

Suicide Attempts among Latinas who Experienced Early Sex Were Largely Mediated by Substance Abuse

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ABSTRACT

The purpose of this study was to describe the role of substance abuse as a mediating factor between early sexual experiences and suicide attempts among adult Latinas. In our study participants (n=158), nearly 15% had attempted suicide and 39% experienced their first sexual encounter at an age of 15 or younger (referred to hereafter as “early sex”). Latinas who experienced early sex were more likely to attempt suicide [OR=2.4, $p<0.05$], and this relationship was largely mediated by substance abuse. An early sexual debut may indicate an environmental adversity on the child that calls for long term intervention for prevention of substance abuse as well as promotion of psychological well-being later in life.

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Introduction

More girls have become sexually active at an earlier age over the past generations (Wells & Twenge, 2005). In 2002, almost 34% of girls in the United States (US) experienced vaginal or oral sex by the age of 15 (Mosher & Chandra, 2005). Due to its various adverse effects, the increasing number of younger girls engaging in sexual activity is a serious concern. Immature reproductive and immune systems make younger girls particularly vulnerable to Human Immunodeficiency Virus (HIV) and other sexually transmitted infections and risky pregnancy. In addition to biological risks, early initiation of sexual activity has also been connected to various behavioral and psychological problems. Adolescents who had an early sexual initiation relative to their peers were reportedly at a higher risk of experiencing delinquency (Armour & Haynie, 2007). Early onset of sexual activity has been linked to greater numbers of sexual partners over time and substance abuse (Ahmed, Davis, Gottman, & Payne, 2006; O'Donnell, O'Donnell, & Stueve, 2001; Brook, Brook, Pahl, & Montoya, 2002; Rosenbaum & Kandel, 1990). In terms of psychological well-being, early sexual activity for a young female increases the chance of suffering from depression (Rector, Johnson, & Noyes, 2003; Meier, 2007). Moreover, a study by the Heritage Foundation (Rector et al., 2003) found that sexually active teenagers were more likely to attempt suicide.

Suicide is a widespread public health problem. In 2005, suicide was the 11th leading cause of death among people aged 16 or older, accounting for 32,170 deaths (Centers for Disease Control and Prevention, 2008). In addition to psychiatric disorders, both early sexual initiation (Rector et al.,

2003) and substance abuse (Bronisch & Wittchen, 1994; Tiet, Ilgen, Byrnes, & Moos, 2006) were strongly associated with suicidal behavior. More Latinas have become sexually active at an earlier age over the past generations (Wells & Twenge, 2005) and the number of Latinas who abuse substances continue to increase in the US (Compton, Grant, Coliver, Glantz, & Stinson, 2004; Grant et al., 2004). However, there is little in the published literature about the relationship between early sexual activity and suicide attempts among Latinas. The lack of information limits the ability of health care providers to develop effective suicide prevention programs that target high-risk groups of Latinas.

Suicidal ideation and behavior are both complex and multifaceted. The main objective of our study was to understand one aspect of it; how early sexual activity results in the increased likelihood of suicide attempts among Latinas. In accordance with literature, we hypothesized that the substance abuse may mediate the relationship between an early sex and suicide attempts. The mediation analysis is a form of causal analysis; therefore, we considered the time sequence of events as well as the plausibility of causal paths based on published literature.

The presumed mediation model in Figure 1 depicts that early sexual activity (we defined as age of 15 or younger) is a significant predictor for suicide attempts with its influence being mostly mediated by substance abuse as an adult. Substance abuse functions as a mediator to the extent that it accounts for the relation between early sexual activity and suicide attempts. Explicitly, the path “A” shows the direct effect from the early sexual experience to the suicide attempt (Landheim, Bakken, & Vaglum,

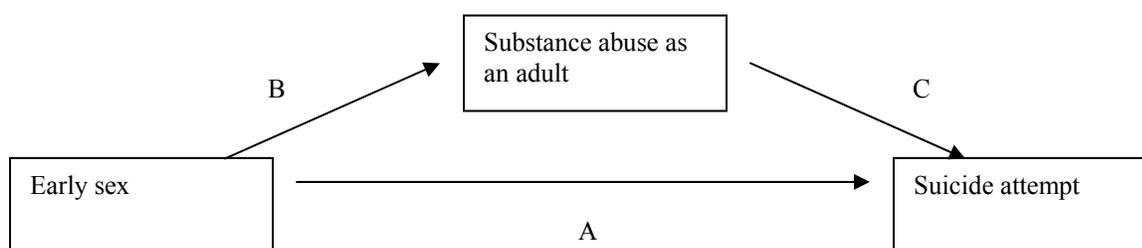
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<http://health.usf.edu/publichealth/fphr/index.htm>

2006; Rector et al., 2003). Path “B” shows the causal path from the early sexual experience to substance abuse (Ahmed et al., 2006; O'Donnell et al., 2001; Brook et al., 2002a; Rosenbaum & Kandel, 1990). Path “C” shows the causal path between substance abuse to the suicide attempt (Bronisch & Wittchen, 1994; O'Boyle & Brandon, 1998; Dhossche, Meloukheia, & Chakravorty, 2000; Kelly, Cornelius, & Lynch, 2002; Tiet et al., 2006; Rowan, 2001).

This study is significant in investigating the role of substance abuse between early sexual activity and suicide attempts later in life particularly among Latinas. This added knowledge on the role of substance abuse as an interceding factor between early sexual experiences and suicide attempts would benefit health care professionals in developing effective suicide prevention programs that target high-risk groups among Latinas.

Figure 1. Presumed mediation model between early sex (age 15 or younger) and suicide attempt



Methods

This study is based on a community-based convenient sample of Latinas residing in Miami, Florida between the years 2004 and 2006. Prior to the interview, all participants signed a written consent form provided. The Institutional Review Board (IRB) of Florida International University reviewed and approved the current study.

Sample Selection and Interview

Study participants were recruited in the community by advertising in a local alternative newspaper, FM radio station, and via announcements at local drug court programs among other outreach activities. Substance users were recruited through substance abuse support groups such as Narcotics Anonymous (NA) and Alcoholics Anonymous (AA) meetings. Among those who reported themselves as substance users, we later screened further if the participant was a substance abuser. Face-to face interviews were conducted in either Spanish or English by trained interviewers using a structured questionnaire. Originally, we interviewed 158 mother-and-daughter dyads to study the intergenerational effect of substance abuse, which was reported in other manuscript. In this analysis, we included daughters only to study about suicide attempts among independent subjects. The survey took place at locations convenient to participants. It took approximately 2-3 hours to complete the survey

and an incentive of \$40 was provided to each participant.

In this retrospective cohort study, participants’ early sexual experience, defined as at 15 year or younger, was considered a “risk factor” and collected retrospectively via interview. Those who did or did not have early sexual experience were further asked to describe if they experienced depression, suicide attempts, substance abuse, and other selected adverse characteristics.

Early Sexual Activity

In our study, we used the legal age of consent in defining an “early sexual activity.” The age at which the first sexual experience occurred was asked for each type of sexual encounter; “how old were you the first time you had vaginal (or anal, oral) sex?” If participants experienced at least one type of sexual encounter at or before age 15, the participant was classified as an individual with an early sexual experience.

Depression, Suicide Ideation, and Suicide Attempt

The experience of depression was assessed by asking respondents: “Have you had a significant period of time experienced serious depression-sadness, hopelessness, loss of interest, difficulty with daily function?” If the response was yes, we determined that the participant had experienced depression. Likewise, suicide ideation and suicide attempt were measured by asking respondents: “Have

you had a significant period of time experienced serious thoughts of suicide (or attempted suicide)?" Our dataset didn't include the age when the participant attempted suicide. Based on literature and statistics, we assumed it happened after the age of 15. Suicide is mainly an adult behavior and statistics shows that the suicide before the age of 15 years are extremely rare and negligible (Centers for Disease Control and Prevention, 2008).

Substance Abuse as an Adult

Substance abuse refers to the harmful use of psychoactive substances including alcohol or illicit and prescription drugs. In our study, a participant was defined as a current substance abuser based on the extent (i.e., amount, number of days of use) of alcohol, illicit drugs (marijuana, cocaine, heroin, ecstasy), or prescription drug use during the last 12 months.

Specifically, alcohol abusers were defined as having at least one binge drinking episode every month during the last 12 months. A binge drinking episode was defined as at least 4-5 glasses of wine, 3-4 cans/bottles of beer, or 3-4 four-ounce drinks of hard liquor per occasion. Illicit drug abusers were defined as participants who reported at least 3 days per week of marijuana use, 2 days per week of cocaine use, one or more occasions of heroin use per week, and/or at least 3 ecstasy uses per month during the past 12 months. Abuse of prescribed medication was measured by asking participants if they were taking medicine without a doctor's authorization, in large amounts than prescribed or for longer periods than prescribed in the last 12 months.

Multiple Sexual Partners

For multiple sexual partners, the participant was asked: "Thinking back over the past 12 months, with how many different people, including men and women, have you had sex (vaginal, anal, or oral) even if only one time?" Participants could report the number of sexual partners regardless of the type of sexual contact. If participants never had sex, no further questions were asked about sexual activity and the number of sexual partners was recorded as "missing." However, if participants were sexually inactive over the past 12 months, then the number of sexual partners was recorded as zero.

Statistical Analyses

In comparing proportions, one-tailed Fisher's exact test was used. This procedure calculates exact probabilities from the hypergeometric distribution for the relationship between two binary variables (Rosner, 2006). The one-sided probability for the Fisher's exact test is calculated by generating all tables that are more extreme than the table observed. Data analyses were performed using the statistical package, STATA version 10.0 (StataCorp, 2005).

In establishing mediation, we followed the four analysis steps suggested by Baron and Kenney (1986). Details concerning mediation analyses were published elsewhere (Baron & Kenny, 1986). Briefly, the causal path "A" in Figure 1 was tested first. If there was no significant connection between early sexual experience and suicide attempts, it was not necessary to investigate further "how" they were connected. Next, significance of causal paths B and C were tested. This was a necessary condition for "substance abuse" to be a mediator but it was not a sufficient condition because the substance abuse and suicide attempt may be correlated because both could be caused by having an early sexual experience. Finally, to establish that substance abuse mediated the relationship between early sexual activity and suicide attempts, the effect of early sexual experience was estimated controlling for the substance abuse. Because all variables in our presumed mediation model were binary, the general linear models with *logit* link were used to estimate the odds ratios for each path.

Results

The ethnic background of participants consisted mainly of Caribbean and South and Central America. Approximately 46% were born in the US and the remaining 54% were foreign-born immigrants. Nearly 63% of participants were currently US citizens. The average age of study participants was 28 years old, and ranged from 18 to 55.

Experience of Sexual Activity as a Child

Four out of 158 study participants never experienced sex. The average age of the first sexual encounter was 16.2 years and ranged from 8 to 25 years old. The distribution of the age of the first sexual encounter was symmetrical around the age of 16 years and nearly half of the study participants experienced sex between the ages of 15-17 years (Figure 2). Approximately 39% (n=61) of our study participants experienced their first sexual encounter as a child, a figure significantly higher than the national average. In the US, according to the National Survey of Family Growth, the average age at which the first sexual encounter occurred was 17.4 years and approximately 26% of female had their first sexual experience by the age of 15 (Mosher et al., 2005).

Early sexual activity was higher among US-born than foreign-born (Caribbean and others from South and Central America) participants. Approximately 57.5% and 22.3% of US-born, and foreign-born Latinas, respectively, experienced sex as a child (Odds Ratio [OR] = 4.7, $p < 0.01$). More Latinas have become sexually active at an earlier as time goes in our study (Table 1). There was an inverse

relationship between the current age of the study participant and proportion of Latinas who had a early sexual experience. For instance, approximately 15% of women aged between 41-55 years old had sex as a child compared to 62.9% of women aged between 18-20 years old who had sex as a child.

To test if this age effect was moderated by birth place, we compared proportions by age-birthplace specific groups. Among foreign-born Latinas, the age effect was strong and statistically significant ($p < 0.01$). Among foreign-born Latinas, approximately 34.1% (13 out of 37) of Latinas aged 18-25 experienced sex as a child compared with 12.5% (6 out of 48) of Latinas aged 26 year or older who experienced sex as a child (Table 1). Among US-born Latinas, however, approximately 60.8% of Latinas aged 18-25 experienced sex as a child compared with 50.0% of Latinas aged 26 or older experienced sex as a child (Table 1). Although the younger US-born Latinas were slightly more likely to experience sex as a child compared with older groups, this difference was statistically insignificant ($p < 0.39$).

Early Sexual Activity & Suicide Attempt (Figure 1, Path A)

Approximately 14.6% of our study participants had a significant period of time during which they made serious attempts of suicide. The causal path “A” in the presumed mediation model (Figure 1) was tested and presented in Figure 3. Latinas who had sex as a child were significantly more likely to attempt suicide (OR = 2.4; 10% vs. 21%, $p < 0.04$). Since the relationship between early sexual activity and suicide attempts was found to be significant, we further investigated “how” they were connected.

Early Sexual Activity & Substance Abuse (Figure 1, Path B)

In an effort to study the effects of substance abuse, we purposely over-sampled people who were using substances. As a result, slightly more than half (58%) of our study participants were categorized as a current substance abuser. As the second step of our mediation analysis, the causal path “B” in the presumed mediation model (Figure 1) was tested. An early sexual activity was a strong factor for substance abuse as an adult. Nearly 78.7% of women who had sex as a child were substance abusers compared with 44.3% of women who did not have sex as a child who were substance abusers. Therefore, as shown in Figure 3, the odds of being a substance abuser was 4.6 times greater ($p < 0.01$) if the participant had an early sexual activity (Figure 3.a).

Substance Abuse & Suicide Attempt (Figure 1, Path C)

Approximately 19.8% of substance abusers attempted suicide compared with 7.5% of non-

substance abusers (results not shown). Therefore, the odds of attempted suicide was 3.1 times greater ($p < 0.02$) in substance abusers than their referent non-users (Figure 3.a). Since all three necessary conditions for “substance abuse” to be a mediator were established, we proceeded to the final step of the mediational analysis: association between early sexual activity and suicide attempts controlling for the substance abuse status.

Early Sexual Activity and Suicide Attempt Adjusting for Substance Abuse

To establish that substance abuse certainly mediates the relationship between early sexual activity and suicide attempts, the effect of early sexual activity was estimated controlling for the substance abuse. Odds ratios of suicide attempts for substance abusers remained significantly larger than non-abusers (OR=2.5, $p < 0.05$) when both variables were entered simultaneously (Figure 3.b). However, the effect of early sexual activity became insignificant when substance abuse was controlled for in the model (OR=1.8, $p < 0.11$). Complete mediation is the case in which early sex no longer affects suicide attempts after substance abuse has been controlled; therefore, the path C is equal to null (i.e. OR =1). However, in our study, the OR in the path C was reduced but it was not reduced to null when the presumed mediator (substance abuse) was controlled. Therefore, we concluded that the substance abuse was a significant but not complete mediator.

Early Sexual Activity and Characteristics in Adult Life

Our study participants attained lower levels of education than that of the general US population. In 2007, 86% of all US adults reported they had completed at least high school (U.S. Census Bureau, 2008). However, only 75% of study participants completed a high school equivalent education. As shown in Table 2, compared to their counterpart, women who experienced an early sex were less likely to finish high school (84% vs. 62%; OR=0.33, $p < 0.01$) and they are also less likely to have a job as an adult (64% vs. 51%; OR=0.58, $p < 0.07$).

Although women with early sexual activity were more likely to experience depression or suicide ideation in adulthood than women without early sexual activity, the results were not statistically significant ($p > 0.05$). However, women with early sexual activity (31%) were significantly more likely to have multiple sexual partners in past 12 months than their referent women without early sexual activity (16%). The age-adjusted odds ratios assessing the association between early sexual activity and adult life sexual, substance abuse and mental health characteristics were graphically

presented in Figure 4. After controlling for age, women with early sexual activity were more likely to experience adult life risks than their referent group (women without early sexual experience).

Discussion

The results provide insights into the role of substance abuse between early sexual activities and suicide attempts later in life among Latinas. We would like to summarize the three main findings in order of importance. First, our study supported that elevated frequencies of suicide attempts among those who experienced an early sex existed, and this relationship was largely mediated by substance abuse. Other studies have shown that sexual intercourse before the age of 15 is associated with lower parental education and non-intact families (Langille, Hughes, Murphy, & Rigby, 2005; Langille & Curtis, 2002). Children who experienced sex may not have the optimal growing environment from the beginning. In addition to the negative environment in which a child is engaging in sexual activity, having sex itself could be an overwhelming physical and emotional experience for children who are developmentally not prepared. Compared with boys, younger girls have been found to be more likely to have sex with an older individual and more likely to be a victim of involuntary or unwanted sex (Marin, Koyle, Gomez, Cavajal, & Kirby, 2000; Manlove, Moore, Liechty, Ikramullah, & Cottingham, 2005). Study supports that childhood trauma causes substance abuse as an adult, (Messina & Grella, 2006) suicidal behavior (Roy, 2004), and we believe sexual activity at such a young age is overwhelming if not traumatic. The consequences of such an overwhelming experience seem to affect their adult life and lead to substance abuse and suicide attempts. This finding has some important implications for suicide prevention efforts involving women. Preventing sexual activity among younger girls from sexual activity may have a protective effect from suicide behavior later in life. If women experience an early sexual activity, this vulnerable subgroup needs to be identified as a risk group at high risk for substance abuse, which can lead to suicidal behavior. This fact reassures that substance abuse treatment should consider the underlying problems as well.

Second, the birth place of Latinas played a strikingly important role in having an early sexual experience for both younger and older study participants. Among 18-25 years old women, 34% of foreign-born and 61% of US-born experienced an early sex. We believe this difference, in part, is explained by the stronger Latin culture among those who were born outside of US (e.g. the Caribbean or Latin America). Latino's "Famillism" refers to family

structures operating within an extended family system and it is believed to be the most important influence in the lives of Latinos (Romero, Robinson, Haydel, Mendoza, & Killen, 2004). Studies reported that family structure and parental involvement play an important role in adolescent problem behaviors (Barrett & Turner, 2006; Wagner, Borges, Medina-Mora, Benjet, & Villatoro, 2001; Miech & Chilcoat, 2005). Lack of parental regulation of television programs was also associated with an increased risk of initiating sexual intercourse (Ashby, Arcari, & Edmonson, 2006). Lack of parental supervision may provide opportunities to engage in an early sexual debut. Children who were born in the Caribbean or Latin America may have been more likely to be under the supervision of an extended family, and less likely to be on their own. Consequently, children may be less likely to get involved in sexual activity. The role of an extended family system needs to be investigated further in protecting children from early exploration of sex. Additionally, the Latin culture of maintaining their virginity before marriage (Espin, 1984) may be more important to Latinas who were born in the Caribbean and Latin countries compared with Latinas who were born in the US.

Third, our study revealed that early sexual activity is a strong predictor of low socioeconomic attainment (as measured by education and employment) and unhealthy adult life among Latinas. Consistent with our findings, teenage girls engaging in sexual activity were reportedly less likely to graduate from high school or attend college (Rector & Johnson, 2005). As expected, current employment status of Latinas with early sexual activity was lower than that of Latinas without early sexual activity. Sexual experience at such a young age could be overwhelming and the children could be distracted from normal developmental tasks including school. Additionally, low socioeconomic attainment among sexually active young girls may be caused by negative environmental factors such as lower socioeconomic reality. Studies reported that indicators of lower socioeconomic status were associated with sexual activity in young women (Langille et al., 2005). Indeed, when environmental differences between families were controlled for, an earlier onset of sexual experience did not increase the likelihood of problem behaviors (Harden, Mendle, Hill, Turkheimer, & Emery, 2008). Regardless the causal direction, early sexual activity was a predictor of low socioeconomic attainment among Latinas.

Limitations

We acknowledge that the mediational analysis itself is a correlation analysis and does not warrant the direction of causation. Although mediational analysis is an extremely useful tool in understanding

how something comes about, if the mediational model was incorrectly specified, the results from a mediational analysis would not be meaningful. To specify the presumptive mediational model, we considered plausibility of causal paths based on published literature as well as the time sequence of events. However, we believe that a longitudinal study would be better to elucidate the sequence of events because it reduces recall bias. Another limitation of our study is that we relied on self-reported data. Due to social stigma, participants could underreport their substance abuse and sexual activity as a child. This study is based on the Latinas residing in Miami, Florida consisting mainly of Cubans and other Hispanics from South and Central America. Thus, the results may not be generalizable to Latina women of other Hispanic descent in different geographic locations (e.g. Mexican Americans in Texas or Puerto Ricans in New York). Latinas who completed suicide could not be part of our study; therefore, the association between having sex as a child and suicide attempts could be underestimated.

Finally, early sexual activity could be due curiosity about sex among girls (willing participants

of sex) or forced sexual intercourse (unwilling participants). We do not have information as to whether the sexual activities at age of 15 or younger were “willing” or “unwilling.” Regardless of how it happens, however, early sexual experiences are associated with substance abuse and suicide attempts later in life.

Conclusion

An early sexual experience predicts a low socioeconomic attainment and unhealthy behaviors during adult life among Latinas. Early sexual activity by age 15 predicts the lower attainment of education and lower employment rate. Women who experienced early sexual activity were also more likely to have multiple sexual partners, attempt suicide and abuse substance later in life. Particularly, our study supported that Latinas who experienced early sex showed elevated suicidal attempts and this relationship was largely mediated by substance abuse. Health care professionals should be alert to the increased risk of substance abuse and suicide attempt among women with early sexual experience.

Figure 2. Study Participants’ Age of First Sexual Experience

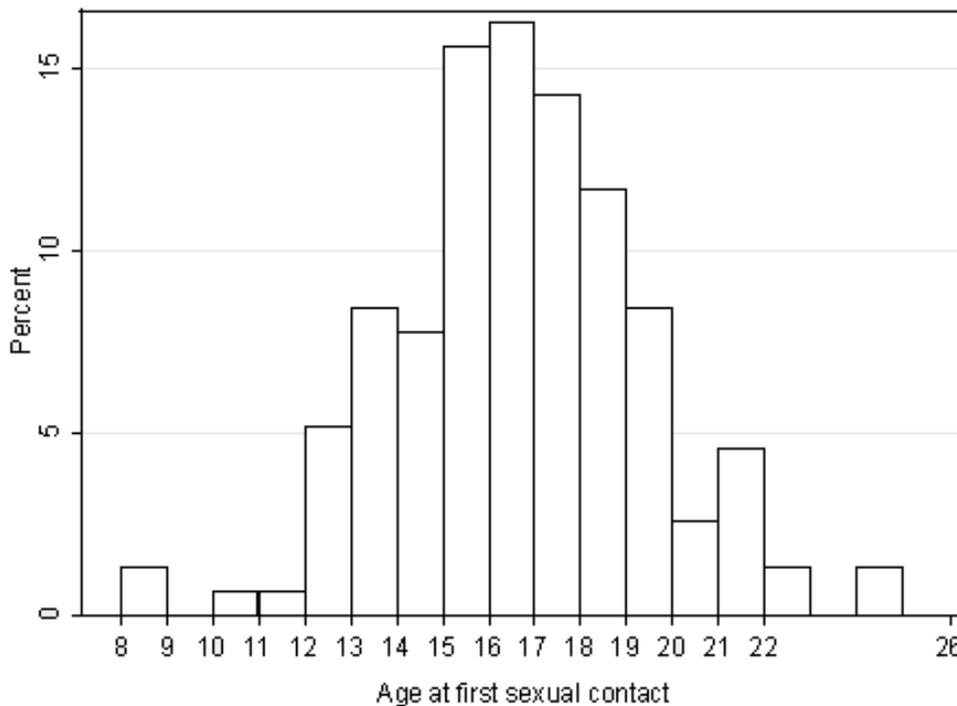


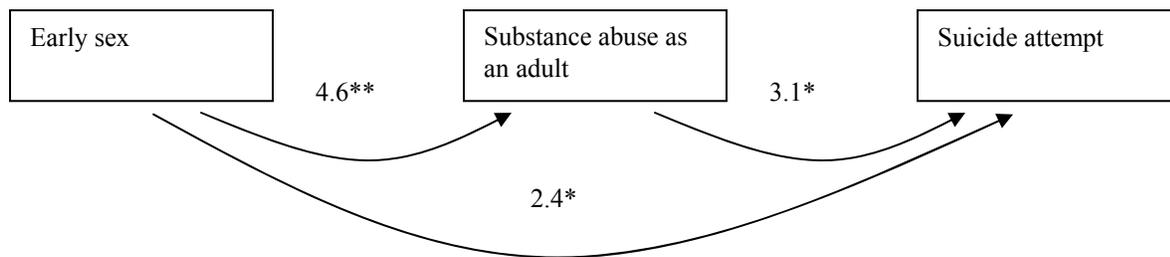
Table 1. Characteristics of the Latinas in Study (n=158)

		Did not have childhood sexual experience		Had childhood sexual experience ≤ age 15		p-value [^]
		N	%*	N	%*	
Total		97	61.4%	61	38.6%	
Birth place	U.S.	31	42.5%	42	57.5%	<0.01
	Other country	66	77.7%	19	22.3%	
US Citizenship	Yes	52	52.5%	47	47.5%	<0.01
	No	45	76.3%	14	23.7%	
Age (in years)	18-20	13	37.1%	22	62.9%	<0.01
	21-25	31	58.5%	22	41.5%	
	26-30	18	69.2%	8	30.8%	
	31-40	18	75.0%	6	25.0%	
	41-55	17	85.0%	3	15.0%	
Age by citizenship						
US-born	18-25 years	20	39.2%	31	60.8%	0.39
	26+	11	50.0%	11	50.0%	
Foreign-born	18-25 years	24	64.9%	13	34.1%	0.01
	26+	42	87.5%	6	12.5%	

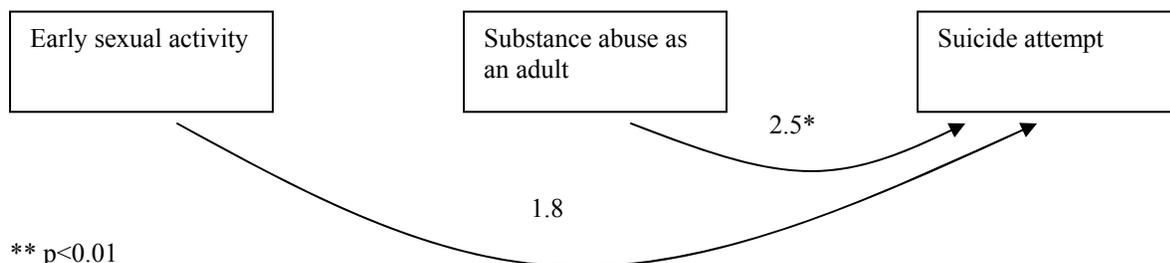
*Row %# ^Fisher's exact test

Figure 3. Mediating Effect of Substance Abuse between Early sex (age of 15 or younger) and Suicide Attempt among Adult Latinas

(3.a) Odds ratios from the series of univariate analysis



(3.b) Odds ratios when both variables were entered simultaneously



** p<0.01
* p<0.05

Table 2. Characteristics of Latinas by Incidence of Childhood Sexual Experience (n=158)

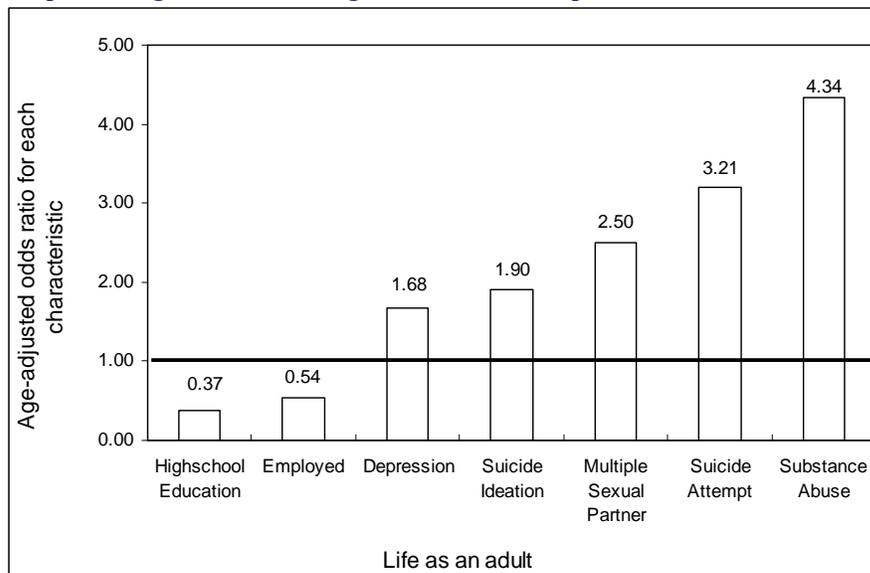
	Women who did not have childhood sexual experience at or before age 15		Women who had childhood sexual experience ≤ 15 years of age		Fisher's Exact test p-value	Unadjusted odds ratio	
	n	% [^]	n	% [^]			
Total	97		61				
High school or equivalent education	Yes	81	83.5%	38	62.3%	<0.01	0.33
	No	16	16.5%	23	37.7%		
Current employment	Yes	62	63.9%	31	50.8%	0.07	0.58
	No	35	36.1%	30	49.2%		
Depression*	Yes	66	68.0%	47	77.0%	0.15	1.58
	No	31	32.0%	14	23.0%		
Suicide ideation	Yes	22	22.7%	20	32.8%	0.11	1.66
	No	75	77.3%	41	67.2%		
Multiple sex partners	Yes	15	16.1%	22	36.1%	<0.01	2.93
	No	78	83.9%	39	63.9%		
Suicide attempt	Yes	10	10.3%	13	21.3%	<0.05	2.36
	No	87	89.7%	48	78.7%		
Substance abuse	Yes	43	44.3%	48	78.7%	<0.01	4.64
	No	54	55.7%	13	21.3%		

*Experienced serious depression-sadness, hopelessness, loss of interest, or difficulty with daily function

[^]Column %

Experienced an early sexual encounter at or before 15 years

Figure 4. Age-adjusted Odds Ratios on Adult Life Characteristics of Latinas Experiencing ≤ 15 Years of Age vs. their Counterparts



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