

Factors Influencing high adolescent pregnancy rate in Riobamba, Ecuador

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Abstract

The country of Ecuador has the highest rate of adolescent pregnancy in Latin America and the Caribbean. Risk factors associated with this pregnancy rate need to be explored to effectively implement educational youth programs.¹ Early sexual initiation, poor reproductive health knowledge, and disruption of family structure are hypothesized to be major risk factors of adolescent (<20 years) motherhood (AMH) in Riobamba, Ecuador.² We conducted a case-control study with case being women <20 years of age during first pregnancy and control being women ≥20 years of age during first pregnancy. Controls were not matched. The study took place in June/July of 2021 in five public governmental primary health clinics within Riobamba, Ecuador with the primary goal of determining risk factors associated with AMH. Age responses were used to designate group status. Risk factors were analyzed using Welch's two-sample t-tests and Fisher's Exact tests. 198 participants were

analyzed: 99 who had AMH and 99 who had non-AMH. Adolescent mothers were significantly younger during first sexual encounter than adult mothers. Adolescent mothers were also more likely to lack reproductive health knowledge and have a disruption in family structure. While our study was able to broadly explore the risk factors for AMH, the underlying causes of these risk factors, such as societal pressures, need to be examined further. Early education about sexual health and use of contraception should be an initial goal of Riobamba's programs to reduce AMH.

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Introduction

Riobamba is an Ecuadorian city in the administrative unit of Chimborazo with the last known population of 146,300 in 2010. This accounts for nearly 1% of the total population in Ecuador.³ The country of Ecuador itself has the highest rate of adolescent (<20 years) motherhood (AMH) in Latin America and the Caribbean with 111 of 1,000 births coming from ages 15-19. In addition to this, Latin America and the Caribbean is the only region in the world that births to females under the age of 15 are increasing.¹ Perinatal complications associated with adolescent pregnancy, such as preterm delivery, fetal growth restriction, and post-partum hemorrhage, make this issue crucial to the health of Ecuadorian children and mothers.⁴

To combat the issue of increasing adolescent pregnancy throughout the country, the government of Ecuador instructed the Ministry of Public Health to create a program called Atencion Integral de Adolescents (AIDA) to assist in preventing teenage pregnancy in 2007. AIDA educates school-age children by providing games, sports, and other activities to kids after a regular check-up at their local clinic. The trained physician and health professionals who volunteer at AIDA then use this recreation time to bridge knowledge gaps about sexual reproductive health.¹ Despite implementation of AIDA, pregnancy in Ecuadorian girls under 15 years old has increased by 74% the past decade.⁵

This increase in AMH has been linked to early sexual initiation, poor reproductive

health knowledge, and disruption of family structure in a neighboring city of Riobamba called Guayaquil.² However, the city of Riobamba itself has not had a localized study to assess their population's risk factors associated with AMH. The purpose of this study is to identify the risk factors associated with increased AMH in Riobamba, Ecuador. Qualifying and quantifying risk factors associated with teenage pregnancy could help target and improve the effectiveness of AIDA programs within the city of Riobamba, specifically.⁵

Materials and Methods

This is a case-control study in five public health clinics within Riobamba, Ecuador (three urban and two rural) in June/July of 2021 with the primary outcome being AMH status. We sought to explore risk factors associated with AMH. We hypothesized that early sexual initiation, lack of reproductive health knowledge, and disruption of family structure would be major risk factors of AMH in Riobamba, Ecuador.

All patients of the female sex presenting for primary care appointments to the above-stated public health clinics were approached for enrollment upon checking in to the clinic site. Inclusion criteria included female sex and at least one biological child. Exclusion criteria included those who declined to participate, incomplete surveys that did not designate their age of first pregnancy, or did not meet inclusion criteria (Figure 1). Those who did not meet inclusion criteria had not had at least one biological child at the time of enrollment. Age responses for age at first pregnancy were used to designate

group status of AMH or control. After meeting inclusion and exclusion criteria, informed consent was obtained.

The study included a 21-question survey about age, education, home life, menstruation, contraception, and sexual activity before first pregnancy. A portion of questions were written to ask about the risk factor before participant's first pregnancy. Each question was designed to either receive a binary answer of yes/no or a singular numerical value for age. Participants were given the option to answer each question "N/A" or no response depending on their situation or willingness to provide an answer. The survey was written and reviewed in English before a final version was translated to Spanish by co-author PM. This Quality Improvement Project was reviewed and approved by the Institutional Review Board at the

University of Iowa to assess the effectiveness of AIDA's interventions. Informed consent was received from each patient.

We analyzed the stated factors between AMH and non-AMH using Welch's two-sample t-tests and Fisher's Exact tests. Odds ratios were computed with corresponding 95% Wald Confidence Intervals for binary variables and p-values were computed using Fisher's Exact Test. Due to large samples (99 in each group), normality was assumed to be met and Welch's t-tests (unequal variances) were performed for continuous variables. All analyses were conducted using R (version 4.1.0; R Development Core Team) within RStudio (version 1.4.1717) and $p < 0.05$ indicated statistical significance.⁶

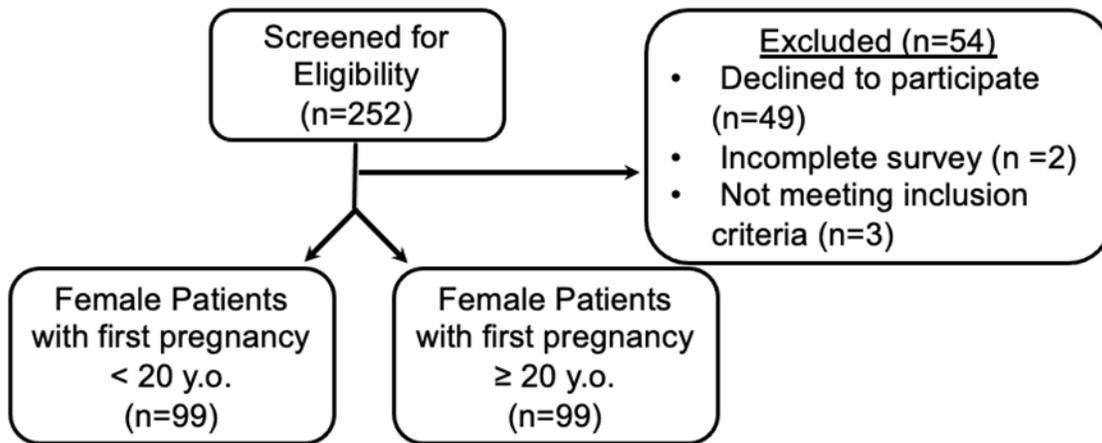


Figure 1: Flowchart of screened individuals and their respective designation.

After screening 252 patients for eligibility, 198 participants were analyzed: 99 who met our definition of AMH (<20 years at first pregnancy) and

99 who met our criteria for non-AMH (≥20 years at first pregnancy) (Figure 1). The mean age [SD] of participants was 34.0[13.3] and 34.2 [9.4] years for AMH

and non-AMH groups, respectively.

Lack of knowledge about contraception was significantly associated with AMH (crude OR=6.6, 95% CI=3.4, 12.6; $p<.0001$), as well as not using contraception (crude OR=3.2, 95% CI=1.5, 6.8; $p=.002$). Also, not living with both parents during childhood, representative of lack of family structure, had a significant association with AMH (OR=2.2, 95% CI=1.1, 4.3; $p=.04$).

Those participants with AMH were, in addition, significantly associated with rural residency, no desire for pregnancy, no prenatal care, and no experience of domestic violence. AMH was not statistically associated with parent or patient's ability to read and write, patient's marriage status at time of conception, or patient receiving consequences from local or governmental law. Table 1 and Figure 2 further show these results.

Table 1: Risk factors for Adolescent Motherhood (AMH)- Binary Variable

	Adolescent (<20) (N = 99)	Adult (20+) (N = 99)	Unadjusted OR (95% CI)	P-value ^a
Patient Can Read	n(col%)	n(col%)		
No	4 (4.0%)	3 (3.0%)	1.35 (0.29, 6.18)	0.99
Yes	95 (96.0%)	96 (97.0%)	Reference	
Patient Can Write				
No	5 (5.1%)	2 (2.0%)	2.61 (0.49, 13.76)	0.28
Yes	93 (93.9%)	97 (98.0%)	Reference	
Missing	1 (1.0%)	0 (0%)		
Pt's Dad Can Read				
No	11 (11.1%)	5 (5.1%)	2.28 (0.76, 6.82)	0.19
Yes	86 (86.9%)	89 (89.9%)	Reference	
NA	2 (2.0%)	5 (5.1%)		
Pt's Dad Can Write				
No	11 (11.1%)	5 (5.1%)	2.23 (0.74, 6.67)	0.19
Yes	86 (86.9%)	87 (87.9%)	Reference	
NA	2 (2.0%)	4 (4.0%)		
Missing	0 (0%)	3 (3.0%)		
Pt's Mom Can Read				
No	15 (15.2%)	12 (12.1%)	1.33 (0.59, 3.01)	0.54
Yes	79 (79.8%)	84 (84.8%)	Reference	
NA	5 (5.1%)	1 (1.0%)		
Missing	0 (0%)	2 (2.0%)		
Pt's Mom Can Write				
No	15 (15.2%)	11 (11.1%)	1.45 (0.63, 3.35)	0.41
Yes	79 (79.8%)	84 (84.8%)	Reference	
NA	5 (5.1%)	1 (1.0%)		
Missing	0 (0%)	3 (3.0%)		
Dual Parent Household During Childhood				
No	29 (29.3%)	16 (16.2%)	2.15 (1.08, 4.28)	0.04 ⁺
Yes	70 (70.7%)	83 (83.8%)	Reference	
Lived In City*				

	No	35 (35.4%)	17 (17.2%)	2.69 (1.38, 5.24)	
	Yes	62 (62.6%)	81 (81.8%)	Reference	0.004 ⁺
	Missing	2 (2.0%)	1 (1.0%)		
Married*					
	No	56 (56.6%)	48 (48.5%)	1.45 (0.83, 2.55)	0.20
	Yes	41 (41.4%)	51 (51.5%)	Reference	
	Missing	2 (2.0%)	0 (0%)		
Had Contraception Knowledge *					
	No	57 (57.6%)	18 (18.2%)	6.58 (3.42, 12.64)	<.0001 ⁺
	Yes	39 (39.4%)	81 (81.8%)	Reference	
	Missing	3 (3.0%)	0 (0%)		
Used Contraception*					
	No	85 (85.9%)	68 (68.7%)	3.23 (1.54, 6.76)	0.002 ⁺
	Yes	12 (12.1%)	31 (31.3%)	Reference	
	Missing	2 (2.0%)	0 (0%)		
Desired Pregnancy*					
	No	49 (49.5%)	27 (27.3%)	2.78 (1.53, 5.05)	0.001 ⁺
	Yes	47 (47.5%)	72 (72.7%)	Reference	
	Missing	3 (3.0%)	0 (0%)		
Received Prenatal Care*					
	No	24 (24.2%)	10 (10.1%)	2.97 (1.33, 6.61)	0.008 ⁺
	Yes	72 (72.7%)	89 (89.9%)	Reference	
	Missing	3 (3.0%)	0 (0%)		
Experienced Domestic Violence*					
	No	89 (89.9%)	79 (79.8%)	2.90 (1.15, 7.30)	0.03 ⁺
	Yes	7 (7.1%)	18 (18.2%)	Reference	
	Missing	3 (3.0%)	2 (2.0%)		
Experienced Trouble with Law*					
	No	95 (96.0%)	98 (99.0%)	0.49 (0.04, 5.44)	0.62
	Yes	2 (2.0%)	1 (1.0%)	Reference	
	Missing	2 (2.0%)	0 (0%)		

OR = Odds Ratio; CI = Confidence Interval; Pt = Patient

^aP-values are from Fisher's exact test

*Factor was only accounted for BEFORE first pregnancy of patient.

+Statistically significant at the 0.05 level of significance

The mean age [SD] at first sexual initiation was significantly lower in those with AMH compared to those with non-AMH (16.4[1.5] and 20.2[3.8], years, respectively; $p < .0001$).

AMH participants' first sexual partner also had a statistically significant

younger age compared to the non-AMH participants' first sexual partner (19.3[3.4] and 22.4[5.1], years, respectively; $p < .0001$). Age of onset of first menstrual period was not statistically different between groups (Table 2).

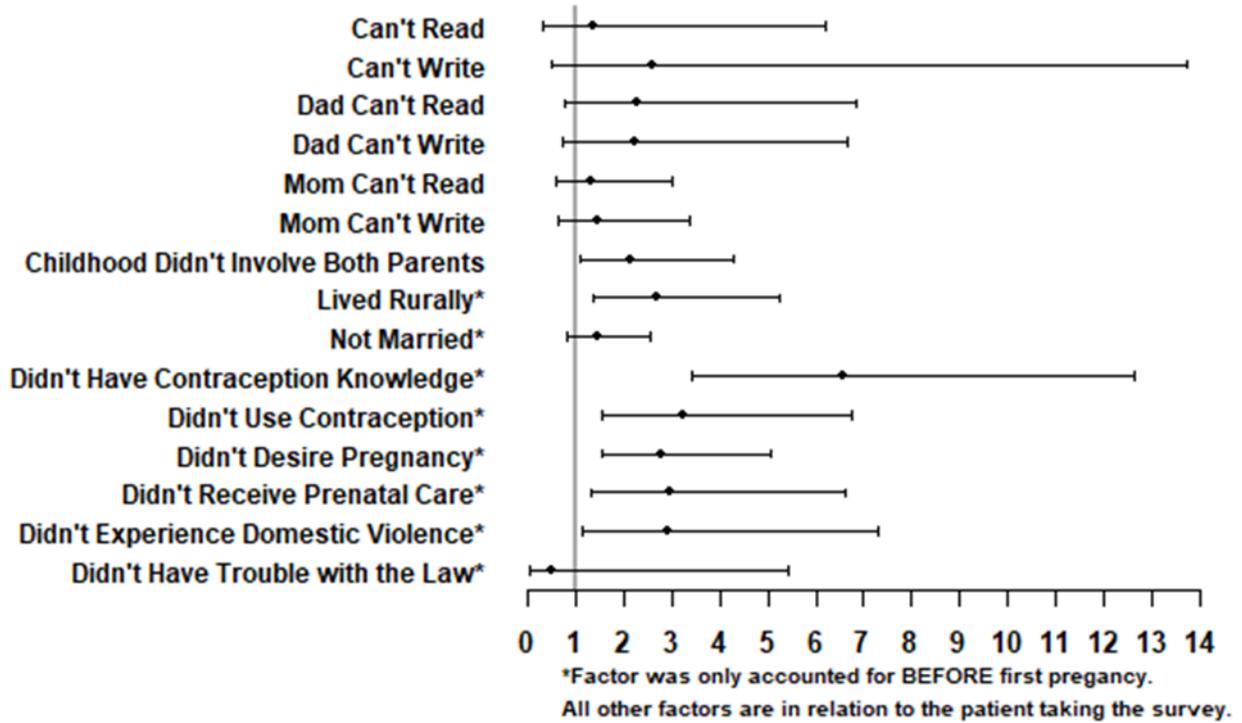


Figure 2: Forest plot of odds ratios and 95% confidence intervals for binary variables with adolescent motherhood (AMH).

Table 2: Risk factors for Adolescent Motherhood (AMH)- Continuous Variables

	Adolescent (<20) (N = 99)	Adult (20+) (N = 99)	Difference (95% CI)	P-value
Age at First Sexual Encounter				
Mean (SD)	16.44 (1.51)	20.18 (3.83)	-3.74 (-4.56, -2.92)	<.0001 ⁺
Missing	2 (2.0%)	1 (1.0%)		
Age of First Partner				
Mean (SD)	19.30 (3.42)	22.36 (5.07)	-3.07 (-4.30, -1.83)	<.0001 ⁺
Missing	2 (2.0%)	3 (3.0%)		
Age of First Period				
Mean (SD)	13.03 (1.65)	13.51 (1.84)	-0.47 (-0.97, 0.02)	0.06
Missing	1 (1.0%)	2 (2.0%)		

CI = Confidence Interval

^aP-values are from Welch's two-sample t-tests

⁺Statistically significant at the 0.05 level of significance

Discussion

Out of the identified factors associated with AMH in Riobamba, the knowledge about and usage of contraception are two factors that can be focused on within the local community, which may improve adolescent pregnancy rates. AIDA should address these factors by creating program goals and educational lessons because access to contraception and knowledge can start today. Since the conclusion of this study, AIDA has focused their plans to be more transparent on the medical and scientific knowledge associated with puberty, contraception, and sexual intercourse. They have also expanded their plans to include topic discussions in local classrooms to reach students more consistently throughout their development. More research on the average depth of knowledge about contraception among adolescents within Riobamba would be helpful in creating tailored plans.

To note, Ecuador has taken steps in the recent past to implement sexual and reproductive education systems within schools outside of the AIDA program. Project RioSueña, implemented by the Ministries of Public Health & Education, National University of Chimborazo, and Cacha Medical Spanish Institute in 2018, sought to establish a train-the-trainer model of classroom based comprehensive sexual education (CSE), per UNESCO guidelines.⁷ Much of this project was created and molded through large scale surveillance and culminated in a university-assisted training of Ecuadorian CSE educators prior to planned intervention in the public school

system.⁸ This endeavor was ultimately halted by the political climate that led to the 2019 unrest of the Lenin-Moreno presidency. The resultant mass-transition of government officials in 2019 led to the dissolution of this project and brings to light an additional barrier (administrative turnover) to programmatic pursuits in the country at-large. With this consequence, AIDA has been left to fill in these educational gaps within Riobamba.⁹

In addition to topics within educational programs, this study can aid in targeting the most at-risk groups for AMH. For example, younger age of first sexual encounter, rural residency, not experiencing domestic violence, and not living with both parents during childhood were all associated with AMH and may describe an at-risk population for AMH. Healthcare workers can determine if an adolescent is at-risk during check-ups and encourage them to attend the AIDA workshops. However, we believe that it is important to note that while this study associated lack of domestic violence with AMH, this topic is sensitive to women throughout the world. This question specifically may not have been answered as accurately as possible due to personal or cultural factors of the patient.

Finally, AMH was associated with not desiring the pregnancy. This demonstrates that adolescent mothers generally do not want to become pregnant, but there are other factors involved that are leading to pregnancy. While some of these factors may have been identified superficially within this study, such as general lack of knowledge about contraception, it is

important to determine the underlying causes of these risk factors, such as societal pressures. Looking into the association of AMH with the cultural and societal pressures of rural life, machismo, and taboo of sexual communication will be imperative to create more effective educational programs. Nonetheless, AIDA can use this study as a baseline for topics to discuss during educational programs as well as what groups to focus on more closely.

It is important to note that other studies done in Latin America and the Caribbean involving AMH have evaluated similar risk factors including lack of reproductive health knowledge and early age of sexual initiation. Many studies have suggested a strong correlation between conditional cash transfers or compulsory education and decreasing AMH rates.¹⁰ Previous studies such as these will be helpful in effectively implementing AIDA's long-term program goals as it pertains to Riobamba's specific patient population and risk factors found within this study.

This case-control study is limited by its self-reported survey data, limited diversity in survey participants, and lack of matched-pairing. Due to the innate biases of a case-control survey, there is increased likelihood of recall bias. Additionally, this sensitive topic may lead to knowingly false answers throughout the survey. A prospective cohort study would be able to mitigate these risks. In relation to the sample population, a more diverse sample would give a more accurate representation of the population of Riobamba. These surveys were

distributed in public hospitals to those seeking appointments. This does not address the segment of population that receives healthcare from private institutions and/or does not utilize the healthcare system. In addition, a matched case-control study could have aided in the control of unquantifiable factors, such as socioeconomic status. Finally, while our study was able to broadly explore the risk factors for adolescent pregnancy, the underlying causes of these risk factors, such as societal pressures, need to be examined further.

Conclusions

The study shows adolescent mothers report being significantly younger during first sexual encounter than adult mothers, and that adolescent mothers were more likely to lack reproductive health knowledge and have a disruption in family structure. Early, transparent, and open education about sexual health and use of contraception should be an initial goal of Riobamba's programs to reduce adolescent pregnancy.

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