with the study sample having a six fold increase from what is found in the literature. The ages are mutually exclusive as the survey was had an age range from 18 to 36, however, so that could explain some of the findings. Alcohol use is also higher than what is found in the literature, but also makes sense when looking at the population involved in the study. All are college students with some disposable income, and many social venues in Riobamba involve alcohol.

Larger variance was found in the analysis between males and females than there was within the same gender when examining substance use and sexual experience. This finding aligns with

the societal and cultural norms of Ecuador. From anecdotal knowledge the author was aware of the traditional “rite of passage” for many young males. Often it consists of a trip to the *chongo*, sex worker house, with an elder male in the family. This can happen as young as 13 for some areas in Ecuador and reflects a much more permissible attitude when it comes to sex. *Machismo*, the cultural norm that men need to be “strong” and “manly” and be the provider in relationships, is ubiquitous in Ecuador.^[56] Many parents’ perceptions of the consequences of risky behaviors for males are lower than the consequence of the same action for females.^[57]

Machismo has been largely adopted by the Indigenous cultures of Ecuador, and this showed in the results of this study.^[58] Of the three questions analyzed in regards to sexual experience (Figure 5.2) there was no statistically significant difference between Indigenous and Mestizo. Many of the Indigenous communities in the province of Chimborazo are conservative Christian or Evangelical Christian.^[58] Part of that religion, at least in Ecuador, is the commitment to a “dry” community, meaning that alcohol and drug use are strictly prohibited. The impact of religion showed in the sample. Despite many other similarities between ethnicities, there was a significant difference between the Mestizo and Indigenous samples for alcohol and drug use (Figure 5.2).

A comparison of the demographic areas by ethnicity resulted in no large differences. This finding supports the idea that cultural differences may be influencing Indigenous students more than their physical background, as proposed previously. Favorable perception of condom use was found to be significantly different between the two ethnicities, with a higher percentage of Indigenous identifying participants looking favorably upon it. There was also a difference in actual condom use with more Indigenous using condoms than Mestizo. A potential reason for this difference is the recent push to provide sexual and reproductive health information and modern contraception to rural communities in the *sierra* region.^[2] The economic factors associated with

university attendance could also speak to this difference; Indigenous students need to be exemplary to be able to succeed while confronting long held institutional racism. That is starting to change however, and Indigenous youth are now the target of many of the scholarships that the *Bienestar Politecnico* provides.^[7]

Differences by gender were found to be significantly different for almost every social characteristic that was examined. Of the three questions on perceptions of health topics, two were found to have significant differences. Figure 5.3 shows that females were significantly more likely to have a positive perception of homosexuality, and less likely to hold positive attitudes about masturbation. Masculine culture and *machismo* do not allow a permissive view of homosexuality for males as it goes against its core concepts.^[57] For females this is a different story, and there is little perceived threat to their womanhood from gays or lesbians.^[57] Perception of masturbation is also a social construct and the act is much more permissible for males than for females. *Machismo* supports the notion that men are born to enjoy their sexuality; for women it is a responsibility.

Females in the sample were significantly less likely to use a condom at their last intercourse than males. They also had a 2% difference in positive perceptions of condom use from 99% for males to 97% for females. This may have to do with a number of factors, including that more sexually active females are in relationships and sexual power dynamics. In a sexual relationship it is culturally normal for the male to have the majority of the power in deciding contraceptive use. This is especially prevalent in the countryside, where many females will accept only contraceptive injections because they are undetectable. Overall for the sample females were significantly less likely to be sexually experienced, again related to approval of male promiscuity through cultural norms like *machismo*.

The findings about sexual experience based on the convenience sample used in the 2010 survey contradicted those in 2013. In the 2010 sample, 97% of the males and 91% of the females were sexually active, or 351 of the sample of 374.^[53] The findings from the 2013 survey found that 87% of the males and 65% of the females were sexually experienced. One possible explanation is the method of surveying that allowed participants to be more or less truthful. The 2013 Sexual Health survey was conducted in classrooms where peer anonymity was not certain. Participants, though told to not share answers or talk during the time period, often glanced at their friends' papers or made short comments to their peers about the questions. Despite the assurance of anonymity once the author received the surveys, this could result in some participants not feeling comfortable in answering some sexual health questions without fear of it becoming common knowledge.

The survey conducted in 2010 was done online, perhaps allowing for participants to feel they were able to answer the questions more truthfully. After the initial question measuring sexual experience the survey moved onto further topics related to sexual experience. For the secondary questions only 275 respondents answered, and that same number is eventually identified as the number of sexually active participants. This is contrary to the initial designation of 351 sexually active participants, but makes sense in comparison to the 2013 data. The designated subsample of 275 is 73.5%, which aligns closely with the 2013 sexually experience sample of 75.9%

Other behaviors varied significantly between females and males, many of which have cultural explanations. Females were significantly less like to have used drugs in the lifetime, as well as to be current tobacco users. Both of these make sense culturally, and the difference in tobacco use is found in the 2010 survey as well. The breakdown of the survey in 2010 had 57% of the females "always" smoking and 77% of males. These findings are substantially higher than

what was found in 2013, 12% and 45% respectively, and are not supported by the current national literature. No plausible explication of these differences can be gleaned from the data, resulting in the possible of error in analysis, sampling, or survey design as the probably factor. Intermittent smoke-free campaigns are commonplace at the ESPOCH, the biggest being one in 2008 and again in 2010. If the campaigns affected the population's tobacco use rate it should have had more effect in the 2010 survey, which was conducted between two large campaigns.

6.1 SEXUAL EXPERIENCE

Sexual experience varied greatly between males and females. Sexually active males were more likely to engage in a multitude of behaviors and hold attitudes that sexually active females did not, and vice versa. In Table 5.4 this comparison was carried a step further by contrasting the attributes of each gender within the gender; males who were sexually experienced were compared to males who were not, females who were sexually experienced were compared to females who were not. The table was created in order to identify the correlated attributes of sexual experience in the sample of students from the ESPOCH, hoping that key characteristics could be discovered for targeting future interventions.

In general the significant differences between the non-sexually experienced and sexually experienced populations are similar for the two genders. Each of the substance use analyses returned significant results, meaning that sexually experienced females and males differed from their non-sexually experienced peers in lifetime alcohol use, current tobacco use, and lifetime drug use. This comes as no surprise as these factors are correlated with sexual experience in the literature.^[37, 59-61]

Age and the participant's partner status (married, dating, or single) were significantly different between sexual experience for both males and females. Additionally, the semester of study and discipline of study were both significant for females. The difference seen in discipline was mostly in Business Administration, with contained 40% of the sample of the non-sexually experienced. In the sexually experienced sample only 26% of the students come from Business Administration. Sampling could be the reason for this difference, as a higher percentage of the students sampled in the Business Administration discipline were younger when compared to other disciplines.

The last significant difference is for females and their birth province. Females who are born in Chimborazo are significantly different in sexual experience from females born outside the province. In the sexually non-experienced sample roughly 59% of the participants are from Chimborazo, while in the sexually experienced sample only around 46% are. Students who originate from Chimborazo usually live at home, which could provide one explanation for this difference.

6.2 ALCOHOL USE

Alcohol use is examined in the same fashion that sexual experience was, the stratification is again by gender, with the intra-gender comparison as alcohol users versus abstainers. The variables that were significant often corresponded to the significant values from the analysis of sexual experience. One variable that was not concordant with sexual experience was age of the sample. Alcohol is legal for consumption after the age of 18, though this law is not frequently enforced outside of Quito and Guayaquil, the two largest cities in Ecuador.^[62] Despite this, the author

postulated that age would be associated with alcohol consumption believing that students aged 18 to 19 would probably have lower alcohol consumption than those who were between the ages of 23 to 36. Semester of study was not significantly different for alcohol users and abstainers, giving credence to the findings concerning age. Though not absolutely constant, the more semesters a student has completed, the older the student is. An insignificant finding in both variables strongly supports the idea that age does not correlate with alcohol use.

Another significant finding about alcohol use that supports prior findings is the difference between ethnicity. The potential reasons, discussed in the introduction to this chapter, include cultural and religious values and norms. This finding is also supported by data from the government. In 2013 only 4.5% of the Indigenous responded reported current alcohol use to the National Survey of Income and Household Spending. This represented the lowest consumption by any ethnic group, the number of Mestizo users was almost double that at 8%.^[63]

Females also significantly differed in the analysis of the province in which they were born. Though data about household composition are not available, the author postulates that many of the females who were born in the province of Chimborazo still live with their close kin, resulting in limited access to alcohol because of limited or monitored excursions from the house. The importance of familial support and perceptions of the appropriate female behavior could be a reason to explain this difference, as discussed in previous sections. Familial support is perceived to facilitate superior performance in many aspects of life in Riobamba, nowhere more so than in academics among young adults. In the sample more abstaining females are from the province of Chimborazo, 71%, compared to abstaining males, 48%.

Drug and tobacco use were found to be significantly associated with alcohol use, but only among the male sample, a finding that was not expected. Populations that engage in one risk

behavior have been shown to more often engaged in other risky behavior, regardless of gender.^[61]

^{64]} The difference here could potentially be explained by the higher ratio of females that were born in the Chimborazo province. Similar to alcohol, parents or close kin are not likely to be as permissive with females as with males regarding these social vices.

The attitudes participants held about masturbation and homosexuality differed between alcohol users and abstainers. Males were more likely to have a positive perception of masturbation and homosexuality if they were alcohol users, a finding for masturbation that was not mirrored by females. In the male subsample of alcohol abstainers, 65% of the sample is Indigenous. If the author's postulations concerning the reasons why Indigenous populations do not drink (i.e. religion and culture) are correct, this could explain the difference. As is well known, many religions, especially socially conservative ones, do not support homosexuality. This could influence an Indigenous respondent's personal view of homosexuality and lead to a negative view of homosexuality when many of his peers hold a different view.

The final grouping of attributes analyzed is within the sexually experience subsample. The author, with support from current literature, postulated that the alcohol using subsample would have some significant differences in sexual conduct.^[65] This was not reflected in the sample, however, where neither the current sexual partner nor condom use were significantly different between the sub-samples. More investigation is needed to explain the background of the similarities between the two groups.

6.3 TOBACCO USE

Tobacco use was the last behavior of interest to the *Bienestar Politécnico* and was the last to be evaluated using a bivariate chi-squared analysis. The analysis was conducted with the same stratification as both alcohol use and sexual experience. Out of the three main behavioral characteristics tobacco use had the fewest significant differences. None of the demographic characteristics analyzed were different by users and abstainers. As with alcohol use, the author had postulated that there would be a significant difference between the ages of tobacco users and abstainers. Tobacco use is illegal to persons under the age of 18 so a gradient of tobacco use was expected.^[66] Perhaps, like alcohol use, the law is not strictly monitored outside of the capital of Quito so many smokers begin in high school or earlier.

There were more significant differences in the analysis of behavioral variables for the male population than for the female in tobacco use. Drug use, alcohol consumption, and sexual experience all were significant for males. Females, however, only had two significant findings in the analysis. Alcohol use was not found significant for the comparison of females by tobacco use, an unanticipated finding. The near ubiquity of alcohol use may have affected the analysis. Male tobacco use differed for those who used condoms at last intercourse as well. Respondents who did not use tobacco had a 20% increase in condom use when compared to tobacco users. The high rate of drug use (47.5%) and alcohol use (99.3%) by the tobacco-using sample could explain this finding.

6.4 LIMITATIONS

Due to the study design and participant selection the results should not be used to make inferences or recommendations for other populations besides the students at the ESPOCH. The study did draw a sample that represented approximately 6% of the student body and used a proportional design to ensure representation of each discipline.

The biases associated with the study are mostly the results of the sampling strategy and study design. As the participant selection was not random, a selection bias could have influenced the results. Despite this, there was a high response rate (88%) for the sample so participant selection should not have a large influence. Participants were not obligated to participate, meaning that self-selection bias could affect the results. This is postulated to be low as only one student refused; however, students missing from classes may have had different characteristics than the students who attended class that day. Some potential characteristics among the absent students could be substantially higher rates of substance use that affected their school attendance. Other unknown biases may have occurred in the process of the data gathering and evaluation. Despite these limitations, the study results can and should be used to inform future research in the area or with similar populations.

**7.0 SEXUAL EXPERIENCE AND CONDOM USE AMONG STUDENTS AT A
STATE UNIVERSITY IN ECUADOR: AN EXPLORATORY STUDY**

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7.1 ABSTRACT

Objective: Previous research has shown that condom use at last intercourse is an indicator of consistent condom use. Yet research on the correlates of condom use at last intercourse in Ecuador has not been prioritized in recent years. The aim of this study was to uncover the social, demographic, and behavioral characteristics associated with condom use at last intercourse.

Methods: A proportional sampling design was used to collect data from 645 students in 31 classrooms at the Escuela Superior Politécnica De Chimborazo (ESPOCH). The survey, written in Spanish, consisted of 35 questions over five domains: demographics, sexual health, tobacco use, drug use, and alcohol use. Analysis of the data was conducted in SAS 9.3 and both a chi-squared test of independence and logistic regressions were run on the data to determine correlations.

Results: Students who learned their sexual and reproductive health information at home or in high school had a higher likelihood of engaging in sexual relations than their peers. However, if sexual health information was learned in either the home or at university the students had a higher odds ratio of using a condom at last intercourse. Condom use at last intercourse strongly correlated with a less recent sexual encounter (OR 2.51), younger age (OR 2.27), and the last sexual partner being outside a relationship (OR 4.12).

Conclusions: Many of the sexual health behaviors of the student sample at the ESPOCH are out of control of that institution. However, there are a few protective factors that remain within their sphere of influence such as increasing frequency between sexual encounters and the inclusion of sexual and reproductive health information in the ESPOCH.

Key Words: Condom Use, Ecuador, Young Adult, Sexual Health, Riobamba, Public University

7.2 RESUMEN

Objetivo: Las investigaciones anteriores han demostrado que el uso del preservativo en la última relación es un indicador del uso del condón constante. Sin embargo, la investigación sobre los correlatos de uso del preservativo en la última relación en Ecuador no se ha priorizado en los últimos años. El objetivo de este estudio era descubrir las características sociales, demográficas y de comportamiento asociados con el uso del condón en la última relación.

Métodos: Un diseño de muestreo proporcional se utiliza para recopilar datos de 645 alumnos en 31 aulas de la Escuela Superior Politécnica de Chimborazo (ESPOCH). El estudio, escrito en español, consistió en 35 preguntas en cinco ámbitos: demografía, salud sexual, el consumo de tabaco, consumo de drogas y consumo de alcohol. El análisis de los datos se realizó en SAS 9.3 y la vez una prueba de chi-cuadrado de independencia y regresión logística se realizaron en los datos para determinar las correlaciones.

Resultados: Los estudiantes que aprendieron su información de salud sexual y reproductiva en el hogar o en la escuela secundaria tenían una mayor probabilidad de tener relaciones sexuales que sus pares. Sin embargo, si la información de salud sexual se supo ya sea en el hogar o en la universidad los estudiantes tuvieron una razón de probabilidad más alta de haber usado condón en su última relación sexual. El uso del preservativo en la última relación fuertemente correlacionada con un encuentro sexual menos reciente (OR 2,51), menor edad (OR 2,27), y la última pareja sexual está fuera de una relación (OR 4,12).

Conclusiones: Muchos de los comportamientos de salud sexual de la muestra de estudiantes de la ESPOCH están fuera del control de esa institución. Sin embargo, hay algunos factores de protección que permanecen dentro de su esfera de influencia, tales como el aumento de la

frecuencia entre los encuentros sexuales y la inclusión de información sobre salud sexual y reproductiva en la ESPOCH.

Palabras Claves: Use de Condon, Ecuador, Juventud, Salud Sexual, Riobamba, Universidad Publica

7.3 INTRODUCTION

Condoms provide the means to live a healthy sexual life by offering protection against a range of sexually transmitted infections, including HIV, that other contraceptive methods do not.^[1] Worldwide condom usage rates vary substantially by country, and within countries.^[1] Studies have found that many factors are associated with condom use, with the strongest being social economic status, education, previous exposure to condom use, knowledge of correct usage, and access.^[1-3] Sexual experience also varies substantially within countries. Several international studies of sexual experience have found being male, using drugs and alcohol, and age are all positive predictors of sexual experience.^[3-6]

Sexual and reproductive health is an important topic for the Ecuadorian government. This focus manifests itself in the constitution of Ecuador, where Title II Article 32 guarantees the citizens the right to health by providing “access to programs, actions, and services promoting and providing integral healthcare, sexual health, and reproductive health” (pg. 29).^[7] Using this refrain as it’s basis, the government of Ecuador launched a national campaign called ENIPLA to address sexual health and wellness among adolescents.^[8] This program provides funding for special health centers focused specifically on young adults equipped with a doctor, nurse, and often psychologist. All of the employees are integral to providing health messages to the youth community though

outreach and youth groups, both requirements of the strategy.^[8] One of the more successful campaigns has been a health communication campaign called “Habla Serio, Sexualidad Sin Misterios” or “talk seriously, sexuality without mystery.”^[8] Concerts, theater, and other public events to promote health sexuality are funded by the program.

Despite the Ecuadorian government’s new focus, sexual experience outside of marriage is not consistently measured and can often only be approximated by using other variables. The mean age of first sexual encounter has been tracked and the findings point to an increasing earlier sexual debut. In 2004, the national study by ENDIEM found that the average age of sexual initiation was 18 years for females and 17 for males.^[9] A similar study conducted in 2011 with adolescents in Cuenca, Ecuador, found that average age of sexual debut was 15 years for females and 14 years for males.^[10]

Condom use among women in consensual unions or marriages remains low.^[11] Of the 59% of women aged 15 to 43 using modern contraceptive methods, only 4.3% were using condoms.^[11] In a study of young males who have sex with males in Ecuador only one in four had used condoms with the last three partners.^[12] Adolescents use condoms at low rates as well. A study in the Amazonian region of Ecuador found that only 34% of females had used a condom, despite 84% having knowledge of it.^[13]

With the new policies of ENIPLA and condom distribution, sexual practices in Ecuador may be changing. ENIPLA also created a subsidiary health clinic that operates within a regular government clinic.. Each of the youth orientated health clinics, focused on ages 13 to 19, are mandated to provide both female and male condoms free to their patients. Additionally each hospital was to have a free male condom dispensary in public spaces.^[8] Although access may be

increased, this does not mean an increased use. To date many of these new programs have not been evaluated as to their effectiveness.

The study aims to evaluate the social, behavioral, and demographic differences between sexually experienced participants and those who were not. It also aims to clarify the impact of those factors on the decision to use a condom for students at the Escuela Superior Politécnica de Chimborazo (ESPOCH).

7.4 MATERIALS AND METHODS

7.4.1 Study Setting

The study setting was Riobamba, Chimborazo, which is the fourth largest city in the Andean region of Ecuador with a city population of around 150,000. The study site, Escuela Superior Politécnica De Chimborazo (ESPOCH), is in Riobamba, and has been a constant presence there since 1972. With its long history and highly rated performance it has become a staple in Riobamba and draws students from every other province in Ecuador. More than 50% of the total student population comes from outside the province of Chimborazo, creating an atmosphere that is unique to the ESPOCH in the Riobamba urban area. Family support plays an important role in the development of young adults in Ecuador, as well as worldwide. Students who come from other provinces often lack the direct support and guidance provided by close family members, which could play a role in the higher risky behaviors among the student population when compared to literature.

7.4.2 Study Design and Participants

A proportional cross sectional study was used to sample an accurate representation of the seven different disciplines at the school.^[14] The distribution of the students across the disciplines made this design appealing as it guaranteed that each area would be sampled. Additionally, it was hypothesized that students studying in one discipline would significantly differ from other populations. The sample size was calculated to be 600 when both the study design and sampling method were taken into account. There is less variability in a proportional design than in a random sample.^[14] Therefore, proportional sampling designs are considered equivalent to simple random sampling for sample size calculations.

7.4.3 Measures and Instruments

Demographics. One aim of the survey was to gather demographic data on the student population. To meet this goal, the demographic questions included both traditional questions such as age, gender, and ethnicity, as well as questions specific for a university population such as the discipline and semester of study.

Sexual Health, Sexuality, and Sexual Experience. The national government and health programs in Ecuador have made sexual health a priority area for work with young people. The ESPOCH is no exception to this, and helped focus and form the survey questions on sexual health and behaviors. Because of this, 19 of the 35 (see Table 7.1) questions were devoted to measuring this area. Sexual experience was determined by the question “have you ever had sex?” with a binary answer of “yes” or “no.” If students did not have sexual experience they were instructed to skip the next five questions concerning sexual experiences. If the participant had engaged in sexual

relations, they went on to answer questions asking their partner status (married, single, dating), the frequency of relations (less than a month, one to two months, three or more months), and their sexual partners (spouse, girlfriend or boyfriend, friend, unknown, sex worker).

Perceptions of homosexuality, condom use, and masturbation were also all measured. The original questions included multiple responses that were all coded as either a negative overall perception or positive one. If it was a mixed perception it was coded as such, however this study did not examine those participants. Sexual orientation was measured by including questions examining same-sex behaviors and thoughts.

Sexual health was measured in a series of questions for both sexually active and non-active participants. One gauged the knowledge of the participants about sexually transmitted infections (STIs), asking students to correctly identify those STIs that could be prevented with proper condom use. Two questions measured HIV knowledge, asking if students knew anyone with HIV or had taken a HIV test before. The sexual and reproductive health questions that appeared on the survey are included in Table 7.1.

Table 7.1. Sample of questions relevant to sexual health and wellness among students at the Escuela Superior Politécnica de Chimborazo from the 2013 Sexual Health Survey

Sexual Health	Response Options
Do you have:	1. Spouse 2. Boyfriend/Girlfriend 3. Single
Have you ever had sex?	1. Yes 2. No
When was the last time you had sex?	1. In the last month 2. 1-2 months ago 3. 3-5 months ago 4. 6-12 months ago 5. More than 1 year
The last time you had sex, did you use a condom?	1. Yes 2. No 3. Don't Remember
Where has received the most information about sex education?	1. Home 2. College 3. Friends 4. Internet 5. University
Do you consider yourself:	1. Homosexual (Gay/Lesbian) 2. Bisexual 3. Heterosexual 4. Not sure
Do you see masturbation as: (later coded for positive perceptions [healthy, normal] and negative perceptions [something embarrassing, a sin] and both)	1. A sin 2. Something embarrassing 3. Healthy 4. Normal 5. Not sure
What do you think about condom use? (later coded for positive perceptions, negative perceptions, and both)	Fill in the blank

Condom Use and Perceptions. Condom use was measured by asking the students, “The last time you had sex, did you use a condom?” with answers “yes” “no” and “don’t remember.” Condom use at last intercourse has been shown in the literature to be an accurate measure of recent consistent condom use.

7.4.4 Analysis

The statistical program SAS version 9.3 was used for all analyses. The survey was designed with 32 categorical questions and three open ended questions. The only open ended question used for this analysis was concerning condom use perceptions. The coding procedure is noted in Table.7.1. The data were analyzed with a chi-squared test of independence to determine differences in demographics for those with and without sexual experience. Second, a bivariate logistic regression was used to examine demographics associated with condom use at last intercourse. A multivariate regression was then used to control for the strongly associated variables, gender and age.

7.5 RESULTS

A total of 645 surveys were drawn from the student body at the ESPOCH from 30 May to July 1 2013. Data were collected on 14 days, and a total of 30 different classrooms were surveyed. A response rate of 88% was calculated using the total number of students enrolled in the classes and the number actually surveyed. Survey respondents came from each of the seven faculties of the ESPOCH and represented 6% of the total student body. Survey respondents varied in age from 18 to 36 and came from every province in the country with a slight majority coming from outside the province of Chimborazo. The equation used for the response rate is as follows.

$$\frac{\text{completes}}{\text{completes} + \text{nonrespondents}}$$

7.5.1 Demographics and Sexual Experience

The number of students who were sexually experienced was 474, which represents around 73% of the sample. Gender differences are present, with 87% of males sexually active and 65% of females sexually active. A statistically significant difference was not found between Mestizo and Indigenous populations, despite the gap in percentages. Of the Mestizo sample 77% were sexually active, while in the Indigenous population there was 71% (Table 7.2).

7.5.2 Comparing socio-demographic factors between those with and without sexual experience

A total of 18 variables were analyzed for the sample participants who had engaged in sexual relations and those who had not. Of those, 11 were found to have significant differences in the distribution as characterized by a chi-squared test.

Four behaviors were analyzed and found to have significant differences is the distribution between the sexually experienced and sexually non-experienced. The largest difference was found in drug use. Of the participants who had engaged in sexual relations, 25% had used drugs. For those who were not sexually experienced, only 2.2% had used drugs. Sexual experience also influenced current partner status in the sample. Only 25% of the sexually active participants were single, however 54% of single participants were sexually non-experience.

Attitudes did not vary as much as behavior between the sexually active and abstainers. Of the eight measures analyzed only three were found to have significant differences. One of these was perception of masturbation, for which there was a large difference between the sexually experienced and the abstinent sample, 64% and 38% respectively. Where the participant learned

sexual and reproductive health (SRH) information was also analyzed. Of the five areas possible (home, friends, high school, university, and family) the only significant difference was found among those who learned SRH information at home or in high school. In both cases, the results indicated that the participants who had learned SRH information in those locations were more likely to have engaged in relations than those who did not. The same was not true for learning the information at university, on the Internet, or from friends.

Condom use at last intercourse was also analyzed among the sexually experience participants and the output displayed in Table 7.2. The analysis of two variables were found to be significant, the positive perception of homosexuality and relationships status for the participant.

Table 7.2. Social and Behavioral Differences in Sexual Experience and Condom Use at Last Intercourse

Domain and Predictor	Sexual Experienced (n=645)		p*	Condom Use At Last Intercourse (n=474)		p*
	Yes % (n=474)	No % (n=144)		Yes % (n=229)	No % (n=238)	
Attitudes						
Positive Perceptions of Condom Use	98.9 (451)	97.1 (134)	.129	98.6 (212)	99.1 (229)	.596
Positive Perception of Homosexuality	55.1 (253)	50.7 (70)	.363	50.9 (111)	60.6 (140)	.039
Positive Perception of Masturbation	64.8 (294)	38.7 (53)	<.001	65.4 (140)	65.2 (150)	.890
Sexual Health Information Learned:						
At Home	69.2 (328)	58.3 (84)	.015	64.9 (148)	72.9 (172)	.064
In High School	47.7 (223)	36.1 (52)	.014	48.3 (110)	47.0 (111)	.794
From Friends	76.4 (362)	80.6 (116)	.294	77.6 (177)	76.3 (180)	.728
On the Internet	73.4 (348)	78.5 (113)	.222	72.8 (166)	74.2 (175)	.743
In University	75.9 (358)	79.2 (114)	.368	71.9 (164)	78.4 (185)	.107
Behavior						
Current Tobacco User	36.1 (160)	8.8 (12)	<.001	33.9 (70)	37.9 (86)	.398
Lifetime Alcohol Use	96.0 (427)	78.3 (108)	<.001	95.8 (205)	96.4 (213)	.753
Lifetime Drug Use	25.0 (107)	2.2 (3)	<.001	22.8 (46)	27.3 (59)	.285
Partner			<.001			<.001
Partnered	74.5 (353)	45.8 (78)		68.4 (156)	80.5 (190)	
Single	25.8 (121)	54.2 (78)		31.6 (72)	19.5 (46)	

*Bivariate chi-squared analysis

Note. Significant p-values (p<.05) are in bold

Finally, demographics showed wide variability between the sexually experienced sample and the abstainers. Age and semester of study were both found to have significant differences, suggesting that older participants were more likely to have engaged in sexual relations. While a difference in sexual experience between ethnicities was not found, there was a significant difference between the distributions of gender. Males were more likely to have engaged in sexual experience (60%), compared to females (39%). Additionally those who were born in the province of Chimborazo had significant differences in distribution between sexual experiences. Fifty seven percent of students born outside of Chimborazo were sexually active, while only 42% of the sexually active sample was from Chimborazo.

Table 7.3. Demographic Differences in Sexual Experience and Condom Use at Last Intercourse

Domain and Predictor	Sexual Experienced (n=645)		p*	Condom Use At Last Intercourse (n=474)		p*
	Yes % (n=474)	No % (n=144)		Yes % (n=229)	No % (n=238)	
Demographic						
Age, y			<.001			.006
18-19	17.9 (85)	30.6 (44)		23.6 (54)	12.3 (29)	
20 to 22	53.6 (254)	59.0 (85)		50 (114)	57.6 (136)	
23 to 36	28.5 (135)	10.4 (15)		26.3 (60)	30.1 (71)	
Gender			<.001			.010
Male	60.8 (288)	29.9 (43)		67.1 (153)	55.5 (131)	
Female	39.2 (286)	70.1 (101)		32.9 (75)	44.5 (105)	
Ethnicity			.417			.315
Mestizo	92.3 (422)	90.2 (129)		90.9 (199)	93.4 (213)	
Indigenous	7.7 (35)	9.8 (14)		9.1 (20)	6.6 (15)	
Birthplace Province			<.001			.880
Chimborazo	42.4 (201)	58.3 (84)		42.1 (96)	42.8 (101)	
Other	57.6 (273)	41.7 (60)		57.9 (132)	57.2 (135)	
Semester of Study			.002			.527
1 through 3	36.5 (161)	47.8 (65)		39.3 (83)	34.1 (75)	
4 through 6	46.5 (205)	46.3 (63)		44.6 (94)	48.2 (106)	
6 through 10	17.0 (75)	6.9 (8)		16.1 (34)	17.7 (39)	

*Bivariate chi-squared analysis

Note. Significant p-values (p<.05) are in bold

7.5.3 Influencing factors of condom use among sexually active respondents

Gender and age were found to be associated with condom use. Being 18 or 19 represents a 2.27 OR of condom use at last intercourse compared to sample participants that were in the reference group of 23 to 36. Males had an OR of 1.65 for condom use when compared to females, who were the reference group.

Many of the substance use variables in Table 7.2 failed to have a significant p value despite having an OR of 1.5 or above. These include current tobacco use, lifetime drug use, and lifetime alcohol use. The lack of significance can be attributed to small sample numbers, as the overall sample of condom use at last intercourse is only 228. Despite the small numbers, sample respondents that had not had financial difficulty from alcohol use had a significant OR of 1.83. To interpret, participants who had not had financial difficulties from alcohol use were 80% more likely to use a condom than respondents who had financial difficulties.

Table 7.4 displays the analysis of behavioral variables in relation to condom use at last intercourse and sexual activity. By using a logistic regression, the analysis can find the direction of association. The reference groups changed between the variables, and in general what was the direction of association for condom use at last intercourse was the opposite of the direction of association for sexual experience. For the analysis of condom use at last intercourse in relationship status the reference group is married, meaning that married respondents were least likely to have used condoms in the sample at last intercourse. However, for sexual experience it is the opposite, the participants who were single were the reference group and the married participants had a much higher odds of using a condom at last intercourse.

Table 7.4. Multivariate Logistic Regression Results Showing Social and Behavior Factors Associated with Condom Use at Last Intercourse and Sexual Experience

Behavior Variable	Condom Use at Last Intercourse (n=228)		Sexual Experience (n=474)	
	OR (95% CI)	p*	OR (95% CI)	p**
Relationship Status				
Single	3.11 (1.5, 6.4)	.002	1.00 (ref)	
Dating	1.84 (1.0, 3.5)	.070	3.57 (2.3, 5.5)	<.001
Married	1.00 (ref)		16.53 (2.7, 73.8)	<.001
Current Tobacco User				
Yes	1.00 (ref)		4.48 (2.3, 8.7)	<.001
No	1.48 (1.0, 2.3)	.071	1.00 (ref)	
Length of Tobacco Use				
1 to 3 years	1.00 (ref)		1.00 (ref)	
4 to 10 years	1.96 (1.0, 3.9)	.056	3.04 (0.4, 25.7)	.308
Lifetime Drug Use				
Used	1.00 (ref)		8.64 (2.6, 15.9)	<.001
None	1.55 (1.0-2.5)	.069	1.00 (ref)	
Lifetime Alcohol Use				
Used	1.02 (.4, 2.6)	.975	7.8 (3.8, 15.9)	<.001
None	1.00 (ref)		1.00 (ref)	
Financial Difficulty from Alcohol Use				
Yes	1.00 (ref)		5.84 (2.0, 16.7)	.001
No	1.83 (1.1, 2.9)	.011	1.00 (ref)	

*Multivariate Logistic Regression Controlling for Gender and Age

** Multivariate Logistic Regression Controlling for Gender, Age, and Birth Province

Note. CI = confidence interval OR = odds ratio, significant p-values (p<.05) are in bold

The analysis of selected sexual behavior variables are displayed in Table 7.5. Time from last intercourse and the partner of last relation were both strong associated with condom use. Participants who had not had sex within the last 2 months had an OR 2.51 of using a condom at last intercourse compared to those who had engaged in sexual relations in the last month. If participants had engaged in relations in the last one to two months they also were significantly more likely to use a condom compared to in the last month (OR 1.64 or a 64% increase). Sample participants were significantly more likely to use a condom if their last sexual relation was with a friend (OR 4.12) rather than with a spouse (reference). Last sexual relation with a girlfriend or boyfriend also predicted condom use, a 187% increase (OR 2.87) in condom use at last intercourse compared to those whose last intercourse was with a spouse.

Those who responded positively to condom use at last intercourse had a higher mean percentage of condom use in the past 60 days when compared to those who responded negatively. They also were most likely to be consistent condom users (52%) in the last 60 days compare to those who didn't use condoms at last intercourse (7%).^[15]

Table 7.5 displays the analysis of the effect that learning sexual and reproductive health (SRH) information had from difference sources as well as other sexual practices. Two sources were found to be significantly associated with condom use. The odds of using a condom at last intercourse were 60% greater for those who reported received sexual and reproductive health information from the university compared to those who learned SRH information elsewhere. Learning SRH information at home was also favorable for condom use, with a 50% increase odds of condom use at last intercourse among those who learned their information in this channel when compared to those who did not.

Table 7.5. Multivariate Logistic Regression Results Showing Sexual Behavior Factors Associated with using a Condom at Last Intercourse

Behavior Variable (n=299)	OR (95% CI)	p*
Sexually Active in the Last		
>1 Month (ref)	1.00	
1-2 Months	1.64 (1.0, 2.7)	.047
3 Months or More	2.51 (1.6, 4.0)	<.001
Sexually Transmitted Infections		
None	3.42 (1.2, 9.5)	.018
Told Of	2.78 (1.2, 6.5)	.081
Treat for (ref)	1.00	
Current Sexual Partner		
Single Regular Sexual Partner (ref)	1.00	
No Sexual Partner	1.38 (.63, 3.0)	.419
Multiple Sexual Partners	2.78 (1.2, 6.5)	.017
Last Sexual Relation		
With Spouse (ref)	1.00	
With Girl/Boyfriend	2.87 (1.5, 5.5)	.001
With Friend	4.12 (1.8, 9.2)	.001
Sexual Health Information Learned:		
At Home	1.50 (1.0, 2.2)	.047
Not at Home (ref)	1.00	
In High School	1.11 (0.7, 1.6)	.595
Not in High School (ref)	1.00	
From Friends	.928 (.6, 1.4)	.735
Not from Friends (ref)	1.00	
On the Internet	.998 (.7, 1.5)	.991
Not on the Internet (ref)	1.00	
In University	1.6 (1.0, 2.5)	.035
Not in University (ref)	1.00	

*Multivariate Logistic Regression Controlling for Gender and Age

Note. CI = confidence interval OR = odds ratio, significant p-values (p<.05) are in bold

7.6 DISCUSSION

The results indicate that the majority of students are behaving in health protecting ways. For many of the variables analyzed, the more risky behavior was used as the reference group in the logistic regression, suggesting that fewer students are engaging in that behavior. Some clear

examples of this are a higher odds condom use for a casual sex partner, for multiple sexual partners, and with students who identify as single.

In the sample approximately 76% (n=474) of the students had previously engaged in sexual relations. Of these, only 48% had used a condom at last intercourse. When broken down by gender, 87% of males were sexually active and 54% of them used condoms, and 65% of females were sexually active and approximately 42% of them used condoms. Table 7.3 clearly shows the analysis of gender and condom use, indicating that there is a 1.65 OR increase for males over females in condom use at last intercourse. A multivariate analysis of specifically condom use has never been done comparing male and female participants in Ecuador. However, a study conducted in 1998 found that males were 3.6 times more likely to use family planning during his first intercourse.^[16] Older age was also found to be a significant factor in contraception use at first sexual encounter in 1998, a finding that is not collaborated in this study.^[16] The measurement indicator could be the reason for this, the current study asking about condom use at last intercourse while the 1998 study asking for information from the first intercourse.

Compared to students who have a single regular sexual partner, the sample that currently was having relations with multiple sexual partners was 1.78 times more likely to use a condom at last intercourse. The participants who did not have a current sexual partner were also slightly more likely to use a condom (OR=1.48). The value was not found to have a significant *p* value however. Despite this, time from last intercourse was found to have a significant relation with condom use at last intercourse. Respondents who had their last sexual relationship were used as the reference group, which resulted in significant findings for both one to two months (OR 1.64) and three months or more (OR 2.51). This could be partly due to recall bias, as those who more recently engaged in sexual activity were more likely to accurately remember the details.

When the variables associated with SRH information in Table 7.2 are viewed it appears that there is a higher likelihood of sexual experience if the participant was taught SRH in earlier stages of their life. Both at home and in high school were significant variables, and happen earlier in life, than the university or potentially SRH access on the Internet. However, the analysis displayed in Table 7.4 shows that both of these venues had resulted in a higher OR of condom use at last intercourse. It appears, then, that despite engaging in sexual relations more often than their peers that learned SRH information outside the home and high school, the participants who learned SRH there have a higher odds of engaging in responsible sexual encounters.

7.6.1 Implications and Future Research

Many of the factors that were different in the analysis of condom use at last intercourse are personal behaviors. The ESPOCH will not have the authority or the power to influence home life or change curriculum in high schools. However, that does not mean there is nothing that can be done. The ESPOCH, with this information, will be able to specifically focus their sexual health campaigns on populations that are at risk. Additionally, the sample showed stronger differences in these personal behaviors and condom use when there was higher risk involved, i.e multiple sexual partners, single status, and last sexual partner. There were a few areas that could be improved upon, however, and which lie within the realm of influence of the ESPOCH.

One of these corresponds to the finding that the longer it had been from the last sexual encounter the more likely a student in the sample was to wear a condom. If proven among the general student body the ESPOCH could use this data to adapt evidence-based interventions that have been shown to increase between sexual encounters. Allowing more time to pass between

sexual experiences has also been shown effective in reducing the number of unwanted pregnancies and STIs.^[3]

An important finding was that the participants who had learned the majority of their sexual and reproductive health (SRH) information at home or in the university were more likely to use condoms. Though the ESPOCH does not have much influence in the home of their students, if these findings are replicated and affirmed on a larger scale there could be larger implications for national or regional policies. Conversations about sexual health involving the nuclear family have been shown to be effective in various cultural settings, including Ecuador.^[3, 17, 18] The ESPOCH does have direct control over the curriculum and programs that their students engage with during their five years studying. According to the findings, students who had learned their SRH information at the ESPOCH had an OR 1.60 increase in condom use. Much of this exposure comes through requested presentations for specific classes. Currently there is no required sexual health curriculum for the student population; only the students in the Discipline of Public Health receive repeated, fact-based information on a regular basis. Expanding this program to all other disciplines could increase condom use and decrease unwanted sexual health outcomes and is within the power of the ESPOCH.

7.6.2 Limitations

Due to the study design and participant selection the results should not be used to make inferences or recommendations for other populations besides the students at the ESPOCH. The study did draw a sample that represented approximately six percent of the student body and used a proportional design to ensure representation of each discipline.

The biases associated with the study are mostly the results of the sampling strategy and study design. As the participant selection was not random, a selection bias could have influenced the results. Despite this, there was a high response rate (88%) for the sample so participant selection should not have a large influence. Participants were not obligated to participate, meaning that self-selection bias could affect the results. This is postulated to be low as only one student refused, however, many classes had students missing class that might have different characteristics than the students that attended class that day. Some potential characteristics among the absent students could be higher rates of substance use or risky sexual behavior. Other unknown biases may have occurred in the process of the data gathering and evaluation. Despite these limitations, the study results can and should be used to inform future research in the area or with similar populations.

7.6.3 Conclusions

The current study aimed to understand what social and personal behaviors affect condom use and sexual behavior in students at a state funded university in Riobamba, Ecuador. Many of the behavioral differences seen among the sample that used condoms at last intercourse are factors that are often well established by the time they enroll in the university. However, protective factors such as a decreased frequency of sexual activity and the inclusion of sexual and reproductive health information curriculum at the ESPOCH are modifiable through single interventions. There are various programs in the literature, including various evidence-based interventions (EBI) that have worked in Latino populations before. One EBI found to influence sexual experience, condom usage, and HIV risk perception is a model developed for Latino youth in Philadelphia.^[19] It utilizes six hands on sessions with students to increase their health knowledge and self-efficacy. Any EBI

would need to be tailor to the specific population at the ESPOCH and would need to be supported by access to contraceptive methods such as condoms.

By using the results of the current survey to guide their future work, the ESPOCH will be able to focus specifically on population with low condom use and modifiable risk behaviors that correlate with use. The use of rigorously collected data is also important for every university in Ecuador to find both focus areas and to monitor current programs. The ESPOCH may well be able to provide by example an effective and simple data collection tool to monitor progress.

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8.0 CONCLUSIONS

The health data of the students in the sample from the 2013 Sexual Health Survey cannot be generalized to the overall student body because of the study design. However, they still represent an important source of information for the *Bienestar Politécnico*. Accurate and up-to-date data are crucial to creating and adjusting programs and interventions, especially in settings where financing is limited.

There were marked differences between males and females in many of the variables, suggesting that a tailored intervention for gender will be a requirement of any successful health program. Many of these differences may have roots in the cultural norms and communal acceptance of *machismo*. While interventions work to help affect the downstream portion of students' health, the ESPOCH and Riobamba as a whole must do more to combat inequality and disparate beliefs that are ingrained in *machismo* and some cultural practices.

Ethnicity should also play a more important role in the decisions of the *Bienestar* for future programmatic work. Despite the similarities between the demographics of Mestizos and Indigenous peoples in the sample, there still emerged significant differences between each group in attitudes and behaviors. Ecuador as a country has worked in the last 10 years to increase the health of Indigenous populations countrywide, and the fact that such a significant number of Indigenous students (8% of sample) attend the ESPOCH is testament to the effectiveness of these programs. However, many barriers remain in the form of poverty and discrimination, and facing these should be priority for the both the *Bienestar* and the Escuela Superior Politécnica De Chimborazo.^[2, 3, 5, 48]

The analysis of the variables of interest (drugs, alcohol, and sexual experience) within each gender by the users and abstainers also reveals results to direct the future of *Bienestar*. In general those who do not partake in any one substance will be less likely to engage in the other two. Demographics do not seem to influence who uses alcohol or tobacco, but appear key in determining who engages in sexual activities. Interestingly, the differences between users and abstainers of alcohol and tobacco are significant when comparing the variable of sexual activities, but not significant when compared as a variable between those who are sexually experienced and those who are not. More research is needed to clarify and focus these topics and others.

8.1 IMPLICATIONS AND FUTURE RESEARCH

Results for the sample of students at the ESPOCH seem to follow many other recognized health findings in Ecuador and internationally. Alcohol use and sexual experience are linked in this survey, and persons engaging in both these behaviors are often more likely to use tobacco and drugs. Apart from these researched health behaviors, the Sexual Health Survey has implications for future research done in young adult populations in Ecuador. Using the results to inform questions and areas of interest is appropriate and should be encouraged.

Gender plays a large role in determining the attitudes and regulating the behaviors of students in the sample. Only one of both the three attitudes and four behaviors analyzed between the males and females were found to be not significant. Many of the health campaigns that the *Bienestar Politécnico* undertook did not have separate arms for the two genders. These findings can help change that in the coming years. Ethnic background also has significant differences between the Mestizo and Indigenous populations. Cultural values and norms still play a large part

in daily life in the sample population. In the creation of future health interventions with alcohol use or tobacco use, it is important that the *Bienestar Politécnico* consider these differences.

Sexual health was the main concentration of the Sexual Health Survey. The *Bienestar Politécnico* was worried that many of their students appeared to be engaging in risky sexual behaviors without protecting themselves. These findings will be able to assure them in some regards. The sample had higher condom use at last intercourse than other samples in Ecuador. The analysis also showed that the sample who engaged in risky sexual behavior such as multiple sexual partners or sexual relations with acquaintances were actually at a higher odds ratio of using condoms. Additionally, Indigenous students, who are often characterized by the literature to have the worst health outcomes, actually have increased protective behaviors in the sample. These include a higher use of condoms, less use of alcohol, and less use of alcohol.

Health and wellness in Ecuador have been valued and prioritized in the past decade more than ever before. Many of the best known indicators to measure overall health of a population such as poverty level, education attainment, and infant and maternal mortality rates have declined substantially in the past 15 years. The voices of ethnic groups that once were marginalized and discriminated against have started to be heard, and recently Ecuador has been upgraded by the United Nations to a middle developed country. Despite these changes, information on the impact of the recent investments in substance use and sexual health education on a national level is still lacking.

This thesis helps to fill that gap by providing an analysis of the health and wellness of a university student body in Riobamba, Ecuador. Specifically, the sample shows protective behaviors in condom use and sexual experience when controlling for potentially confounding factors such as age or gender. Condoms were used at last intercourse by almost 50% of the sample,

a figure that is seldom found in comparable literature. Additionally, learning sexual health information from the university actually increased the chance that the participants used a condom at last intercourse. These findings have profound impacts for the future direction of sexual health programs, and provide the first steps to the creation of database of health statistics from which to measure future health interventions.

APPENDIX A: OFICIO OF PERMISSION (SPANISH)



ESCUELA SUPERIOR POLITÉCNICA DE CHIMBORAZO
DEPARTAMENTO DE BIENESTAR POLITÉCNICO
Panamericana Sur Km.1 ½ * Telefax 032-998-200 Ext. 217*453* info@esPOCH.edu.ec

Oficio No. 0278.DBP.ESPOCH.2013
Abril 2 del 2013

Señor
Orrin Tiberi
VOLUNTARIO DEL CUERPO DE PAZ
Presente

De mi consideración:

Con un saludo cordial, informo que en base a su pedido de poder realizar una investigación y aplicar una encuesta sobre Salud Sexual y Reproductiva en la población estudiantil, debo indicar que la misma cuenta con el visto bueno para que pueda ejecutar lo antes mencionado en la institución.

Con la consideración y estima.

Atentamente,
"Saber para Ser"



Dra. Silvia Veloz Miño
DIRECTORA DPTO. BIENESTAR POLITÉCNICO.

Rosanna V.

APPENDIX B: OFICIO OF PERMISSION (ENGLISH)

ESCUELA SUPERIOR POLITÉCNICA DE CHIMBORAZO
DEPARTAMENTO DE BIENESTAR POLITÉCNICO
Panamericana Sur Km. 1 ½ * Fax 032-998-200 Ext. 217-453 * info@epoch.edu.ec

Oficio No. 0278.DBP.ESPOCH.2013
2 April of 2013

Sir
Orrin Tiberi
Peace Corps Volunteer
Present

Of my consideration,

With a cordial greetings, I inform to you the status of your request to conduct research and apply a survey about sexual and reproductive health in the student population of the ESPOCH. I wirt to indicate to you that the same request, with good intentions, can be carried out with the previously mentioned institution.

With consideration and esteem

Sincerely
"To know in order to be

Dra. Silvia Veloz Miño
Directo of the Departamento de Bienestar Politécnico

APPENDIX C: SEXUAL HEALTH SURVEY (SPANISH)

Escuela Superior Politécnica de Chimborazo Encuesta Salud Sexual

ESPOCH Bienestar Politécnica & Cuerpo de Paz

Reciban un gran saludo de mi parte y quiero que por la presente sepan que soy miembro activo de Bienestar y que también soy un voluntario extranjero que trabaja en su lindo país. Estoy acá en Riobamba haciendo mi tesis sobre salud sexual por lo que me gustaría que usted me ayude a responder con veracidad y exactitud la siguiente encuesta. Esta enfocada en salud sexual entre los estudiantes de la ESPOCH, como tal, se le pedirá que llene varias preguntas sobre su conocimiento sexual, también algunos temas potencialmente relacionados, tales como las drogas y el alcohol. Todas las respuestas son anónimas y confidenciales y sólo para uso personal. Su cooperación es voluntaria y no existen riesgos asociados con este estudio de 5 minutos. Si decide no participar, por favor, no tome una encuesta. Gracias por su ayuda y tenga un buen día.

Rodear o llenar la respuesta correcta

1. Fecha de Nacimiento _____

2. Sexo 1. M 2. F

3. Lugar de Nacimiento

Provincia _____

Cantón _____

4. Etnia

1. Afro-Ecuatoriana 2. Mestizo/a

3. Indígena 4. Otro _____

5. ¿En qué semestre esta? _____

6. ¿En qué facultad estudia?

VIIH / ITS

7. ¿Alguna vez ha recibido tratamiento para una ITS (Infección de Transmisión Sexual) o han dicho que tiene una ITS.

1. Sí (han dicho) 2. Sí (tratamiento)

3. Ambos 4. No

8. ¿De qué infecciones de transmisión sexual puede protegerse mediante el uso de un condón?

(Marca todo que aplica) 1. Gonorrea 2. Sífilis

3. Herpes Genital 4. VPH 5. Chancro

6. Hepatitis B 7. VIH 8. Ladilla

9. ¿Ha tenido una prueba para ver si tiene el VIH/SIDA?

1. Sí 2. No

10. ¿Conoce usted una persona que está infectado con el virus de VIH?

1. Sí 2. No

11. ¿Cuál es el principal problema de salud sexual que ve en su compañeros de la ESPOCH hoy en día? (llene el espacio en blanco)

Pasado Sexual / Salud Sexual

12. Tiene usted:

1. Novia/o 2. Marido/mujer 3. Ninguna

13. ¿Alguna vez ha tenido relaciones sexuales?

1. Sí 2. No (si no, pase a la pregunta 19)

14. ¿Tiene actualmente:

1. Una pareja sexual regular

2. Varias parejas sexuales

3. No tiene pareja sexual

15. ¿Cuándo fue la última vez que tuvo relaciones sexuales?

1. En el último mes 2. Hace 1-2 meses

3. Hace 3-5 meses 4. Hace 6-12 meses

5. Más de 1 año

16. La persona con quien tuvo relaciones sexuales la última vez era?

1. Cónyuge / Unión Libre

2. Novio/novia

3. Amigo/a

4. Desconocido

5. Pariente

6. Trabajadora sexual

7. Otro

17. La última vez que tuvo relaciones sexuales, usó un condón?

1. Sí 2. No 3. No recuerdo

18. ¿Alguna vez ha tenido relaciones íntimas con una pareja del mismo sexo?

1. Sí 2. No

19. ¿Dónde ha recibido la mayor información sobre educación sexual?

1. Hogar 2. Colegio 3. Amigos

4. Internet 5. Universidad

20. ¿Se considera usted

- 1. Homosexual (Gay Lesbiana)
- 2. Bisexual (Ambos)
- 3. Heterosexual
- 4. No está seguro

21. ¿Ha tenido fantasías o pensamientos íntimos con personas del mismo sexo?

- 1. Sí
- 2. No

22. ¿Usted ve la homosexualidad como:

- 1. Un pecado
- 2. Algo anormal
- 3. Una parte de la humanidad
- 4. No está seguro

23. ¿Usted tiene un amigo o miembro de la familia que es abiertamente gay/lesbiana/bisexual?

- 1. Sí
- 2. No

24. ¿Usted ve la masturbación como:

- 1. Un pecado
- 2. Algo vergonzoso
- 3. Saludable
- 4. ¿No está seguro
- 5. Algo normal

25. ¿Qué piensa sobre el uso del condón? (llene el espacio en blanco)

26. ¿Qué papel tiene el sexualidad en nuestras vidas? (llene el espacio en blanco)

Tabaco

27. ¿Fuma usted actualmente algún producto de tabaco, tales como cigarrillos, puros o pipas?

- 1. Sí, cada día
- 2. Sí, pero no todos los días
- 3. No, no en absoluto (si respondió 1 o 2 sigue a pregunta 28, si respondió 3, sigue a pregunta 29)

28. ¿Durante cuántos años ha fumado?

- 1. Menos de 1
- 2. 1 a 3
- 3. 3 a 5
- 4. 6 a 10

Drogas

29. ¿Alguna vez ha consumido algún tipo de droga (tal como marihuana, cocaína, heroína, ácidos, éxtasis, etc)

- 1. Sí
- 2. No (si no omitir hasta el 32)

30. ¿Durante los últimos 3 meses ¿cuántas veces ha usado drogas?

- 1. 1 a 2
- 2. 3 a 5
- 3. 6 a 10
- 4. Más de 11

31. ¿En un día que no ha consumido drogas, usted esta pensando en consumir las?

- 1. Sí
- 2. No

Alcohol

32. ¿Alguna vez ha consumido bebidas que contienen alcohol (como cerveza, vino, etc)?

- 1. Sí
- 2. No (si no omitir 33, 34, 35)

33. ¿Durante las últimas dos semanas, ¿cuántos vasos de cerveza o de cualquier bebida alcohólica ha consumido?

- 1. 1 a 2
- 2. 3 a 5
- 3. 6 a 10
- 4. Más de 11

34. ¿Ha tenido dificultades financieras a causa de la bebida?

- 1. Sí
- 2. No

35. ¿Suele seguir bebiendo a la mañana siguiente después de una noche de beber?

- 1. Sí
- 2. No

Para más información o si tiene preguntas sobre cualquiera de los temas de la encuesta, acérquese al Departamento de Bienestar Estudiantil Politécnica o el Centro de Atención Integral en Salud de ESPOCH (CAISES)

Gracias por su participación!

APPENDIX D: SEXUAL HEALTH SURVEY (ENGLISH)

Escuela Superior Politécnica de Chimborazo
Sexual Health Survey
ESPOCH Bienestar Politécnico & Cuerpo de Paz

Receive a big welcome and thank for my part. I would like you to know that I am part of the Bienestar Politécnico and also a volunteer working abroad in your beautiful country. I'm here in Riobamba doing my thesis on sexual health so I would like you to help me by answering the following survey truthfully and accurately. The survey is focused on sexual health among students ESPOCH and as such, you will be asked to fill out several questions about your sexual knowledge and some potentially related issues such as drugs and alcohol. All responses are anonymous and confidential and only for personal use. Your cooperation is voluntary and there are no risks associated with this 5-minute study. If you decide not to participate, please do not take a survey. Thanks for your help and have a good day.

Circle or fill in the correct answer

- Age _____
- Gender 1. M 2. F
- Place of Birth
Province _____
County _____
- Ethnicity**
1. Afro-Ecuadorian 2. Mestizo / a
3. Indian 4. Other _____

5. In what semester are you studying?

6. In what school are you studying?

HIV / STI

7. Have you ever been treated for an STID (sexually transmitted disease) or been told you have one?

1. Yes 2. No 3. I do not remember

8. What STDs can condoms protect you from?

1. Gonorrhea 2. Syphilis 3. Genital Herpes
3. HPV 4. VIH 5. Chancro 7. Hepatitis B 8. Ladilla

9. Have you had a test to see if you have HIV, the virus that causes AIDS?

1. Yes 2. No 3. I do not remember

10. Do you personally know someone who is infected with HIV?

1. Yes 2. No 3. I do not remember

11. What is the main sexual health problem he sees in your peers at ESPOCH today? (Fill in the blank)

Past Sexual / Sexual Health

12. Do you have:

- Boyfriend/girlfriend
- Husband / wife
- None

13. Have you ever had sex?

1. Yes 2. No (if no, skip to question 19)

14. Do you currently have:

- Regular sex partner
- A sexual partner
- No partner sexual

15. When was the last time you had sex?

- In the last month
- 1-2 months ago
- 3-5 months ago
- 6-12 months ago
- More than 1 year

16. The person you had sex was the last time?

- Spouse / cohabiting
- Boyfriend / girlfriend
- Friend
- Casual acquaintance
- Relative
- Sex worker
- Other

17. The last time you had sex, did you use a condom?

1. Yes 2. No 3. I do not remember

18. Have you ever been intimate with a partner of the same sex?

1. Yes 2. No

19. Where has received the most information about sex education?

- Home
- College.
- Friends.
- Internet
- University

20. Do you consider yourself

1. Homosexual (Gay Lesbian) 2. Bisexual (Both)
3. Heterosexual 4. Not sure

21. Have you had intimate fantasies or thoughts with people of the same sex?

1. Yes 2. No

22. Do you see homosexuality as:

1. A sin 2. Something abnormal
3. A part of humanity 4. Not sure

23. Do you have a friend or family member who is openly gay / lesbian / bisexual?

1. Yes 2. No 3. Not sure

24. Do you see masturbation as:

1. A sin 2. Something embarrassing
3. Healthy 4. Not sure 5. Normal

25. What do you think about condom use? (Fill in the blank)

26. What is the role of sexuality in our lives? (Fill in the blank)

Tobacco

27. Do you currently smoke a snuff product, such as cigarettes, cigars or pipes?

1. Yes, every day 2. Yes, but not every day
3. No, not at all (if you answered 2 or 3 continues to question 29, if you answered 1, continues to question 28)

28. How many years have you smoked daily?

1. Less than 1 2. 1 to 3 3. 3 to 5
4. 6 to 10.

Drugs

29. Have you ever used any type of drug (such as marijuana, cocaine, heroin, acid, ecstasy, etc.)

1. Yes 2. Never (if never skip to 32)

30. During the past three months how often have you used drugs?

1. 1 to 2 2. 3 to 5
3. 6 to 10. 4. More than 11

31. Do you find yourself thinking about your next drug use during a day when he's sober?

1. Yes 2. No

Alcohol

32. Have you ever consumed drinks containing alcohol (such as beer, wine, etc.)?

1. Yes 2. Never (if never, skip 33, 34, 35)

33. During the past 7 days, how many servings of beer or any alcoholic beverage have you consumed? (A portion means 12 ounces of beer, half a bottle of Pilsener, or a glass of wine)

1. 1 to 2 2. 3 to 5 3. 6 to 10. 4. More than 11

34. Have you had financial difficulties because of drinking?

1. Yes 2. No

35. Do you usually keep drinking the next morning after a night of drinking?

1. Yes 2. No

Thank you for participating

For more information or questions about any of the topics of the survey, approach the Polytechnic Student Welfare Department or the Center for Integral Health ESPOCH (CAISES)

APPENDIX E: IRB APPROVAL LETTER



University of Pittsburgh *Institutional Review Board*

3500 Fifth Avenue
Pittsburgh, PA 15213
(412) 383-1480
(412) 383-1508 (fax)
<http://www.irb.pitt.edu>

Memorandum

To: Orrin Tiberi
From: Christopher Ryan PhD, Vice Chair
Date: 4/25/2013
IRB#: [PRO13020446](#)
Subject: A Review of Sexual Health and Education on the Escuela Superior Politécnica de Chimborazo Campus in Riobamba, Chimborazo

The above-referenced project has been reviewed by the Institutional Review Board. Based on the information provided, this project meets all the necessary criteria for an exemption, and is hereby designated as "exempt" under section 45 CFR 46.101(b)(2)

Please note the following information:

- If any modifications are made to this project, use the "**Send Comments to IRB Staff**" process from the project workspace to request a review to ensure it continues to meet the exempt category.
- Upon completion of your project, be sure to finalize the project by submitting a "**Study Completed**" report from the project workspace.

Please be advised that your research study may be audited periodically by the University of Pittsburgh Research Conduct and Compliance Office.

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