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Childhood Abuse and Early Menarche among Peruvian Women

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Abstract

Objective—Childhood abuse has been associated with age of menarche in some studies, but not all, and few have assessed the independent associations of sexual and physical abuse with early menarche. We examined the association between childhood abuse and early menarche among pregnant women in Lima, Peru.

Methods—Multinomial logistic regression procedures were used to estimate odds ratios (OR) and 95% confidence intervals (CIs) for early menarche (11 years) in relation to any physical or sexual childhood abuse, physical abuse only, sexual abuse only and both physical and sexual abuse in a cohort of 1,499 pregnant (first trimester) women.

Results—Approximately 69% of participants reported experiencing physical or sexual abuse in childhood. The frequencies of physical abuse only, sexual abuse only and both physical and sexual abuse were 37.4%, 7.7% and 24.5%, respectively. Compared with women who reported no childhood abuse, those who reported any childhood abuse had a 1.38-fold increased odds of early menarche (95% CI: 1.01–1.87). Compared to no abuse, the odds of early menarche was 1.60-fold among women with childhood sexual abuse only (OR=1.60; 95% CI 0.93–2.74) and 1.56-fold for those with both physical and sexual abuse (OR=1.56; 95% CI 1.07–2.25) during childhood. Isolated physical abuse was weakly associated with early menarche (OR=1.23; 95% CI 0.87–1.74). There was no clear evidence of association of childhood abuse with late menarche (15 years).

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Conclusion—Childhood abuse, particularly joint physical and sexual abuse, is associated with early menarche. Our findings add to an expanding body of studies documenting the enduring adverse health consequences of childhood abuse.

Keywords

childhood abuse; age at menarche; Peru

Introduction

Menarche is an important milestone of sexual development for a woman. Age at menarche signals the end of puberty and the beginning of her reproductive life [1,2]. According to Belsky, Steinberg and Draper's evolutionary theory of socialization and development children in highly stressful family context where resources are limited, parents are harsh, rejecting, insensitive or inconsistent (possibly physiologically or physically abusive) develop psychological and behavioral issues and experience early maturation and puberty. They also engage in earlier sexual activity and have short unstable pair bonds with little parental investment in their own offspring [3,4].

Reaching menarche at an early age has been associated with a broad spectrum of behavioral, reproductive and health outcomes including early age at initiation of sexual activity [5–7] and first pregnancy [6,8], diminished ovarian function [9], increased risks of obesity [10], autoimmune disorders [11], psychiatric disorders [12], metabolic syndrome, type 2 diabetes, cardiovascular disorders [1,13,14], and medical complications of pregnancy including preeclampsia [15,16], and gestational diabetes [10].

Consistent with Belsky, Steinberg and Draper's theory, an emerging literature implicates childhood physical and sexual abuse, a specific type of early life stressor, as a risk factor for reaching menarche early [17–19]. For instance, Romans et al using the Otago Women's Health Child Sexual Abuse Survey noted that a number of adverse childhood experiences including childhood physical and sexual abuse preceded early menarche [18]. In concurrence, Henrichs et al in a nationally representative sample found increased odds of early menarche associated with childhood sexual abuse.[20] Similar results were reported by other investigators.[8] However, few investigators have assessed the relationship between child sexual abuse and age at menarche among Latin American women. Using information from a large pregnancy cohort, we conducted the present cross-sectional analysis to assess the extent to which, if at all, women's early experience with physical and/or sexual abuse is associated with early age at menarche. We sought to explore the independent and joint association of physical and sexual abuse with risk of early age at menarche among low-income Peruvian women, a population known to be exposed to a high prevalence of gender-based violence across the life course, with up to 40% intimate partner violence and 67% childhood physical punishment [21–24]. Documentation of associations of childhood abuse with early age at menarche in this population may have important clinical implication insofar as alerting health care providers to the need to evaluate and screen women for past and current abuse.

Methods

The PrOMIS Study

The population for the present study was drawn from participants of the ongoing Pregnancy Outcomes, Maternal and Infant Study (PrOMIS) Cohort, designed to examine maternal social and behavioral risk factors of preterm birth and other adverse pregnancy outcomes. The study population consists of women attending prenatal care clinics at the Instituto Nacional Materno Perinatal (INMP) in Lima, Peru. The INMP is the primary reference establishment for maternal and perinatal care operated by the Ministry of Health of the Peruvian government. Recruitment began in February 2012. Women eligible for inclusion were those who initiated prenatal care prior to 16 weeks gestation. Women were ineligible if they were younger than 18 years of age, did not speak and read Spanish, or had completed more than 16 weeks gestation.

Enrolled participants were invited to take part in an interview where trained research personnel used a structured questionnaire to elicit information regarding maternal socio-demographics, lifestyle characteristics, medical and reproductive histories, and early life experiences of abuse. All participants provided written informed consent. The institutional review boards of the INMP, Lima, Peru and the Harvard School of Public Health Office of Human Research Administration, Boston, MA approved all procedures used in this study.

Analytical Population

The study population for this report is derived from information collected from those participants who enrolled in the PrOMIS Study between February 2012 and March 2013. During this period 1,810 eligible women were approached, and 1,556 (86%) agreed to participate. Fifty-seven were excluded from the present analysis because of missing information concerning their experience with abuse in childhood and/or missing information for age at menarche. Women excluded from this analysis did not differ in regards to sociodemographic and lifestyle characteristics as compared with those included. As shown in Table 1, a total of 1,499 women remained for analysis. Participants' age was categorized as follows: 18–20, 20–29, 30–34, and 35 years. Other sociodemographic variables were categorized as follows: maternal ethnicity (Hispanic vs. others); educational attainment (6, 7–12, and >12 completed years of schooling); marital status (married and living with partner vs. others); employment status (employed vs. not employed); access to basic foods (very hard/hard, somewhat hard, not very hard); parity (nulliparous vs. multiparous); planned pregnancy (yes vs. no); self-reported health in the last year (good vs. poor) and gestational age at interview. Self-reported age at menarche, categorized into three groups (11, 12–14, and 15 years), was based on cut-points reported by previous investigators [10,15,20].

Childhood Abuse Assessment

We used the Childhood Physical and Sexual Abuse Questionnaire to elicit information concerning participants' experiences with physical and sexual abuse in childhood [25]. The instrument consists of eight questions concerning abuse taken from the Centers for Disease Control and Prevention (CDC) Adverse Childhood Experiences Study. Respondents were rated as having experienced childhood abuse if, before the age of 18 years, they reported that

an older person touched them, they were made to touch someone else in a sexual way, or intercourse was attempted or completed (sexual abuse); or that they were hit, kicked, or beaten often and/or their life was seriously threatened (physical abuse). Participants who responded 'no' to all questions regarding sexual and physical abuse were categorized as 'no abuse'. Those responding 'yes' to only physical abuse questions were categorized as 'both physical abuse only' and those responding 'yes' to only sexual abuse questions were categorized as 'sexual abuse only'. Those responding 'yes' to any physical abuse questions and 'yes' to any sexual abuse questions were categorized as having experienced 'physical and sexual abuse'. Participants who responded 'yes' to any questions of physical abuse or 'yes' to any questions of sexual abuse or yes to both abuse types were categorized as having experienced 'any abuse'.

Statistical Analyses

Frequency distributions of maternal sociodemographic characteristics by types of history of childhood abuse were examined. Multinomial logistic regression procedures were used to calculate maximum likelihood estimates of odds ratios (ORs) and 95% confidence intervals (CIs) for early age and late age at menarche in relation to childhood abuse (any abuse, physical only, sexual only, and both physical and sexual) while adjusting for potential confounders. Those with "No Abuse" and "Menarche age (12–14 years)" served as the reference group. Potential confounders were selected *a priori* based on their hypothesized relationship between childhood abuse and age at menarche. The variables included maternal age, education, employment status, parity and difficulty paying for basic foods [15, 19, 21, 26, 27]. All statistical analyses were performed using SAS 9.3 (SAS Institute, Cary, NC, USA). All reported *P*-values are 2-tailed with statistical significance set at 0.05.

Results

Approximately 69.6% of participants reported having experienced any physical or sexual abuse during their childhood. The frequencies of physical abuse only, sexual abuse only and both physical and sexual abuse were 37.4%, 7.7% and 24.5%, respectively. Overall, the mean age of menarche among participants was 12.9 years (standard deviation (SD) = 1.6 years).

Sociodemographic and lifestyle characteristics of study participants according to history and type of childhood abuse are shown in Table 1. The mean age of participants was 28.0 years (SD: ± 6.2) and approximately 80% were married or were living with their partner. Approximately 60% reported being unemployed, about 55% completed between 7–12 years of education and 40% completed more than 12 years. Among the non-abused women, 14.3% reported that it was very hard to access basic foods and this proportion was higher for women who reported experiencing sexual abuse only or both sexual and physical abuse in childhood (21.6% and 21.9% respectively). Approximately 75% of the non-abused women self-reported their health status in the last year as having been good, while only 58% of those who had a history of both physical and sexual abuse reported their health status as good.

Approximately 18.3% of participants were classified as having had early age at menarche (11 years), and 16.8% of participants were classified as having had a late age at menarche (15 years). For this analysis the remaining 64.8% women with an age at menarche between 12–14 years and those who experienced no abuse comprised the referent group. As shown in Table 2, a history of any childhood physical or sexual abuse was associated with a 1.40-fold increased odds of early menarche (OR=1.40; 95% CI 1.03–1.90). The association remained but was slightly attenuated after adjustment for age, educational attainment, employment status, parity, and difficulty paying for basics (adjusted odds ratio [aOR]=1.38; 95% CI 1.01–1.87). There was no clear evidence of an association between childhood physical or sexual abuse and odds of late age at menarche (aOR=1.16; 95% CI 0.85–1.58). We next evaluated the association of early and late age at menarche with each specific type of childhood abuse. As shown in the bottom panel of Table 2, compared with women who experienced no abuse during childhood, the odds of early menarche was 1.60-fold for those who reported experiencing sexual abuse only (OR=1.60; 95% CI 0.93–2.74) and 1.56-fold among those who reported experiencing both physical and sexual abuse (OR=1.56; 95% CI 1.07–2.25) during childhood, although statistical significance was not achieved for sexual abuse only. There was no clear evidence of an association of isolated physical abuse during childhood and risk of early age at menarche (aOR=1.23; 95% CI 0.87–1.74). Those with isolated experience of sexual abuse in childhood were 1.65 times as likely to have a late age at menarche compared with women who experienced no abuse during childhood, however the association did not reach statistical significance after we adjusted for confounders (aOR=1.65; 95% CI 0.97–2.81).

Discussion

We found that a history of any childhood physical or sexual abuse was associated with 1.40-fold increased odds of reporting early age at menarche among pregnant Peruvian women. Additionally, we found that a history of both physical and sexual childhood abuse was associated with a 1.56-fold increased odds of early menarche. Our results are consistent with previous studies which investigated both physical and sexual abuse and found associations between each type of abuse and early menarche [8,18,20,26–28]. Our results are also consistent with previous studies that focused solely on childhood sexual abuse and which found a positive association between sexual abuse and early menarche [17,19, 29, 30].

Prior studies regarding age at menarche rely on retrospective reporting. For example, Romans and colleagues conducted a mailed survey of 350 women to investigate a number of childhood factors thought to be associated with early menarche [18]. They found that women with early menarche were more likely to report a history of childhood sexual abuse and severe physical punishment. They further analyzed those women who reported sexual abuse and found that the association with early menarche was strongest if the sexual abuse involved attempted or completed intercourse [18]. A second study of a nationally representative sample of women in the United States evaluated eleven childhood adversities and found that physical abuse, sexual abuse, family violence and parental mental illness were associated with early menarche [20]. After adjusting for co-occurring adversities that happened prior to menarche, only the relationship between childhood sexual abuse and early menarche remained (OR=1.77; 95% CI 1.21–2.60) [20]. Brown et al also examined the

sexual trajectories of abused and neglected youth during a prospective study with the Children in the Community study of New York [8]. Their results showed that among those children experiencing physical abuse the mean age at menarche was 12.3 years and for those who experienced two or more episodes of sexual abuse it was 11.8 years, with the comparison group having a mean age of 12.4 years [8].

Retrospective reports from women participating in the Nurses' Health Study II showed that 57% had experienced some form of physical or sexual abuse (36% physical abuse only, 8% sexual abuse only, and 13% both physical and sexual abuse) during childhood and the overall median age at menarche was 12 years [27]. Their results showed that, compared to women who reported no childhood abuse, those with a history of severe physical abuse (aOR=1.22; 95% CI 1.10–1.37) and sexual abuse (aOR=1.20; 95% CI 1.10–1.37) had a positive association with early menarche (<11 years) [27]. They also reported finding a dose-response association between severity of physical abuse and delayed onset of menarche (>15 years), but found no such association between sexual abuse and late menarche [27]. In our analysis of late menarche we did not find a statistically significant association with a history of childhood physical or sexual abuse. The analysis of abuse and age at menarche among the Black Women's Health Study participants considered independent and joint experience of abuse types [26]. Their results showed an adjusted relative risk (RR) for early menarche of 1.27 (RR=1.27; 95%CI 1.20–1.35) for those having experienced sexual abuse only and a weak, but statistically significant, RR of 1.05 (RR=1.05; 95%CI 1.01–1.09) for physical abuse only and RR of 1.22 (RR=1.22; 95%CI 1.16–1.28) for both physical and sexual abuse relative to no abuse [26]. They suggested that self-reported history of sexual abuse, which was confirmed to have occurred prior to menarche, increased risk of early menarche (<12 years) and that the association between childhood physical abuse was unclear [26].

Specifically considering sexual abuse, the findings of our analysis provide support for an association between childhood abuse and early age at menarche but cannot speak to the temporal association between the two. The more traditional hypothesis is that there is greater vulnerability and increased desirability to perpetrators among girls developing early [26]. Zabin et al set out to test that hypothesis along with a second; which considers that abuse occurs prior to puberty and menarche specifically because the perpetrator finds it appealing that the victim is a child and has not yet developed adult female traits [29]. Their results showed that, although abuse did occur during puberty while secondary sex features were developing, the abuse generally began prior to the onset of puberty; with 63% of the cases reporting their abuse began prior to 3 years or more before menarche and over 18% of the cases reporting their abuse occurred 8 years prior to menarche, with an average age of 9 years old at the onset of abuse [29]. It was a small study of 323 African American and multi-ethnic Caucasian women in the US, but they were able to show that many sexual abuse events occurred long before puberty. In a second effort to investigate the direction of the relationship between menarche and childhood sexual abuse, Kendall et al, interviewed 365 adults and found that the average age of onset of sexual abuse was 7 years, indicating that abuse preceded the onset of puberty [17]. A short survey of childhood abuse among children admitted to a referral hospital in Lima, Peru was able to determine that among the admitted, sexually abused girls, the average age of reported abuse was 9 years old [23]. Collectively,

the US studies help to clarify the possible temporal relation between abuse experience and early menarche. Moreover, these studies underscore the importance of future investigations among diverse populations designed to assess bio-psychosocial mechanisms whereby childhood physical and sexual abuse may contribute to accelerated sexual maturation [29].

Pubertal development is primarily controlled through the hypothalamic-pituitary-axis (HPA) and the hypothalamic-pituitary-gonadal (HPG) axis. Indicating that a biological plausible association between childhood abuse and early age at menarche may exist due to the biological affect that severe stress or childhood trauma has on the HPA and HPG axis [26]. However, further research is required to understand the full interaction between HPA and HPG to explain the biological underpinnings of the associations found between childhood abuse and early age at menarche. Other risk factors associated with early menarche include a diverse set of psychosocial, behavioral, environmental and genetic factors [3,31–33]. Notably, birth size [31] and early life obesity [34], physical inactivity [35], and calorie dense diets [36] have been implicated as important determinants of early menarche.

Available evidence also indicates that age at menarche is decreasing rapidly for virtually all populations [37,38]. Reasons for the downward trend are not fully understood, but it is likely that non-genetic factors are important in these pronounced secular trends. Yet, nationally representative data for developing countries regarding age at menarche is lacking and makes it difficult to make comparisons between and within countries. Parent et al conducted a review of global variations of age at menarche and found only a small number of studies from Latin American countries [39]. For instance, mean or median age at menarche were reported for Guatemalan (13.8 years), Columbian (13.4 years), Chilean (12.5 years), and Venezuelan (12.6 years) girls) [39]. In the United States, population-based studies that have assessed racial differences in age at menarche demonstrated that non-Hispanic black women reported the earliest median age (12.1 years), non-Hispanic white women reported the latest (12.6 years) and Mexican American women fell in-between (12.3 years) [40]. Studies measuring differences in age of menarche between racial/ethnic groups are limited and few explore childhood abuse on menarche in developing countries with a high prevalence of childhood abuse, such as Peru [21–23], in part due to the lack of consensus on how to define harsh physical discipline that is widespread and culturally acceptable [22]. This study is the first, to our knowledge, to examine the relationship between childhood physical and sexual abuse and age at menarche among a Peruvian cohort.

Our relatively large sample size allowed us to control for several potential confounding factors and we had the opportunity to examine the relations according to type of childhood abuse experienced. However, several limitations should be acknowledged. First, we did not have detailed information about the specific timing and severity of childhood abuse in this cross-sectional study and we cannot determine a temporal relation. Secondly, age at menarche and experience with childhood abuse were assessed using participant self-report and the other covariates were related to current status of the women. Hence, due to self-report these data are subject to misclassification or recall bias. Also, this analysis was conducted among currently pregnant women and limits generalizability. Finally, although we used multivariable logistic procedures to adjust for confounding, we cannot rule out the possibility of some residual confounding by unmeasured factors. Specifically, we did not

have information regarding nutrition, physical activity or weight at the time of menarche nor did we know the mother's age of first menstruation.

Further research on the types, severity, duration and perpetrators of childhood abuse is needed, as well as research aimed at understanding the biological mechanisms through which childhood abuse is associated with age at menarche. Early menarche may be a signal to health care providers or supportive caregivers that the young girl may be suffering from abuse. Identifying young girls who are suffering from abuse or experiencing early menarche and providing them support during this potentially difficult time may help mitigate negative psychosocial and health outcomes. Greater efforts are needed to prevent child abuse and its many health consequences.

A history of childhood abuse is prevalent among pregnant Peruvian women. Any physical or sexual childhood abuse is associated with early menarche. Regarding abuse types, we found that experiencing childhood physical and sexual abuse combined and isolated sexual abuse increased the odds of early menarche. Our findings add to an expanding body of literature documenting the enduring adverse health implications of childhood abuse.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

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Implications and Contributions

Childhood abuse is prevalent among pregnant women in Peru, a population known to have a high burden of gender-based violence across the life course. This study documents the association of childhood abuse with early menarche among low-income Peruvian women. Healthcare providers should screen women for past and current abuse.

Table 1

Sociodemographic and Reproductive Characteristics of the Study Population by Types of Childhood Abuse in Lima, Peru (N=1,499)

Characteristics	No abuse (N=456)		Physical abuse only (N=561)		Sexual abuse only (N=116)		Physical and sexual abuse (N=366)	
	n	%	n	%	n	%	n	%
Age (years) *	27.4 ± 6.2		28.0 ± 6.2		27.9 ± 6.3		28.7 ± 6.2	
Age (years)								
18–20	28	6.1	30	5.4	9	7.8	19	5.2
20–29	285	62.5	318	56.7	66	56.9	188	51.4
30–34	76	16.7	116	20.7	18	15.5	87	23.8
35	67	14.7	97	17.3	23	19.8	72	19.7
Education (years)								
6	19	4.2	24	4.3	2	1.7	19	5.2
7–12	260	57.0	308	54.9	62	53.5	211	57.7
>12	176	38.6	228	40.6	50	43.1	135	36.9
Hispanic	351	77.0	425	75.8	90	77.6	266	72.7
Married/living with a partner	375	82.2	458	81.6	90	77.6	297	81.2
Nulliparous	256	56.1	274	48.8	62	53.5	161	44.0
Employed	195	42.8	243	43.3	53	45.7	157	42.9
Access to basic foods								
Very hard/hard	65	14.3	109	19.4	25	21.6	80	21.9
Somewhat hard	132	29.0	169	30.1	42	36.2	143	39.1
Not very hard	259	56.8	282	50.3	49	42.2	143	39.1
Planned pregnancy	202	44.3	249	44.4	44	37.9	137	37.4
Self-reported health status in last year								
Good	346	75.9	392	69.9	75	64.7	214	58.5
Poor	102	22.4	162	28.9	39	33.6	144	39.3
Gestational age at interview *	9.6 ± 3.4		9.9 ± 3.4		9.5 ± 3.1		9.9 ± 3.4	

Due to missing data, percentages may not add up to 100%

*
mean ± SD (standard deviation)

Table 2

Association between Childhood Abuse and Timing of Menarche (N=1,499)[*]

Childhood abuse	Menarche age (12–14 yrs.) (N=972) n (%)	Early menarche (≤ 11 yrs.) (N=275)			Late menarche (≥ 15 yrs.) (N=252)		
		n (%)	Unadjusted OR (95% CI)	Adjusted OR (95% CI)[**]	n (%)	Unadjusted OR (95% CI)	Adjusted OR (95% CI)[**]
No abuse	314(32.3)	70(25.5)	Reference	Reference	72(28.6)	Reference	Reference
Any Abuse	658(67.7)	205(74.6)	**1.40 (1.03, 1.90)**	**1.38 (1.01, 1.87)**	180(71.4)	1.20 (0.88, 1.62)	1.16 (0.85, 1.58)
Types of abuse							
No abuse	314(32.3)	70(25.5)	Reference	Reference	72(28.6)	Reference	Reference
Physical Abuse Only	362(37.2)	100(36.4)	1.24 (0.88, 1.75)	1.23 (0.87, 1.74)	99(39.3)	1.20 (0.85, 1.68)	1.17 (0.83, 1.64)
Sexual Abuse Only	66 (6.8)	24 (8.7)	1.63 (0.96, 2.78)	1.60 (0.93, 2.74)	26(10.3)	**1.72 (1.02, 2.89)**	1.65 (0.97, 2.81)
Physical & Sexual Abuse	230(23.7)	81(29.5)	**1.58 (1.10, 2.27)**	**1.56 (1.07, 2.25)**	55(21.8)	1.04 (0.71, 1.54)	1.01 (0.68, 1.50)

CI = confidence interval; OR = odds ratio; Bold = statistically significant values.

[*]
Multinomial logistic regression model was built where those with "No Abuse" and "Menarche age (12–14 years)" served as the reference group.

[**]
Adjusted for age (years), education (years), employment status (yes vs. no), parity (nulliparous vs. multiparous) and difficulty paying for the very basics (very hard or hard, somewhat hard, not very hard)