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Community Influences on Sexual Risk Taking Behavior among Youth in Bolivia and the Dominican Republic

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An abstract of
A thesis submitted to the Faculty of the
Rollins School of Public Health of Emory University
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2011

Abstract

Community Influences on Sexual Risk Taking Behavior among Youth in Bolivia and the Dominican Republic

By Sarah D. Gilman and Rob Stephenson, PhD

Objectives: This analysis examined the role of community-level factors on risky sexual behaviors among young people aged 15 to 24 years in Bolivia and the Dominican Republic (DR).

Methods: Demographic and health survey data from Bolivia (2003) and the DR (2007) was analyzed to identify individual and community level factors associated with reports of risky sexual behaviors.

Results: The pathways through which the community environment affected sexual behaviors varied by gender, country and outcome. The community environment plays an important role in shaping risky sexual behavior among youth. Marital status, parity and ethnicity of surrounding communities were strong influences on youth sexual behavior.

Conclusions: These results provide support for a focus on community-level influences as an intervention point for behavioral change. However, interventions should recognize culture and context specific pathways through which the community can shape the sexual behaviors of youth.

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CH 1: Introduction

Introduction

Youth, the period between 15 and 24 years of age, represents an important transition between childhood and adulthood (3). The main objective sought at this point is to become an independent individual, a process that is often accompanied by high risk behavior (4, 5). High risk sex is one of the most common risk behaviors engaged in at this time. Sexual risk taking can have life changing consequences for youth. This ranges from the spread of HIV, HPV, and other sexually transmitted diseases, to early or unwanted pregnancy and unsafe abortion(6).

In 2000, 155 million people in Latin America and the Caribbean (LAC)were aged 10 to 24 years old (7). Given the large number of youth in the region, adolescent sexual health and sexual risk taking are important and far reaching considerations. Latin America has the second highest fertility rate among the world regions(8). Furthermore, by the year 2000, approximately 76,000 cervical cancer diagnoses and almost 30,000 cervical cancer deaths were estimated for the whole region (9). UNAIDS reports that in Latin America infections among young people are rising , increasing the disease burden on this population (10). Among young people aged 15-24, an estimated 0.4 % of women and 0.6% of men were living with HIV in 2005 (10) . In this region, negative health outcomes arising from HIV, HPV and unwanted pregnancy stem primarily from high risk sex and present major barriers to the attainment of reproductive health among youth (11).

At present, adolescent sexual health research is focused on negative and protective risk factors at the individual level (12). A multitude of individual level risk factors like education, media exposure, and drug use have been previously correlated with high risk sexual activity[(13-15). However, the relationship between individual level predictors and adverse reproductive health consequences, are seldom expanded to include the contextual factors that influence adolescent sexual behavior.

Although this area of research offers promise, further investigation is necessary to fully understand the pathways through which the community influences the individual (16, 17). Prior studies analyzing the impact of community level predictors on sexual and reproductive health outcomes are primarily centered on US and African populations (17-19). In Latin America, negative health outcomes arising from HIV, HPV and unwanted pregnancy stem primarily from high risk sex and present major barriers to the attainment of reproductive health among youth(11). Nevertheless, in this region, there is a dearth of information detailing how the environment in which one lives affects a young person's behavior.

A better understanding of how the community environment impacts decision making around sexual behavior would elucidate whether there are important social and cultural determinants among Latin American communities that affect young people's sexual behavior differently, from prior research in Africa. Additionally, understanding the community environment and its impact on sexual behavior will better inform programmatic and policy based initiatives seeking to reduce negative health outcomes resulting from high risk sex in Latin America.

The aim of this research is to examine how the community environment, including economic prosperity, demography, health knowledge and behavior and gender norms and inequalities, shapes young people's sexual behavior in two Latin American countries: Bolivia and the Dominican Republic.

The study has three primary objectives:

1. To identify how specific community characteristics like ethnicity and attitudes towards domestic violence influence the sexual behavior of young people living in that community.
2. To compare the significant community level influences across genders, outcomes and two culturally distinct countries.
3. To identify specific pathways that take advantage of the results above to implement communitywide initiatives that promote safer sex among youth.

This study contributes to existing research by providing specific pathways through which the community environment shapes young people's sexual behavior in Bolivia and the Dominican Republic. This will serve to begin filling important gaps in the literature regarding contextual effects on youth sexual behavior in Latin America. This research will also serve to elucidate whether there are important social and cultural determinants among Latin American communities that affect young people's sexual behavior differently from prior research undertaken in the US and Africa. Additionally, community based public health interventions will ensure higher success rates if they have greater knowledge regarding specific communitywide influences on young people's sexual risk taking behavior. Thus, understanding the community environment and its impact on sexual

behavior will inform and serve programmatic initiatives seeking to reduce negative health outcomes resulting from high risk sex in Latin America.

Background

Youth in Latin America and the Caribbean

In 2000, 155 million people in Latin America and the Caribbean (LAC) were aged 10 to 24. This consists of approximately one third of the total population of the region (11).

Among young people in Latin America and the Caribbean, 15 million young people are living in extreme poverty (20). While young people in Latin America do not live in the world's poorest region, it is the most unequal in the world. Data on income distribution show that on average, the richest 10 percent of the population earns 36.1 percent of all household income, while the poorest 40 percent receives just 13.6 percent. In 2002, the per capita income of the wealthiest 20 percent of the population exceeded that of the poorest 20 percent by a factor of 24.6 in the Dominican Republic, 29.6 in Colombia and 44.2 in Bolivia(7).

These economic inequalities have a significant impact on young people's reproductive health prospects(21). Factors like gender, ethnicity, race and geographic location exacerbate economic and health inequalities for young people, limiting access to social capital and opportunities (7). These limitations can also have an effect on the sexual and reproductive health choices that young people make. Currently, 50% of women and almost all sexually active men reported sex in the past year with a non-marital, non-cohabiting partner, and few reported using a condom (22). In contrast to global trends,

youth in Latin America seem to be achieving earlier ages of sexual debut, than past generations, while the age of first marriage is increasing (22). This points to a widening window of time during which Latin American youth may be most likely to engage in sexual risk taking behavior.

Bolivia and the Dominican Republic: General Overview

The two countries analyzed in this study were chosen because they are culturally, demographically and economically distinct. Both countries are similar in terms of population size, yet operate within different historical, cultural and economic contexts. Bolivia has a population of 9,947,418(23), while the Dominican Republic's population is 9, 823, 821 (24). However, Bolivia's Gross Domestic Product is approximately 47.98 billion dollars, while that of the Dominican Republic is nearly 2 times larger: 84.94 billion dollars (23, 24). Although 95% of the population identified as Roman Catholic in both countries, the ethnic makeup of each country accounts for significant cultural differences(23, 24). Each country is ethnically unique, with 73% of the population identifying as mixed race in the DR, while 75% of the population in Bolivia identifies as Quechua, Aymara or mixed Amerindian ancestry(23, 24).

Figure 1: Map of Bolivia(23)

BOLIVIA

- *Poorest country in Latin America(23)*
- *49% of the population is under age 20 (3).*
- *Highest Total Fertility Rate in Latin America: 3 children born/woman (23)*
- *41% of adolescents had their first sexual experience before reaching age 18 (12).*
- *Among women age 15-19, 18% were mothers, or pregnant (12).*
- *Bolivia HIV prevalence: 0.2% (23)*
- *High rates of HIV found among Bolivian street youth(25).*

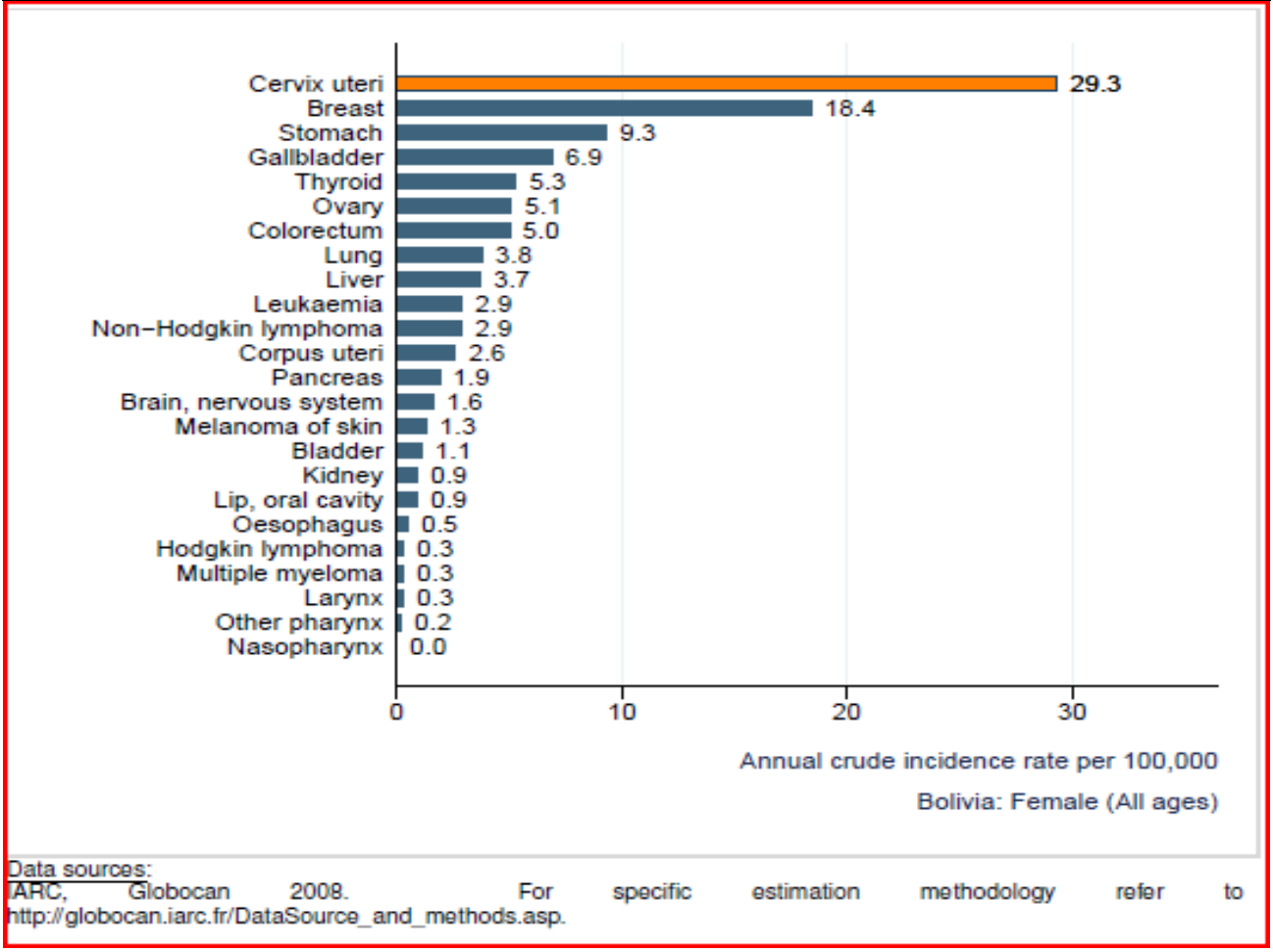
Adolescent sexual health is an important concern in Bolivia, given that approximately 49% of the population is under age twenty(26). Bolivia possesses the highest adolescent fertility rate in Latin America[5]; 27.8 %of Bolivian teenagers were sexually active at the time of the 2003 DHS survey, 3.6 % were pregnant, and 12.6 % already had a child (27).

Forty one percent of Bolivian adolescents between 15-19 years of age had their first sexual experience before reaching age 18.(12) Among this age group, only 32% of those that were sexually active used a contraceptive method. The majority of those who used a method were males older than age 17 (12). Furthermore, the majority of women didn't use any method until age 19. Among women ages 15-19, 18% were mothers, or pregnant for the

first time. Larger proportions of teen pregnancy were seen among unschooled youth(52%) and in the rural areas of Bolivia(22%) (12).

Among women of all ages in Bolivia, cervical cancer has the highest incidence of all other cancers (29.3/100,000 women per year) (28). This cancer is also the top cause of cancer mortality in the country (28). The relative incidence of cervical cancer in Bolivia is shown below.

Figure: 2 Incidence of cervical cancer compared to other cancers. Bolivia, 2008(2)



While HIV prevalence is not high in Bolivia, incidence is rising among young people, particularly in the lower socio-economic strata (25). Among those infected, the majority were diagnosed as teenagers or young adults(25). Epidemic levels of HIV remain concentrated among men who have sex with men. Surveys in Santa Cruz and La Paz, suggest that HIV prevalence has been quickly rising in this population, from nearly 0% to over 20%. On the other hand, HIV prevalence among female sex workers in 2003 was 0.2% in La Paz, Cochabamba, Chuquisaca and Santa Cruz and lower in the country's other departments (29).

DOMINICAN REPUBLIC

- *Total Fertility Rate: 2.6 children born/woman(24)*
- *23% of women 15-19 currently pregnant(30)*
- *Cervical Cancer is second most frequent cancer among women (28)*
- *DR HIV prevalence: 0.8 percent(24)*
- *Heterosexual intercourse reported as primary infection mode (31)*
- *Men who have sex with men play a large, yet under-reported role in HIV infection (32).*

Dominican Republic's, total fertility rate (2.6 children born per woman) is not as high as Bolivia's, but early childbirth remains an issue of concern (30). Findings from the 2007

Demographic Health Surveys indicate that approximately 23% of women aged 15-19 were pregnant with their first child (30). This proportion remains the same as estimates for 1996, indicating a lack of progress on goals to reduce the adolescent fertility rate(33). Additionally, it is estimated that 23% of adolescents, between the ages of 15-19 still have unmet contraceptive needs (34).

Yearly, approximately 1, 299 women are diagnosed with cervical cancer in the Dominican Republic(35). Cervical cancer ranks as the second most frequent cancer among women in the Dominican Republic, and the first most frequent cancer among women between 15 and 44 years of age(9). Data is not yet available on the prevalence of HPV among the general population in this country.

According to the 2007 Demographic and Health Survey, the adult prevalence of HIV in the Dominican Republic is 0.8 percent(31). UNAIDS estimates that 62,000 Dominicans are HIV positive(31). Heterosexual intercourse is reported to be the primary mode of HIV transmission. However, it is possible that the number of infections resulting from men who have sex with men is actually much higher than current numbers show. A culture of shame and stigma against homosexuality may be responsible for significant under-reporting in this area(31).

Among women of reproductive age, HIV is the leading cause of death in the Dominican Republic(30). However, nearly three quarters of all reported HIV cases occur in men. (30). Despite this data, studies conducted in the Dominican Republic have shown that higher rates of condom use and HIV prevention knowledge are easily achievable through adolescent sexual education(36).

Chapter 2: Comprehensive Review of the Literature

Youth: a time of transition

The United Nations defines youth as individuals between the ages of 15 and 24 (37). This period represents an important transition between childhood and adulthood, redefining their identities and perspectives on the communities they form a part of. During this time, young people invariably encounter new experiences and life changes. They take on new roles and responsibilities, making decisions that ultimately influence the quality and length of their lives. Many health protective, as well as health damaging behaviors begin in youth, and as a result, youth can be considered a time of risk and opportunity(21).

When society provides guidance and opportunities for youth through education, access to health, employment and sports and recreation, young people are more likely to transition successfully into adulthood and contribute meaningfully to the development of their societies(37). On the other hand, lack of support and guidance for the development of young people can deprive them of the opportunities and resources needed to make informed choices for them and their surrounding communities(37).

Globally, there are 1.2 billion young people aged 15-24. This group comprises 18 % of the world's population and is an essential component of projections for the global economy and development (21). About 70% of youth live in developing countries and, in 2000, 22.5% of the world's youth were surviving on less than US$1 per day (3, 21).

Theory of Risky Behavior among Youth

The period from 15-24 years old is a time of developmental change for youth. The main objective sought at this point is often to become an independent individual, a process that is often accompanied by high risk behavior (4, 5). Furthermore, it has been shown that young people respond to behavior change incentives differently (4). Peer pressure, the formation of identity and the need to establish independence are more crucial to youth than adults or children. Prior research has shown that among adolescents, specific risk behaviors may be culturally bound, but the impetus for the adolescent to engage in risky behavior is universal across all cultures (38-40).

There are three dominant theories of adolescent risk taking behaviors: biological, psychological and universal. Biologically based theories attribute risk taking behavior among youth to genetic, hormonal and psychosocial changes occurring at puberty(16, 41). Psychologically based theorists attribute risk taking behavior to a need for sensation seeking, based on an adolescents desire for new experiences that incentivize youth to take physical and social risks (42, 43). Universal theory attributes risk taking behavior to a broader combination of biologic, genetic, cultural and environmental factors. (44).

The biological perspective emphasizes individual genetic predispositions and biological differences, like timing of puberty or risk relevant genes, but does not take into account motivation or contextual effects on risk behavior(45). Psychologically based theory emphasizes the role of motivation, attitudes, and knowledge to explain risk taking behavior. However, it has been criticized for over-emphasizing a single pathway from rational risk appraisal to conscious commitment, ignoring the biological and contextual elements that affect risk taking(45). Universally based theory combines biological and psychological theory, along with an emphasis

on family, community and socio-cultural factors that moderate risk (45). Given that the focus of this study is on the community environment, this analysis is grounded in the universal theory of adolescent risk taking, which acknowledges individual biological and psychological elements, but places a large emphasis on the contextual environment surrounding young people.

Sexual Health and Risk Taking Behavior among Youth

During the passage from childhood to maturity, sexuality takes on new dimensions; feelings become more intense, relationships become more complex, and sexual behavior may commence (6) . Demographic patterns have changed over the past decade for young people, and with it patterns of sexual behavior. Earlier puberty, later marriage, a decline in the family leading to less control and more autonomy, exposure to sexual stimuli via the mass media and travel across cultural boundaries have made premarital adolescent sexual activity more common(6). Global demographic patterns show a growing gap between age of sexual debut and first marriage; with age at marriage rising and age of first sex decreasing (6, 21). As this gap widens, reproductive health risks and consequences are becoming an increasingly significant part of young people's transition from childhood to adulthood. Thus, it's not surprising that over the past decade unwanted pregnancy, sexually transmitted infections, and other young people's sexual and reproductive health concerns have been increasingly on national agendas (16).

During youth, one of the most consequence laden and common risk behaviors is high risk sex(21, 46, 47). Commonly utilized indicators of high risk sex include number of partners in the past year, condom use, commercial sex, condom use associated with commercial sex, contraceptive use and alcohol use associated with intercourse(48).

Prior research has shown that social factors play a major role in making young people sexual risk takers(49). One study found that urban secondary school students who use drugs and alcohol are more likely to engage in activities that put them at risk of contracting sexually transmitted diseases. The same study found that male students were more likely than females to take sexual risks, but were also more likely to use condoms. Risk takers were described as being more likely to socialize frequently with peers, to receive little social support and to believe that they are at high risk of STD infection with little that can be done to prevent it(49).

In Latin America, gender norms play a large part in sexual risk taking behavior. According to the results of a cross sectional survey conducted among 552 never married women and 289 never married men aged 15-24 across six departments in Nicaragua were interviewed on perceived social pressure to have intercourse. Among those interviewed, 83% of men reported that they had received direct encouragement from at least one person in the last year to engage in pre-marital sex, compared to 26% of women. Among the same group, 22% of males were encouraged to have sex by their father, in contrast to 1% for young women. For sexually active women, the vast majority 83%, report their boyfriend as their first partner, in contrast to men, where fewer than 47% of men reported the same. (50)

Another study in Nicaragua examined rural residence, rising levels of educations and greater wealth, finding that they were associated with older age at sexual debut. Having had first sex before age 15 was associated with an increased risk of having an earlier first birth. On the other hand, having first sex at age 16 or later was associated with a decreased risk of earlier first birth. Study results led to the conclusion that interventions that improve young women's education and economic opportunities might help them delay sexual debut and early childbearing. (51)

A Peru based study found that secondary school student's perceptions of their peers sexual activity is one of the strongest predictors of their own behavior. (52, 53) Males who said one of their friends had sex were more likely than those who thought that none had done so, to be sexually experienced and to have had multiple partners in the past three months. However, they were also more likely to have used a condom at first intercourse. (53)

Sexual risk taking can have life changing consequences for youth, ranging from the spread of HIV, HPV, and other sexually transmitted diseases, to early marriage, early or unwanted pregnancy and unsafe abortion. Ultimately, these may take a large economic and social toll on youth, curtailing education, employment and other opportunities to develop financial and social capital(54).

Unwanted or Too Early Pregnancy & Unsafe Abortion

Worldwide, between 10 and 14% of young unmarried women experience unwanted pregnancies each year(55). The worldwide average rate of births per 1000 young women aged 15-19 years is 65, with average rates of 25 in Europe, 56 in the Middle East and North Africa, 59 in Central Asia, 78 in Latin America, and 143 in Sub-Saharan Africa(56). Unplanned pregnancies are the result of various factors, including lack of knowledge regarding menstruation and pregnancy, as well as lack of access to and knowledge about contraceptives (3).

The consequences of adolescent childbearing are well established. They include high risk of pregnancy complications and maternal mortality and increased rates of infant mortality and malnutrition, higher overall parity and more closely spaced births. (57) In addition to physical risks, unplanned or adolescent pregnancy can significantly limit the future potential of young women(58). Young women with too early pregnancies possess poorer health outcomes, less

education, lower incomes and higher rates of single parenthood, than women who delay childbearing (59). This, in turn may replicate similar future challenges for the social and economic development of her offspring. A study analyzing parental pregnancy intention in in Bolivia found significant associations between childhood stunting and pregnancy intention. Multivariate analysis indicated that toddlers had a 30% higher risk of stunting if their mothers reported that their conception had been unwanted or mistimed rather than intended(60). Additionally, the risk of stunting was higher among toddlers whose conception had been reported as mistimed by both parents, than among those whose conception had been reported as intended by both parents. (60)

Even when pregnancies are planned, they can have adverse consequences for young women if experienced too early. In Honduras, 15% of births are attributed to adolescent mothers. In this population, associations have been shown between adolescent maternity, being a female head of household and subsequent low income levels (61). Young women who marry young are also more likely to have children in quick succession and are less likely to engage in adequate birth spacing to protect their health (62) .

Of an estimated 600,000 annual pregnancy-related deaths worldwide, about 13% are related to complications of unsafe abortion(63). In developing country settings where abortion is illegal or highly restricted, abortion mortality is often hundreds of times higher than in developed countries(63). Complications of unsafe abortion include cervical or vaginal lacerations, sepsis, hemorrhage, bowel or uterine perforation, tetanus, pelvic infections or abscesses, chronic pelvic inflammatory disease and secondary infertility(3).

Where abortion is illegal or highly restricted, adolescents have the highest risks of complications from unsafe abortions. Among women treated for unsafe abortion complications, those under 20 years of age account for 38-68% of cases in many developing countries (64). Adolescents are less likely to have adequate information regarding access to safe abortion, so they are more likely to self-induce an abortion. In the process, they often use unsafe methods, for example inserting objects into the vagina or uterus, using toxic substances, or self-inflicting bodily harm. Adolescents are also more likely to delay seeking care for abortion-related complications, due to lack of transportation, lack of knowledge, ability to pay for post-abortion care or fears of repercussion from authority figures (3).

Latin America has the second highest fertility rate among the world regions. In the Latin America and Caribbean region 35-52% of adolescent pregnancies are unplanned(46). Furthermore, between 10 and 21% of hospitalizations result from complications of unsafe abortion among adolescents (3). Among those hospitalized after abortion, one third of adolescent females suffered sepsis, compared with one fourth of adult women.(54)

In Latin America, young women bear the burden of early pregnancy and unsafe abortion. In Ecuador, 20% of adolescent women have had at least one pregnancy. (65) Recent findings also suggest an increase in the incidence of teenage sexual activity, pregnancy, and motherhood in Bolivia (66). In Peru, one third of the women hospitalized for abortion complications were between 15 and 25 years old. (67) With the exceptions of Cuba and the Federal District in Mexico the majority of countries in Latin America only provide legal abortions in cases of rape, incest and serious fetal defects(8).

Human Papilloma Virus (HPV) and HIV/AIDS

Human Papilloma Virus

Developing countries account for 78% of all cervical cancer diagnosis(68). In contrast, in most industrialized countries, incidence and mortality have decreased steadily in the last 30 years(68). Studies suggest that, in addition to lack of adequate screening, early age at first intercourse and multiple sexual partners are some of the most consistent risk factors for cervical cancer(68). However, male sexual behavior also plays a significant role in the risk of women developing disease(69). For example, norms for male sexual behavior, including extra marital relationships and visits to prostitutes, could explain the high incidence of cervical cancer in some Latin American countries (70).

Women in lower socio-economic strata also have a greater risk of cervical cancer than those in higher strata (71). Unfortunately, women in the lowest socio-economic strata may also have the lowest access to regular screenings for cervical cancer. High parity is also associated with increased risk of HPV infection. Recent studies have found an independent risk of cervical cancer with increased parity, even after adjusting for sexual behavior and socio-economic status (72).

Historically, cervical cancer has been associated with demographic, cultural and socio-economic variables characteristic of less developed societies (young age at first coitus, elevated number of partners, low socioeconomic status, low education, and poor genital hygiene) (73). Since then, it has been shown that certain sexually transmitted types of human papilloma virus (HPV) actually cause cervical cancer, showing that most of these factors are surrogates for HPV infection (73). High parity, smoking, oral contraception and deficient diets are considered co-factors for cervical

cancer. Each of these significantly increases the risk of cervical cancer among HPV-positive women (74) .

Increased risk of cervical cancer has been correlated with reduced life expectancy, fewer doctors, more infants with low birth weights and more adults with tuberculosis and HIV, all of which are indicators of low social and economic development (75).

By the year 2000, approximately 76,000 cervical cancer diagnoses and almost 30,000 deaths due to cervical cancer were estimated for Latin America [33]. The highest rates are found in Haiti, Nicaragua and Bolivia. The Dominican Republic is second only to Haiti in the Caribbean (35). Ranked as the second most frequent cancer in the Dominican Republic, cervical cancer affects 1,032 women per year(35). Three main barriers, have been identified for HPV screening and treatment: 1) lack of access to health care ; 2) absence of providers and 3) overwhelming financial burden(76). Other barriers include social norms like accepted infidelity, prostitution and low levels of education regarding condom use for prevention of pregnancy and protection against HPV and other sexually transmitted infections (76).

In Latin America, access to screening has produced mixed results. The protective effect of screening in Latin America has been assessed in several case control studies. The studies showed a decreased risk for women who had ever received a Pap test, but also pointed out problems related to inadequate coverage and frequency of screening(77). For example, a significant problem related to screening in Latin America is inadequate collection of and reading of cytological samples, often coupled with lack of post-test follow ups (78)

Human Immunodeficiency Virus(HIV)

One third (over 100 million) cases of curable STI's are contracted each year by women and men younger than 25 years (79). Nearly half of 4.9 million new HIV infections each year occur among those aged 15-24, with a higher rate of incidence in young women than in young men (79). Among those infected, the majority were diagnosed as teenagers or young adults(25). In Latin America, Epidemic levels of HIV remain concentrated among men who have sex with men. Surveys in Santa Cruz and La Paz, suggest that HIV prevalence has been quickly rising in this population, from nearly 0% to over 20%. On the other hand, HIV prevalence among female sex workers in 2003 was 0.2% in La Paz, Cochabamba, Chuquisaca and Santa Cruz and lower in the country's other departments (29).

Evidence from Latin America and Sub Saharan Africa suggest that condom use at last sex have increased. However, levels of condom use remain inadequate for significantly reducing HIV transmission (80). Furthermore, a systematic review of the evidence from 17 countries between 1999 and 2003 revealed that on average, only 24% of females and 29% of males showed adequate levels of knowledge regarding HIV prevention(32).

Several explanations account for the high burden of HIV among young people. As discussed above, these include demographic trends showing a growing gap between first sex and marriage, as well as an increased willingness for youth to engage in risky behavior, compared to adults(3).

In addition to drastically increased morbidity and mortality, young people diagnosed with HIV/AIDS must live with many social repercussions of the disease. These include social exclusion, discrimination, intimidation and loss of opportunities for advancement like education

and employment (81). Although advances are progressively made in terms of HIV/AIDS treatment, prevention efforts are clearly still needed.

Among young people 15-24 years old in Latin America, an estimated 0.4 % of women and 0.6% of men were living with HIV in 2005 (10) . Approximately 300,000 people are living with HIV in the Caribbean, the second most affected region in the world (82). UNAIDS reports that here, infections among young people are rising(10).

In Latin America, HIV is predominantly concentrated on young men who have sex with men. Among young men in Peru who self- identified as homosexual, 40% reported recent unprotected anal intercourse(82). In a separate study, over 72% of young Latino men who had sex with other men in Tijuana, Mexico, and in San Diego, United States, reported unprotected anal intercourse (82). However, HIV prevalence is growing among non-traditional vulnerable groups such as migrants and street youth, usually considered part of the general population (10, 32, 82, 83). More than 50% of 141 street children interviewed in South Africa reported having exchanged sex for money, goods or protection, and several indicated they had been raped (82).Among street youths in Bolivia, overall HIV prevalence was higher among those recruited in the street, than among registered and unregistered sex workers (25). However street youth have different characteristics throughout Latin America, suggesting that interventions focused on this population must be designed on a case by case basis (84).

Community Influences on Sexual and Reproductive Health

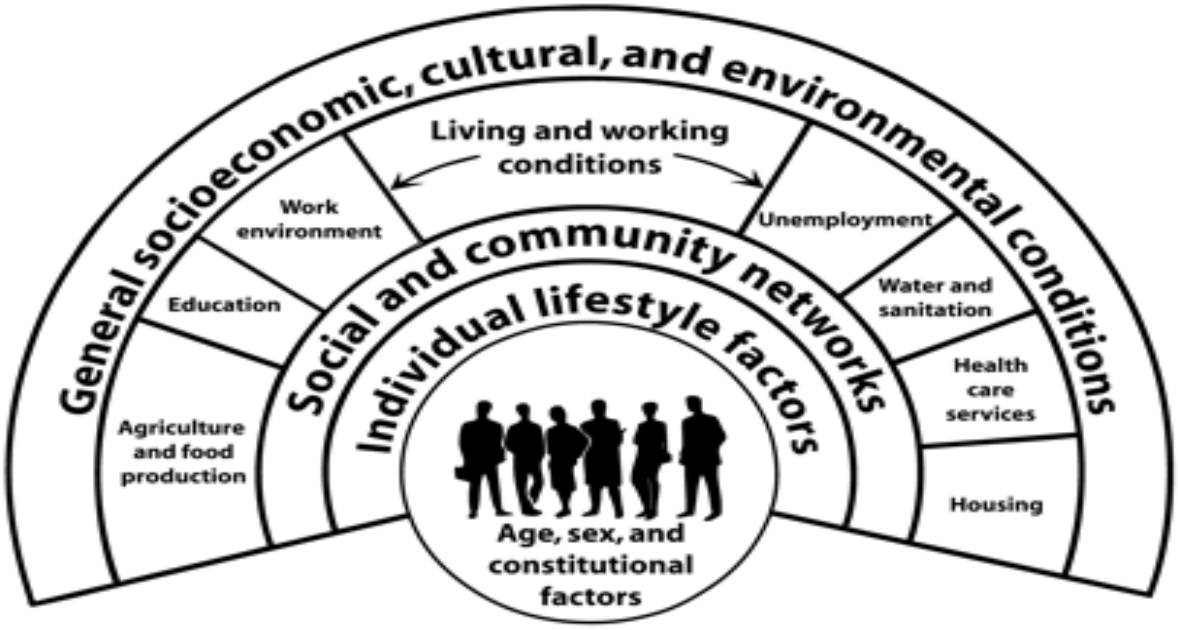
Young people's journey into adulthood is influenced by many social, psychological, economic and cultural factors(5). Yet, adolescent sexual health research prioritizes individual level analysis of negative and protective risk factors (12). A multitude of individual risk factors like education, media exposure, and drug use have been previously correlated with high risk sexual activity (13-15). However, risk factor analysis is rarely expanded to include the contextual environment surrounding youth. This occurs despite the fact that programmatically, changing community level risk factors may be simpler and more sustainable than modifying individual ones (12, 16, 22, 85, 86).

In their social determinants of health model, illustrated below, Dahlgren and Whitehead (1993) illustrate how the environment affects an individual's access to health and health seeking behavior. At the center of their framework, the authors situate the individual, along with inherent biological traits, like age, sex and genetics(1). The individual is subjected to or chooses a variety of individual lifestyle factors, and these are the risk factors most frequently studied. However, the community they form a part of, and the broader socioeconomic context that this community exists in (see all spheres outside of individual lifestyle factors), have important effects on this individual's health outcomes.

The rainbow model, developed by Dahlgren and Whitehead (1993) is one of the most widely used models to explain the multiple pathways through which the contextual environment affects health behavior and health inequities(85). The authors argue that the health of individuals is influenced by a number of context specific layers (presented in the figure below) (1). Each layer has an effect on all of the layers below it. These impact personal behavior (at the bottom of the

rainbow) which is then influenced by social and community networks. These networks are in turn influenced by living and working conditions, including access to education and healthcare. Living and working conditions are ultimately influenced by the broader economic, cultural and environmental conditions.

Figure 4: Dahlgren and Whitehead's "Rainbow Model" illustrates the effect of contextual health determinants on the individual (1).



Building on the work of Dahlgren and Whitehead, Billy et al. (1994) proposed that community influences on youth sexual health are moderated by opportunity structures and social norms. Social norms, like religion or cultural traditions, vary according to context. Community opportunity structures can be defined as consisting of the following: potential paths for social

mobility; availability of reproductive health services for adolescents, and demographic characteristics (18). Billy argues that adolescents without adequate paths for social mobility in their environment (such as continuing education) do not perceive as much to be at stake when engaging in risky sexual behavior. Availability of reproductive health services in turn, may dictate the decisions that adolescents make in regards to sexual health (such as not wearing a condom due to lack of availability). Finally, certain demographic characteristics, such as socioeconomic status and ethnicity, may place certain individuals at more risk than others.

Expanding on these ideas, Stephenson (2009) has analyzed community level effects on youth sexual behavior in three African countries. His findings imply that, at the community level, education, HIV/AIDS knowledge and higher tolerance towards HIV-positive individuals are associated with protective sex behaviors(17). Speizer (2009) built further on this work by exploring whether female youths from communities with higher sexual violence were at greater risk of negative reproductive health outcomes. Speizer found that females from communities with greater sexual violence were significantly more likely to have experienced adolescent pregnancy, or to be HIV positive, and less likely to have used a condom at last sex than youth from communities with lower levels of sexual violence (87).

Further research is necessary to fully understand the pathways through which the contextual environment influences the individual, but this area of research is swiftly solidifying, and several researchers have begun to explore risk factors outside of the individual sphere (16, 17, 85, 86, 88-91).

In Ethiopia, research has shown that social exclusion, or the lack of community connectedness, may increase sexual risk taking behavior (88). A population based study of females aged 10-19

was conducted in low income areas of Ethiopia in 2008. Of those sampled, 48% were domestic workers, and many reported significant social exclusion, including a lack of friends, community support networks, and group membership. Compared to other young women, domestic workers were over 3 times as likely to have had sex before age 15, and almost 2 times as likely to have been coerced into having sex. Social exclusion was associated with having twice the odds of coerced first sex. (88)

Research in China has linked sexual debut to contextual factors like school type, socioeconomic status and family structure. Youth that attended an ordinary or elite high school were less likely to have had sex than those attending a vocational school. Further, the odds of being sexually experienced were higher among students living in a moderately or highly developed area. The researchers of this study aptly comment that "sexual behavior is social behavior (92)" and as such, research and intervention analyzing sexual health should look at the social contexts in which youth make decisions related to sexual health. (92)

One study analyzed DHS data for 12 developing countries to identify statistical differences between the poorest and richest quintiles of young women, in terms of adolescent reproductive health(90). In most countries, young women from the poorest households were more likely than those from richer households to be married by the age of 18, and to have had a child by the same age. They were less likely to be using contraception or maternal health services, and had less knowledge regarding HIV prevention. Among this population, economic autonomy, school enrollment and regular exposure to mass media were also less common than among rich adolescents. Many of the current delivery modes for reduction of sexual risk taking among youth rely heavily on school, clinics, or mass media. However, among the poorest young women, community based outreach programs may be more appropriate (90).

In the United States, several studies have examined the role of the contextual environment on adolescent sexual risk taking (18, 19, 86, 89, 93-95). The majority of these studies analyze race, ethnicity, socioeconomic status and the school environment(15, 86, 95-101). Notably, several studies have specifically analyzed the association between the built environment surrounding youth and sexual risk (100, 102). Using data from the National Longitudinal Survey of Adolescent Health, researchers examined the relationships between four neighborhood dimensions (socioeconomic characteristics, norms and opportunity structure, social disorganization and racial and ethnic composition) and sexual initiation. For females, living in a neighborhood with a greater concentration of youth who were "idle" or black residents was associated with increased odds of sexual initiation, whereas a greater concentration of married households or Hispanic residents was associated with decreased odds of initiation. Higher initiation among males was associated with a higher concentration of poverty or "idle" youth, while lower initiation was found with a higher concentration of affluent households or affluent women (100).

Another study analyzed zip-code level teenage birthrates, coupled with the clinical observations of local public health experts (102). Based on this information, researchers were able to identify "hot spots": zip codes with the highest birthrates for 15–17-year-olds. This enabled local public health authorities to review and classify potential intervention areas by caseload and priority (102).

As illustrated above, studies analyzing the impact of community level predictors on sexual and reproductive health outcomes are primarily centered on United States, Asian and African populations(17-19, 86, 88, 92). In Latin America, negative health outcomes arising from HIV, HPV and unwanted pregnancy stem primarily from high risk sex and present major barriers to

the attainment of reproductive health among youth(11). Nevertheless, in this region, there is a dearth of information detailing how the environment in which one lives affects a young person's behavior.

A better understanding of how the community environment impacts decision making around sexual behavior would elucidate whether there are important social and cultural determinants among Latin American communities that affect young people's sexual behavior differently, from prior research in other regions. Additionally, understanding the community environment and its impact on sexual behavior will better inform programmatic initiatives seeking to reduce negative health outcomes resulting from high risk sex in Latin America.

Community Influences on Sexual Risk Taking Behavior among Youth in Bolivia and the Dominican Republic

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Abstract

Objectives: This analysis examined the role of community-level factors on risky sexual behaviors among young people aged 15 to 24 years in Bolivia and the Dominican Republic (DR).

Methods: Demographic and health survey data from Bolivia (2003) and the DR (2007) was analyzed to identify individual and community level factors associated with reports of risky sexual behaviors.

Results: The pathways through which the community environment affected sexual behaviors varied by gender, country and outcome. The community environment plays an important role in shaping risky sexual behavior among youth. Marital status, parity and ethnicity of surrounding communities were strong influences on youth sexual behavior.

Conclusions: These results provide support for a focus on community-level influences as an intervention point for behavioral change. However, interventions should recognize culture and context specific pathways through which the community can shape the sexual behaviors of youth.

Introduction

Prior research has shown that among adolescents, risk behaviors may be culturally bound, but the impetus for adolescents to engage in risky behavior is a universal trait across all cultures (1). Sexual risk taking can have life changing consequences for youth, ranging from the spread of HIV, HPV, and other sexually transmitted diseases, to early or unwanted pregnancy and unsafe abortion.

In 2000, 155 million people in Latin America and the Caribbean (LAC) were between the ages of 10 and 24 (2). Latin America has the second highest fertility rate among the world regions. In this region, 35-52% of adolescent pregnancies are unplanned(3). Furthermore, Latin American countries are among those with the highest incidence rates of cervical cancer in the world. By the year 2000, approximately 76,000 cervical cancer diagnoses and almost 30,000 deaths were estimated for the region (4). Additionally, about 300,000 people are living with HIV in the Caribbean, the second most affected region worldwide, and UNAIDS reports that infections among youth are rising in Latin America (5).

Young people's journey into adulthood is influenced by social, economic and cultural factors. Yet, adolescent sexual health research prioritizes individual level analysis of risk factors (6) and is rarely expanded to include the social and physical environment surrounding youth. This occurs despite the fact that changing community level risk factors may be simpler and more sustainable than modifying individual ones (6-10).

Prior studies analyzing the impact of the community environment on sexual health are centered on US and African populations (11, 12). Yet, in Latin America there is a dearth of information detailing how the community environment affects a young person's behavior. A better understanding of how the community environment impacts sexual decision making would reveal social and cultural determinants among Latin American communities that affect young people's behavior differently from research in other regions. This research aims to examine how the community environment shapes young people's sexual behavior in Bolivia and the Dominican Republic (DR). Exploring the community environment and its impact on sexual behavior in Latin America will provide important intervention points for initiatives seeking to reduce negative reproductive health outcomes.

Background

Over time, a growing body of evidence has shown that the environment in which youth live strongly influences their reproductive health (13-15). In 1994, Billy et al. proposed that community influences on youth sexual health are moderated by opportunity structures and social norms. Social norms, like religion or cultural traditions, vary according to context. Community opportunity structures can be defined as consisting of the following: potential paths for social mobility; availability of reproductive health services for adolescents, and demographic characteristics (12). Billy argues that adolescents without adequate paths for social mobility in their environment (such as continuing education) do not perceive as much to be at stake when engaging in risky sexual behavior. Availability of reproductive health services in turn, may dictate the decisions that adolescents make in regards to sexual health (such as not wearing a condom due to lack of availability). Finally, demographic characteristics, such as socioeconomic status and ethnicity, may place certain individuals at more risk than others.

Expanding on these ideas, Stephenson (2009) has analyzed community level effects on youth sexual behavior in three African countries. Findings imply that, community education, HIV/AIDS knowledge and higher tolerance towards HIV-positive individuals are associated with protective sexual behaviors among youth (13). Speizer (2009) built further on this work by exploring whether females from communities with higher sexual violence were at greater risk of negative reproductive health outcomes. Speizer found that females from communities with greater sexual violence were significantly more likely to have experienced adolescent pregnancy, or to be HIV positive, and less likely to have used a condom at last sex than youth from communities with lower levels of sexual violence (14).

On an individual level, studies in Latin America and Africa have found that adolescent sexual behavior is influenced by wealth, gender norms, ethnicity, school attendance, peers, feelings of community connectedness and communication with sexual partners(6, 13, 16-19). An analysis of DHS data from 12 developing countries found that women from the poorest households were more likely than those from richer households to be married and to have had a child by age 18 (16). They were less likely to be using contraception or maternal health services, and had less knowledge regarding HIV prevention.

.In Latin America, many of the current delivery modes for reduction of sexual risk taking rely on individually focused sex education based out of schools, clinics, or through mass media. However, in many cases, community based outreach programs may be more appropriate (16). Prior studies analyzing the impact of community level predictors on sexual and reproductive health outcomes are primarily centered on US and African populations (11-13). This study builds on previous literature, and fills a gap in the existing research by illustrating how the community environment impacts sexual behavior among youth in two Latin American countries. An

improved understanding of how the community impacts sexual behavior across gender and countries in Latin America will provide policy makers and program planners with potential intervention points for initiatives seeking to reduce risky sexual behavior among youth.

Data and Methods

The countries analyzed were chosen because they are culturally, demographically and economically distinct. Both have a similar population size, yet Bolivia's Gross Domestic Product is only half that of the DR's. Additionally, at 2.47, the total fertility rate (TFR) in the DR is closer to the regional average(2.05 children born per woman) , than Bolivia's TFR of 3.07(20, 21). Although, in both countries, 95% of the population identifies as Roman Catholic, the ethnic makeup of each state accounts for significant cultural differences. Each country is ethnically unique, with 73% of the population identifying as mixed race in the DR, while 75% of the population in Bolivia identifies as Quechua, Aymara or mixed Amerindian ancestry (20, 21)

The data used in this analysis are from the nationally representative Demographic and Health Surveys (DHS) for Bolivia (2003) and the DR (2007). Clearance through the Institutional Review Board (IRB) was not required, as human subject research was not conducted .DHS sampling systems consisted of a two stage sampling design. Using the most recent census in each country as the sampling frame, primary sampling units (PSU's) were selected. A PSU is a cluster of approximately 30 households. During the second stage, households within each PSU were randomly selected. In each sampled household, all eligible women (ages 15-45) and men (ages 15-59) are questioned on demographic, socioeconomic, knowledge and behavior based characteristics. The sample for the current analysis focuses on young women and men aged 15-

24. The sample sizes for young women are 17,654 (Bolivia) and 27,195(DR). The sample sizes for young men are 6,230 (Bolivia) and 27,975 (DR).

Four dependent variables were chosen to examine different elements of sexual risk taking behavior among youth:

1. Whether the respondent reports using a condom at first sex.
2. Whether the respondent reports using a condom at last sex.
3. The respondents reported age at first sex.
4. The respondents reported number of sexual partners in the last year.

DHS data provided individual, household and community level information for this analysis. Factors potentially associated with risky sexual behavior were first considered at the individual and household level. The individual level factors included in the final analysis can be divided into four categories. These include: demographic, socioeconomic, health knowledge and gender norms categories. The majority of variables in these areas were chosen based on previous work (12, 13, 22), identifying important variables for individual and community level analysis of reproductive health data.

Community level data was not available within the DHS data and was derived from individual level data. Individual data was aggregated to primary sampling units (PSU), forming proxy community measures. The choice of community level variables was guided by previous work regarding dimensions of the community environment that are influential in shaping youth behavior (12, 22, 23). In previous studies, the use of derived community level variables has proven useful in understanding a range of health related behaviors and outcomes (24). Table 1 defines the community level variables included in the analysis.

[TABLE ONE HERE]

The community level variables included in the models can be divided into the following four categories:

Community socioeconomic prosperity: Higher levels of economic resources have been associated with increased levels of access to health care, and increased health seeking behavior (16). To measure socioeconomic prosperity, we measured household wealth and employment status at the individual and community level. Community levels of wealth were calculated based on the individual level data and used the mean score for household wealth in each PSU. The analysis included a wealth index based on ownership of household goods that was divided into quintiles. We also analyzed individual level data regarding self-reported employment in the past year. Community level results were created by averaging individual level data belonging to each PSU.

Community health knowledge: Previous studies have shown associations between health knowledge and reproductive health (25). To measure associations between community levels of health knowledge and dependent variables, we measured the mean community score on knowledge indices of HIV and reproductive health. The indices were first created at the individual level, and then averaged to the PSU. A higher score was indicative of greater knowledge levels.

Community demographic characteristics: This analysis measures marital status, smoking, alcohol use, area of residence, education, sex of head of household, media exposure, ethnic status, physical activity and number of children per household, all of which have been associated with reproductive health outcomes(26-29).

To measure physical activity levels, as well as media exposure, indices were created. Creation of these indices follows the same methodology as the knowledge indices described above. The physical activity index was calculated only for Bolivia as DR data did not exist for this topic. The media exposure index is based off of three questions that explore newspaper, radio and television exposure in the past week.

Community gender norms: Previous studies have established associations between perceived levels of women's autonomy and access to health care, as well as health seeking behaviors (30). To measure autonomy, a decision making index was created. A higher score indicated greater decision making autonomy among female respondents. Attitudes towards intimate partner violence (IPV) have also been associated with health behavior and access (31). Therefore, a justification of domestic violence index was created for each gender and country. To create community level data, the indices were first created at the individual level, and then averaged to the PSU.

Separate logistic models were fitted for each outcome. Using STATA software, linear and logistic regression modeling techniques were employed in the analysis. Predictors included in the models were grouped into individual and community level variables. Community variables that were statistically significant in at least one country for one gender are presented in the final analysis.

Results

Distribution of Study Outcomes

Self-reported sexual behaviors varied by gender and country. Relative to their male counterparts, women's condom use at first sex was low (9.66% and 15.20% for Bolivian women and men; 21.28% and 53.86% for DR women and men). Additionally, DR men and women reported over twice as much condom use at first sex as Bolivian men and women did. Condom use at last sex was over three times higher among DR men than DR women (56.18% among DR men versus 15.88% among DR women). Bolivian men reported relatively low levels of condom use at last sex (28.98%) and self-reported data was not available for Bolivian women. Mean age at first sex was higher among women than men in both countries (15.62 and 16.72 for Bolivian men and women; 15.3 and 15.99 for DR men and women). Likewise, women in both countries had a far lower mean number of partners in the last year than their male counterparts (1.12 and 0.44 for Bolivian men and women; 1.08 and 0.6 for DR men and women).

Tables 2, 3, 4, & 5 depict the individual and community level results of regression analysis.

[TABLES 2, 3, 4 & 5 HERE]

DR men and women were more likely to be older at first sex if they resided in a community with higher numbers of married households. Across all countries and genders, individuals from communities with higher numbers of married households were significantly more likely to have a higher number of partners in the last year, relative to those living in communities with fewer marriages.

For Bolivian men, residing in indigenous communities was associated with a higher age of first intercourse and increased odds of condom use at first and last sex, relative to those that lived in communities of European descent. On the other hand, residing in indigenous communities was significantly associated with a lower age of first intercourse among Bolivian women. Among both sexes in Bolivia, those residing in indigenous communities were significantly more likely to have a lower number of partners in the last year, compared to those residing in white communities. Bolivian men residing in indigenous communities were more likely to have used a condom at first sex, relative to those residing in mostly white communities.

In Bolivia, young men residing in communities with high average media exposure were also significantly more likely to be younger at first sex. In the DR, young women residing in the same type of community had significantly higher odds of condom use at last sex. For DR women, living in wealthy communities was associated with a higher age of first sex, relative to those living in poorer communities. Additionally, DR women were more likely to have a higher number of partners in the past year if they lived in wealthier communities.

In the DR, men residing in communities with high scores on the justification of domestic violence index had significantly lower odds of condom use at last sex, relative to those residing in communities with a low justification of domestic violence. Additionally, residence in a community with high levels of justification for domestic violence was found to be significantly associated with lower odds of condom use at first sex among Bolivian men, DR men and DR women.

Relative to communities with lower numbers of children per household, residence in a community with higher numbers of children was significantly associated with lower odds of condom use at first and last sex among men from the DR. Among Bolivian women, residence in a community with high numbers of children per household was also associated with diminished odds of condoms use at last intercourse. In the DR, young women in these types of communities, had significantly lower odds of condom use at first sex, compared to women in communities with fewer children per household.

For Bolivian men, residence in a community with high reproductive health knowledge was significantly associated with diminished odds of condom use at last sex, relative to residence in a community with lower reproductive health knowledge scores. Among the same group, residence in a community with higher reproductive health knowledge was significantly associated with increased odds of condom use at last intercourse.

On the individual level, most results follow trends and associations established in previous research. Results follow these trends for age(26), education(26), area of residence(32), marital status(33), media exposure(34), alcohol use(26), smoking(27), number of children(26),

employment (15) decision making power (35), physical activity (36)and socioeconomic status(26).

Discussion

This analysis illustrates several pathways through which the community can influence adolescent sexual behavior including marital status, ethnicity, media, gender norms and parity.

Marital status was significantly associated with risky and protective sexual behaviors among youth. Across all countries and genders, youth from communities with higher numbers of young, married households were more likely to have a higher number of partners in the last year. In communities where male dominance and Roman Catholicism are normative, teens that have pre-marital sex, particularly sex resulting in pregnancy, may feel obligated to marry (37). Additionally, opportunity structures that incentivize delaying age at first sex and marriage may not exist in these communities, normalizing early sexual experience as well as marriage (12). In Latin America, many interventions focus solely on unmarried youth, yet study results imply that their married peers have a strong effect on sexual behavior. As such, married youth should be considered an important target population for safe sex interventions. Interestingly, in other cases, living in this type of community had a protective effect. Associations between high numbers of young married households in the community and increased likelihood of condom use at first and last sex may be due to efforts to space births and control family size for health and economic reasons (38). It may also be an indication of efforts to avoid pregnancy, given negative religious views of pre-marital sex and childbearing. The influence of gender norms and Roman Catholicism on adolescent sexual behavior should be examined in future studies.

In Bolivia, indigenous groups have traditionally had worse health outcomes than those of European descent (39). Among females in this study, findings echo previous work on social and economic disparities among the indigenous in Latin America, including the observation that youth from these groups tend to marry earlier, having fewer sexual partners(39). This is generally viewed as the result of social and religious norms (including more traditional views on women's role in society) and the existence of fewer socio-economic incentives to delay marriage (19).The results of this study support previous evidence, pointing to an increased need to focus attention on indigenous communities. Surprisingly, men from these communities were actually more likely to have a higher age of first intercourse and increased odds of condom use at first and last sex, relative to those that lived in communities of European descent. Further research is needed as to why this unexpected pattern emerges for Bolivian men.

The protective effects of community wealth on sexual debut, and community media exposure on condom use in the DR agree with previous literature stating that higher economic status seems protective in sexual health (16). As in previous studies, this is likely due to increased access to health care and accurate reproductive health knowledge (16). Surprisingly, Bolivian males in communities with high average media exposure were more likely to be younger at first sex. In this case, it will be important to conduct further research that elucidates whether the actual media content had any effect on male sexual debut, or whether there are other issues at play.

In both countries, community attitudes towards domestic violence were significantly associated with adolescent sexual behavior. Residing in communities that were more accepting of domestic violence was associated with lower odds of condom use at first and last sex among youth in both countries. Previous research has linked domestic violence with adverse reproductive health outcomes (14, 17). This is a novel finding in Latin America, and further research is warranted to

illustrate the mechanisms through which community attitudes towards gender violence affect young people's sexual behavior. Perhaps, as in other regions (17), communities that normalize domestic violence also tend to diminish the role of women in society, making it difficult for young women to negotiate sex or contraceptive use.

Fertility levels in the community surrounding adolescents also played an important role in shaping sexual behavior among youth from both countries. As previously mentioned, small area estimation has been used in the US to identify communities in which teenage pregnancy is high (40). Likewise, there may be potential in Latin America to focus intervention efforts on high parity communities. Lack of contraception in these communities is likely resulting in a higher number of children per household. Alternately, larger families may be more valued in these communities, leading to more laxity in terms of condom use. Finally, the observation that, among Bolivian men, residence in a community with high reproductive health knowledge was associated with diminished odds of condom use at last sex , warrants further research. However, as discussed, studies show that reproductive health knowledge itself is not as important as where the knowledge comes from, and how acceptable it is among peer groups(18). Thus, it will be important to determine where Bolivian males are getting reproductive health knowledge from. These findings reinforce the importance of using peer based education to effect behavior change among adolescents.

Limitations

This study is partially limited by its reliance on self-reported data. Previous studies suggest that young women are likely to underreport sexual activity while their male counterparts are more likely to over report sexual activity(41). However, DHS are one of the only sources of nationally

representative, systematic and routinely collected data on young people's sexual behavior in Bolivia and the DR and therefore the value of new data gained outweighs this potential bias. Additionally, community level data was derived from individual level data. Therefore, we cannot include information on community specifics, like health facilities. However, this data provides an important starting point for qualitative research than can build a more complete picture of the effect that communities have on sexual health among youth.

Conclusion

On a global scale, the relationship between adolescent sexual health and the communities they live in is steadily gaining importance. This study fills a gap by providing information on community contexts in two Latin American countries, as well as how these may impact adolescent sexual behavior. This study illustrated several pathways, specific to Bolivia and the Dominican Republic, through which the community can influence youth sexual behavior including marital status, ethnicity, media, gender norms and parity. Importantly, variation in community level factors throughout this study indicates that there is no overarching community effect on adolescent sexual health. Rather, these effects will vary according to context, gender and outcome. Looking forward, it will be important to conduct similar research in other countries throughout Latin America, to provide a more in depth picture of community effects on youth sexual behavior.

Table 1: Definitions of community level variables included in the final analysis of sexual behavior among young people in Bolivia (DHS, 2005) and the Dominican Republic (DHS, 2005).

		Mean(Range)of Community Level Variables			
Characteristic	Description	Bolivian Men	Bolivian Women	DR Men	DR Women
Demographic					
Ethnicity	Mean proportion of young people identifying as indigenous in the community (Bolivia only)	0.51 (0,1)	0.48 (0, 1)	(…)	(…)
Total Number of Children	Mean number of children per household in the community	2.60 (.43, 7.2)	2.45 (.33, 7.2)	2.22 (.17, 6.56)	2.07 (.17, 6.56)
Marital Status	Mean percentage of young people that are married in the community	0.19 (0, 1)	0.34 (0, 1)	0.17 (0, 1)	0.46 (0, 1)
Health Care Knowledge and Behavior					
Media exposure	Mean score of media index per community. Index measures the frequency of exposure to radio, television and newspaper.	2.19 (.0, 3)	2.07 (0, 3)	2.21 (0, 3)	2.21 (0, 3)
Reproductive Health Knowledge	Mean score on knowledge of reproductive health index for all young people ages 15-24 in the community. Index ranges from 0 to 6.	5.46 (4, 6)	3.46 (0, 4.75)	4.76 (2, 6)	5.58 (3, 6)
HIV knowledge	Mean score on knowledge of HIV/AIDS index for all young people ages 15-24 in the community. Index ranges from 0 to 6.	1.43 (0, 6)	1.14 (0, 3.5)	4.84 (.5, 6)	4.27 (1, 6)
Physical activity Levels	Mean score on physical activity index for all young people ages 15-24 in the community (Bolivia only). Index ranges from 0 to 6.	3.53 (0,6)	2.51 (0, 4.63)	(…)	(…)
Economic Prosperity					
Household Wealth	Mean score on household wealth index among young people ages 15-24 in the community. Index is categorized into: poorest, poorer, middle, richer and richest categories.	3.21 (1, 5)	3.25 (1, 5)	2.56 (1, 5)	2.73 (1, 5)
Employment	Mean proportion of young people aged 15-24 employed in the last 12 months in the community.	0.65 (0, 1)	1.01 (0, 2)	(…)	0.52 (0,1)
Gender Norms and Inequalities					
Justification of Domestic Violence	Mean score on justification of domestic violence index among young people ages 15-24 in the community. Index ranges from 0 to 5.	0.65 (0, 5)	0.41 (0, 3.5)	0.27 (0, 4.5)	0.12 (0, 3)
Decision Making Ability	Mean score on decision making index among young people ages 15-24 in the community. Index ranges from 0 to 5.	0.39 (0, 3)	1.75 (0, 3.67)	1.26 (0, 5)	1.09 (0, 5)

(…) = data not available.

Note: all variables in the table were included in the analysis; those in italics were significant in at least one country and are thus presented in the final analysis.

Table 2: Linear regression model for age at first intercourse among women and men in Bolivia (DHS, 2005) and the Dominican Republic (DHS, 2005). Numbers shown are β (std error).

	Bolivia Men	Bolivia Women	DR Men	DR Women
Individual Level Variables				
Age(20-24)	0.90 (0.21) *	3.46 (0.19)*	5.90 (0.18) *	3.29 (0.16) *
Education				
Secondary	0.56 (0.26)*	0.00 (0.18)	1.12 (0.17) *	0.54 (0.15) *
Higher	1.31 (0.34)*	-0.10 (0.31)	1.63 (0.33) *	0.93 (0.24) *
Rural Residence	-0.24 (0.28)	-0.01 (0.24)	-0.61 (0.19) *	-0.39 (0.15) *
Current Marital Status	-0.10 (0.17)	8.81 (0.24) *	2.59 (0.27)*	(…)
Employed in the last year	0.17 (0.21)	0.67 (0.07) *	(…)	0.99 (0.14) *
Female Household Head	-0.03 (0.22)	0.60 (0.18) *	0.11 (0.16)	0.88 (0.13) *
Wealth Index				
Poorer	-0.10 (0.47)	-0.18 (0.29)	-0.13 (0.23)	-0.41 (0.20) *
Middle	-0.14 (0.56)	-0.66 (0.37) **	0.10 (0.26)	-0.73 (0.22) *
Richer	-0.14 0.63)	-0.46 (0.43)	-0.19 (0.32)	-0.39 (0.26)
Richest	0.12 (0.74)	0.10 (0.49)	0.17 (0.39)	-1.00 (0.31) *
Total number of children	-0.10 (0.17)	0.74 (0.12) *	(…)	-0.34 (0.10) *
Reproductive Health Knowledge Index	-0.11 (0.15)	0.28 (0.07) *	0.11 (0.08)	0.46 (0.09) *
Decision Making Power Index	0.06 (0.14)	0.76 (0.07) *	0.07 (0.06)	(…)
Physical Activity Index	-0.09 (0.06)	-0.34 (0.06) *	(…)	(…)
Smokes Tobacco	-0.32 (0.18)**	-0.66 (0.08) *	1.20 (0.44) *	0.69 (0.53)
Ever Consumed Alcohol	(…)	(…)	4.19 (0.21) *	(…)
Community Level Variables				
Current Marital Status	-0.70 (0.44)	0.56 (0.41)	1.65 (0.55) *	0.87 (0.33) *
Ethnicity	1.41 (0.21) *	-0.43 (0.22) *	(…)	(…)
Media Index	0.19 (0.19)	-0.46 (0.21) *	-0.09 (0.22)	-0.16 (0.18)
Wealth Index	-0.06 (0.20)	0.02 (0.17)	-0.10 (0.13)	0.23 (0.11) **

* denotes significance at the .05 level
**denotes significance at the .10 level
(…)=data not available

Table 3: Logistic regression model for condom use at first intercourse among women and men in Bolivia (DHS, 2005) and the Dominican Republic (DHS, 2005). Numbers shown are adjusted odds ratio (confidence interval).

	Bolivia Men	DR Men	DR Women
Individual Level Variables			
Age(15-24)	0.72 (0.50, 1.04) **?	0.91 (0.81, 1.02) **	0.83 (0.70, 0.99) *
Education			
Secondary	1.40 (0.84, 2.36)	1.08 (0.95, 1.22)	1.14 (0.95, 1.37)
Higher	1.79 (0.94, 3.43) **	0.82 (0.66, 1.02) **	1.09 (0.83, 1.43)
Marital Status	0.68 (0.48, 0.95) *	0.63 (0.54,0 .72) *	0.50 (0.42, 0.59) *
Rural Residence	0.69 (0.39, 1.22)	1.02 (0.90, 1.15)	0.85 (0.71, 1.01) **
Smokes Tobacco	0.75 (0.54, 1.05) **	0.77 (0.60,0 .99)*	1.15 (0.69, 1.90)
Wealth Index			
Poorer	1.10 (0.38, 3.22)	1.16 (0.99, 1.36) **	1.16 (0.92, 1.47)
Middle	1.82 (0.62, 5.35)	1.32 (1.11, 1.56)*	1.18 (0.92, 1.69)
Richer	2.02 (0.66, 6.15)	1.22 (1.00, 1.48) *	1.40 (1.07, 1.85) *
Richest	2.63 (0.83, 8.38)	1.16 (0.94, 1.45) *	1.24 (0.92, 1.69)
Number of children ever born	0.87 (0.56, 1.37)	(…)	0.82 (0.74, 0.90) *
Media Index	1.23 (0.94, 1.61)	1.08 (1.00, 1.17) *	1.23 (1.11, 1.36) *
Decision Making Power Index	1.15 (0.91, 1.45)	1.07 (1.03, 1.12)*	(…)
Community Level Variables			
Ethnicity	2.06 (1.38, 3.08) *	(…)	(…)
Justification of Domestic Violence Index	0.66 (0.50, 0.88) *	0.70 (0.60, 0.80) *	0.69 (0.46, 1.04) **
Total Number of Children	0.71 (0.55, 0.90)	0.75 (0.69, 0.83) *	0.71 (0.62,0 .83) *

* denotes significance at the .05 level

**denotes significance at the .10 level

(…)= data not available

Data for this outcome is not available for Bolivian Women

Table 4: Linear regression model for number of partners in the last year among young women and men in Bolivia (DHS, 2005) and the Dominican Republic (DHS, 2005). Numbers shows are β (std error).

	Bolivia Men	Bolivia Women	DR Men	DR Women
Individual Level Variables				
Age(15-24)	-0.38 (0.25)	0.08 (0.01) *	0.64 (0.05) *	0.11 (0.01) *
Education				
Secondary	-0.04 (0.30)	-0.03(0.01) *	0.11 (0.04) *	-0.01 (0.01)
Higher	0.55 (0.40) *	-0.02 (0.02)	0.31 (0.08) *	-0.02 (0.02)
Rural Residence	-0.44 (0.34)	0.00 (0.02)	-0.05 (0.05)	-0.02 (0.01) **
Marital Status	-0.59 (0.16) *	0.69 (0.01) *	0.32 (0.07) *	0.73 (0.01)*
Employed in the last year	0.56 (0.25) *	0.03 (0.01) *	(…)	0.08 (0.01) *
Went dancing in the last week	0.07 (0.23)	0.06 (0.01) *	(…)	(…)
Wealth Index				
Poorer	0.50 (0.56)	-0.01(0.02)	0.09 (0.06)	-0.02 (0.02)
Middle	0.83 (0.66)	-0.03 (0.02)	0.12 (0.07) **	-0.05 (0.02) *
Richer	0.72 (0.75)	-0.04 (0.03)	0.07 (0.08)	-0.02 (0.02)
Richest	1.23 (0.89)	-0.03 (0.03)	0.29 (0.10) *	-0.09 (0.03)*
Smokes Tobacco	0.24 (0.21)	-0.04 (0.01) *	0.66 (0.11) *	0.30 (0.05) *
Ever Consumed Alcohol	(…)	(…)	0.54 (0.05) *	(…)
Reproductive Health Knowledge Index	0.06 (0.18)	0.02 (0.00) *	0.04 (0.02) *	0.03 (0.01) *
Decision Making Power Index	0.14 (0.16)	-0.02 (0.00) *	0.01 (0.02)	(…)
Physical Activity Index	0.13 (0.08)	-0.03 (0.00) *	(…)	(…)
Community Level Variables				
Married	0.99 (0.52) **	0.08 (0.03) *	0.23 (0.14) **	0.10 (0.03) *
Ethnicity	-0.64 (0.25) *	-0.07 (0.01) *	(…)	(…)
Wealth Index	-0.27 (0.23)	0.00 (0.01)	0.02 (0.03)	0.03 (0.01) *

* denotes significance at the .05 level

**denotes significance at the .10 level

(…)=information not included in data set

Table 5: Logistic regression model for condom use at last intercourse among women and men in Bolivia (DHS, 2005) and the Dominican Republic (DHS, 2005). Numbers shown are adjusted odds ratio (confidence interval).

	Bolivia Men	Bolivia Women	DR Men	DR Women
Individual Level Variables				
Age(15-24)	0.29 (0.18, 0.45) *	0.83 (0.60, 1.14)	0.77 (0.66, 0.90)*	0.87 (0.69, 1.09)
Education				
Secondary	0.65 (0.36, 1.15))	1.25(0.88, 1.76)	1.35 (1.14, 1.60)*	1.06 (0.81, 1.39)
Higher	1.50 (0.73, 3.07)	1.07 (0.65, 1.76)	1.26 (0.94, 1.67)	1.02 (0.70, 1.50)
Rural Residence	0.90 (0.50, 1.63)	1.12 (0.69, 1.83)	1.07 (0.90, 1.27)	0.71 (0.54, 0.91) *
Marital Status	0.58 (0.42,0.79) *	.37 (0.27, 0.52)*	0.06 (0.04, 0.07) *	0.07 (0.06, 0.09)*
Played basketball in the last week	5.47 (1.66, 17.97) *	1.59 (0.99, 2.54) **	(…)	(…)
Played football in the last week	1.29 (0.86, 1.95)	2.62 (1.32, 5.18) *	(…)	(…)
Wealth Index				
Poorer	0.87 (0.31, 2.44)	1.26 (0.50, 3.15)	1.10 (0.88, 1.37)	1.09 (0.77, 1.54)
Middle	0.83 (0.28, 2.45)	2.07 (0.81, 5.25)	1.23 (0.97, 1.56) **	1.18 (0.82, 1.71)
Rich	0.82(0.27, 2.49)	3.63 (1.39, 9.52)*	1.25 (0.96, 1.63) **	1.35 (0.91, 2.00)
Richest	0.69 (0.21, 2.22)	3.31 (1.21, 9.06)*	1.06 (0.78, 1.43)	1.16 (0.75, 1.80)
Media index	1.03 (0.68, 1.56)	1.21 (0.96, 1.52)	0.99 (0.89, 1.12)	1.16 (0.99, 1.36)**
Reproductive Health Index	2.66 (1.31, 5.38) *	1.29 (1.06, 1.56)*	0.99 (0.91, 1.08)	.86 (0.71, 1.03)
Decision Making Power Index	0.66 (0.48, 0.92)*	.98 (0.87, 1.11)	0.98 (0.92, 1.04)	(…)
Community Level Variables				
Marital Status	0.89 (0.33, 2.44)	2.37 (1.05, 5.32)*	0.71 (0.43, 1.19)	1.51 (0.86, 2.65)
Ethnicity	1.60 (1.00, 2.56)*	.72 (0.46, 1.12)	(…)	(…)
Justification of Domestic Violence Index	.99 (0.74, 1.34)	.76 (0.50, 1.15)	0.75 (0.61,0 .91) *	0.73 (0.40, 1.32)
Media Index	1.68 (0.93, 3.05)**	.96 (0.56, 1.60)	1.10 (0.87, 1.39)	1.35 (0.95, 1.90)**
Reproductive Health Knowledge Index	0.44 (0.20,0 .97)*	1.30 (0.87, 1.95)	1.32 (1.10, 1.56)*	1.51 (0.98, 2.32) **
Number of children ever born	0.83 (0.63, 1.09)	.66 (0.52, 0.83)*	0.84 (0.74, 0.96)*	0.85 (0.68, 1.07)

* denotes significance at the .05 level

**denotes significance at the .10 level

(…)= data not available

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Chapter 4: Public Health and Policy Implications

As illustrated in Dahlgren and Whitehead's (1993) rainbow model, determinants of health are largely composed of the community and contextual environment surrounding an individual, including factors outside of individual control(1). Yet, much of our research to date focuses on that individual's inherited traits and individual lifestyle choices (18, 85, 103). This study shows that relationships between youth and the communities they live in can reveal important associations between the environment around them and health endangering or health protective behaviors.

This research builds towards a better understanding of adolescent reproductive health, situated within the unique cultural and historical context of Latin America. By incorporating individual and community level data within this context, a richer portrayal emerges, identifying the potential pathways through which Latin American youth make reproductive health decisions.

This in turn may inform important public health interventions and policy changes. For example, in this study it was found that in Bolivia, young women living in communities with more accepting attitudes towards domestic violence had a lower age of sexual debut. In response, program planners might work on gender equity promotion in primary schools while helping to establish micro-credit or adult education initiatives that help empower older women in the communities.

Additionally, this study found that in the majority of cases, adolescents form indigenous communities had riskier sexual behavior than those from European communities. This is highly relevant to Latin America as Peru, Bolivia, Chile and Ecuador are all Andean

countries with high percentages of Quechua and Aymara indigenous populations(104). The majority of interventions focused on this population are understood to be biomedical driven, individually focused health models that discount contextual and cultural influences (104). These populations have high levels of maternal mortality and poor access to and utilization of reproductive health services(12, 104, 105). In this scenario, the conclusions of this study could help policy makers and public health institutions address the challenges facing the Andean community in a more integrative and sustainable way. For example, program planners might work together with indigenous communities to create peer based educational groups that encourage higher numbers of youth to attend school, access the social institutions available to them(including sources of subsidized contraception) and understand the benefits of delayed sexual debut, birth spacing and smaller family sizes.

Another example of study data with important public health implications is that among youth from both countries, living in a community with higher levels of tolerance towards domestic violence was associated with lower odds of condom use at sexual debut. Similar to previously discussed research in which zip codes identify “hot zones” of adolescent pregnancy (102), communities with high tolerance for domestic violence could now be singled out and prioritized as high risk zones for adolescent sexual health. This is particularly meaningful because despite growing support for victims of domestic violence, strong advocacy for victims of domestic violence is only just emerging in Latin America (106). Further evidence of domestic violence having effects outside the sphere of individual influence would lend credence and support for advocacy groups against

domestic violence and could potentially lead to more equality in terms of community gender norms.

This study also provides an important jumping off point for qualitative and mixed methods research that seek to delve further into the specific mechanisms through which the contextual environment affects youth sexual behavior. By providing evidence linking specific community level factors and youth sexual behavior, a foundation has been built from which future qualitative and mixed methods research can better define these communities and the mechanisms through which they impact youth sexual behavior.

This study could also be replicated in other Latin American countries identifying common patterns and important distinctions regarding the effect of the contextual environment on youth sexual behavior. If data were to exhibit a region wide pattern, policy makers and public health institutions would be more likely to intervene and share the costs of the intervention, given the scope of the problem. On the other hand, if similar studies are conducted across different countries and varying results emerge, the outcome could also be positive. In this case, results would highlight the importance of tailoring youth reproductive health interventions and policies to a specific context. This study could also be compared to similar sexual health studies conducted in Africa(17), to identify and delineate key differences as far as adolescent reproductive health needs. These findings would be important in order to differentiate those interventions and policies which might be very successful in one region, but which might fail in another.

While this study used specific community level variables to determine associations between the contextual environment and sexual risk taking, there are many other community level variables which can be explored, building upon the methodology of this work. For instance, Latin America is considered unique for a long standing culture of machismo(50, 107), as well as the fact that a majority of its population identifies as Roman Catholic(108, 109). However, there is a dearth of quantitative or mixed methods data regarding how these cultural factors permeate the contextual environment, and whether or not they effect individual sexual behavior among youth in Latin America. Avenues for future research and possible public health interventions could focus on how communities with higher levels of machismo, or more observant Catholic households, impact sexual risk taking behavior among Latin American youth.

This study also shows that as long as community wide data, (or a community proxy, which can be created with cluster sampling) exists, a wide range of data sets can be used to evaluate community effects on any number of health related behaviors. At present, Latin America faces several public health challenges among these, smoking, drug use, and increases in diabetes and obesity. Building on the work undertaken in this study, each of these could be evaluated against a range of community risk factors to establish whether they have a significant effect on individual behavior. For example, a study could be designed that analyzes whether communities that have a high number of children, a low female to male education ratio, or a high score on the domestic violence acceptability index could be significantly associated with a higher prevalence of domestic violence.

On a global scale, the relationship between adolescent sexual health and the communities they live in is steadily gaining importance. This study fills a gap by providing information on the community context in two Latin American countries, as well as how these may impact adolescent reproductive health. With continued emphasis on the effect of the community environment on young people, there is ample potential for future public health interventions and policies to address the results of this research, as well as future research building upon it.

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