Disparities in Reported and Substantiated Infant Maltreatment by Maternal Hispanic Origin and Nativity: A Birth Cohort Study

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Abstract We followed Latino infants prospectively through age 1 to determine whether maternal foreign-born status conferred a protective advantage against reported and substantiated maltreatment across Hispanic-origin groups, and whether the likelihood an infant was reported or substantiated for maltreatment varied by Hispanic origin. We drew data for all Latino infants born in California between 2000 and 2006 (N = 1,909,155) from population-based birth records linked to child protective services data. We used χ^2 tests to assess distributional differences in covariates and utilized generalized linear models to estimate the adjusted relative risk of report and substantiation in models stratified by nativity. We observed significant health advantages in reported and substantiated maltreatment for infants of foreign-born mothers within every Hispanic-origin group. Risks of report and substantiation among infants of Mexican and Central/South American mothers were consistently lower than Puerto Rican and Cuban mothers despite socioeconomic disadvantage. The presence of disparities among Hispanic-origin groups in child maltreatment report and substantiation during infancy has implications for the health of Latinos across the life course. Further research is warranted to unravel the complex processes underlying observed relationships.

Keywords Latino health paradox · Latino infant health · Child maltreatment · Hispanic health paradox

Introduction

Latino children represent the fastest growing child population in the United States and in the public child protection system. National data indicate that the percentage of children confirmed as victims of maltreatment who are of Latino ethnicity increased from 14.2 % in 2000 to 22.1 % in 2011, [1] consistent with growth in the US child population. Latinos are highly diverse with regard to nativity,

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place of origin, socioeconomic status (SES), and cultural orientation. However, with few exceptions, Latino children who come to the attention of the US child protective service (CPS) system have been studied as a pan-ethnic group, with comparisons limited to children of other races. This is primarily because indicators that would differentiate Latino subgroups are not routinely collected in CPS data.

Child maltreatment is a persistent social problem deeply rooted in social, economic, and cultural contexts. In 2011, approximately 675,000 children were confirmed as maltreated by CPS agencies in the United States [1]. With a total lifetime cost of confirmed victims of child maltreatment estimated at $124 billion each year [2], the prevention of child maltreatment is a significant public health goal [3]. Among maltreated children, infants are at greatest risk of victimization at 21.2 per 1,000. The relation of child maltreatment to a broad range of emotional, behavioral, and physical health consequences is well established in the research literature [4]. Consequences vary based on factors such as the child's age at victimization, the duration and severity of maltreatment, and co-occurrence with other adverse exposures such as parental mental illness, caregiver substance abuse, or domestic violence [4]. Infants are particularly vulnerable to the consequences of maltreatment given their dependence on caregivers during a critical period of human development, as maltreatment that occurs during infancy has a disproportionate effect on a child's development and infants suffer injury and death more often than other age groups [1, 5, 6].

Though studies inclusive of Hispanic-group origin have been largely absent from the literature, the few studies of CPS-involvement among Latinos inclusive of parent or child nativity indicate important subgroup variations in the prevalence of risk factors and substantiation patterns [7–9]. These studies suggest that while risk factors associated with maltreatment are less likely to be present in foreign-born Latino families when compared to US-born Latino families, substantiation patterns vary [7–9]. For example, one study observed decreased odds of substantiation among families with at least one immigrant parent [9] while no significant differences in substantiation were observed in other studies [7, 8]. A recent study arising from population-level linkages of birth records to CPS records in California revealed patterns of CPS-involvement among young Latino children consistent with the Latino health paradox [10]. Specifically, after adjusting for other risk factors, low-income infants of US-born Latina mothers had significantly lower rates of reported and substantiated maltreatment when compared to low-income white infants; infants of immigrant Latinas had lower rates of maltreatment than those born to either US-born Latina or white mothers. Notably, a growing body of literature on Latino health points to important variations in health indicators based on

Hispanic origin, whereby Mexicans tend to experience health advantages and Puerto Ricans tend to demonstrate poorer health [11]. Given the remarkable growth and diversification of the Hispanic-origin populations living within the United States, research is needed to elucidate the social mechanisms and cultural processes that create and sustain disparities in child maltreatment [4].

Epidemiologic data represent a valuable tool to both enhance the field's understanding of the diversity of Latino children and families who come to the attention of the CPS system and to provide population-level monitoring of the success of prevention efforts over time. In the current study, we sought to examine two critical yet unexplored issues using population-based birth records linked to infant CPS data for all Latino children born in California between 2000 and 2006. Latino infants were followed from birth through age 1 to determine: (1) whether maternal foreign-born status conferred a consistent protective advantage against reported and substantiated maltreatment risks across Hispanic-origin groups, and (2) whether the likelihood an infant was reported or substantiated for maltreatment varied by Hispanic origin, both before and after adjusting for maternal, infant, and socioeconomic indicators associated with CPS-involvement [12–14].

Note that "Hispanic" and "Latino" are used interchangeably in this study.

Methods

Dataset

This study is based on a Latino subset of a larger California dataset constructed by linking vital birth records to CPS records [14, 15]. Records were matched using probabilistic linkage software (Link Plus version 2.0), with potential record pairs established based on a combination of unique (e.g., maternal SSN) and non-unique (e.g., child first and last name, child date of birth) personal identifiers common to both files. After record pairs were generated, match score thresholds were established for determining a record pair to be a match or a non-match. All pairs falling between the lower- and upper-bound scores were clerically reviewed before a final match assignment was made. Our analytic dataset consisted of all California births occurring between 2000 and 2006 where maternal race/ethnicity was coded as Hispanic origin (N = 1,909,155). For each child, we longitudinally documented CPS-involvement through age 1. This study received approval from state and university committees for the protection of human subjects and was reviewed by the California Vital Statistics Advisory Committee.

Variables

Dependent Variable

We defined two dichotomous measures of infant CPS-involvement based upon: (1) whether any report of alleged abuse or neglect was made or not during the first year of life (*reported, not reported*) and (2) whether any report of alleged abuse or neglect was substantiated during the first year of life (*substantiated, not substantiated*). In California, substantiation refers to a maltreatment report determined by a CPS investigator to constitute child abuse or neglect based upon evidence that makes it more likely than not that maltreatment occurred (Penal Code Sections 11165.12, 11165.6).

Independent Variable

Infants were categorized based on self-reported maternal Hispanic origin in the birth record (*Mexican, Puerto Rican, Cuban, Central/South American, Other Hispanic*). We further stratified analyses based on maternal nativity (*foreign-born, US-born*).

Covariates

Covariates derived from birth records were used to explore subgroup variations in correlates of CPS-involvement. These included maternal characteristics and health behavior, infant characteristics and birth outcomes, and measures correlated with SES. Maternal characteristics and health behavior include maternal age (*≤19, 20–24, 25-29, ≥30*); number of children (*one, two, three or more*); and initiation of prenatal care (*first trimester, second trimester, third trimester, no prenatal care*). Infant characteristics and birth outcomes include infant gender (*male, female*); infant birth weight (*low: <2,500 g, normal: 2500–3999 g, macrosomic: ≥4000 g*); and birth abnormality (*one or more abnormalities, none*). Measures of SES include maternal education (*high school degree or less, some college, college+*); paternity (*missing, established*); and birth payment method (*public, private*).

Rates of missing values for all covariates were low, ranging from <0.01 % (for gender) to 1.58 % (for maternal education). It should be noted that among women giving birth without health insurance in California, infants are retroactively enrolled in the state's public health insurance program and therefore fall in the public birth payment group. Paternity was coded based on whether or not a father was named on the birth record. In California, paternity is established through marriage or when a father signs a voluntary declaration of paternity in the hospital. The presence of a recorded abnormality at birth was gleaned from a list of newborn health codes.

Analysis

We report covariate characteristics for all infants born to Hispanic mothers between 2000 and 2006. Covariates are stratified by maternal origin and birth place; χ^2 tests are used to assess distributional differences among infants born to foreign-born versus US-born mothers within each country/region of origin. We also present the rates of reported infant maltreatment (per 1,000) for each maternal Hispanic-origin group, as well as adjusted relative risks (RR) and 95 % confidence intervals (CI). Adjusted relative risks provide a means of comparing the probability of an event between one group relative to a reference group after adjusting (controlling) for the effects of other observable risk factors. These data are presented separately for infants with foreign- versus US-born mothers. We then presented these same statistics for the subset of infants for whom a report was substantiated by CPS. We utilized generalized linear models to estimate the adjusted relative risk of report and substantiation [16, 17], with a Poisson distribution, log link, and robust standard error adjustment. We excluded the "other Hispanic" group from our multivariable analyses given our inability to determine meaningful origin/background information for women in the "other Hispanic group." All statistical analyses were conducted using StataSE version 12 (StataCorp).

Results

Table 1 characterizes Latino infants born in California between 2000 and 2006 (n = 1,909,155) by maternal Hispanic origin and nativity. Overall, the majority of infants were of Mexican heritage (87.4 %; n = 1,668,200), followed by Central or South American (9.7 %; n = 184,310), "other Hispanic" (1.9 %; n = 37,139), Puerto Rican (0.8 %; n = 14,438), and Cuban (0.3 %; n = 5,068). A majority of infants (63.4 %; n = 1,210,439) were born to foreign-born mothers.

Within each Hispanic-origin subgroup, infants of US-born mothers were more frequently born to adolescent mothers and less likely to have paternity established when compared to their foreign-born counterparts. Other birth record covariates produced less consistent findings. For example, lower proportions of infants born to foreign-born Mexican and Central/South American mothers were of low birth weight or had birth abnormalities when compared to infants born to US-born mothers within the same Hispanic-origin groups, trends that were not observed for infants of Puerto Rican or Cuban mothers. Differences also emerged in markers of SES: US-born Mexican mothers had more formal education and were less frequently publicly insured when compared to foreign-born Mexican mothers, while

Table 1 Birth characteristics by maternal Hispanic-origin and nativity, California 2000–2006

	Mexican (N = 1,668,200)			Puerto Rican (N = 14,438)			Cuban (N = 5,068)			Central/South American (N = 184,310)			Other (N = 37,139)		
	Foreign (62.7 %)	US (37.3 %)	χ^2 test P value	Foreign (18.3 %)	US (81.7 %)	χ^2 test P value	Foreign (31.1 %)	US (68.9 %)	χ^2 test P value	Foreign (85.7 %)	US (14.3 %)	χ^2 test P value	Foreign (5.5 %)	US (94.5 %)	χ^2 test P value
Maternal age															
≤19 years	10.1	20.4	<0.001	6.8	13.8	<0.001	1.3	12.1	<0.001	6.6	21.4	<0.001	2.6	14.3	<0.001
20–24 years	25.7	34.3		24.1	28.7		8.9	22.9		22.7	30.6		9.9	28.0	
25–29 years	28.7	24.7		27.5	25.6		19.3	24.8		28.4	22.4		21.0	25.3	
30+ years	35.5	20.6		41.6	31.9		70.5	40.3		42.3	25.5		66.6	32.4	
Number of children															
1	30.7	40.3	<0.001	37.4	39.2	0.182	36.1	47.1	<0.001	33.4	53.1	<0.001	43.5	40.5	<0.001
2	29.9	30.0		31.7	30.3		35.4	30.8		31.8	30.1		32.6	30.4	
3+	39.3	29.8		30.9	30.4		28.4	22.0		34.7	16.9		23.9	29.1	
Prenatal care															
1st Trimester	81.8	81.8	<0.001	85.9	84.3	0.010	93.2	89.7	<0.001	86.5	88.0	<0.001	88.5	81.9	<0.001
2nd Trimester	13.1	13.5		9.4	11.7		5.1	7.9		9.8	9.5		7.5	12.6	
3rd Trimester	2.9	2.4		2.0	2.0		0.6	1.3		1.8	1.4		1.5	2.7	
No prenatal care	2.3	2.4		2.8	2.0		1.1	1.2		1.8	1.1		2.5	2.8	
Gender															
Female	49.1	49.0	0.108	46.8	49.8	0.007	48.5	47.8	0.665	49.1	48.8	0.464	46.9	49.4	0.027
Male	50.9	51.0		53.2	50.2		51.5	52.2		50.9	51.2		53.1	50.6	
Birth weight															
Low (<2,500 g)	5.4	6.5	<0.001	7.7	8.0	0.839	6.4	6.8	0.414	6.6	7.2	<0.001	7.9	6.6	0.039
Normal (2,500–3,999 g)	84.7	84.2		83.9	83.8		83.1	83.9		85.2	85.0		83.1	83.6	
Macrosomic (≥4,000 g)	9.9	9.3		8.4	8.2		10.5	9.3		8.2	7.8		9.0	9.8	
Birth abnormality															
Abnormality	5.3	6.3	<0.001	8.3	8.3	0.981	5.9	6.9	0.179	5.5	6.9	<0.001	7.8	6.6	0.038
None	94.7	93.7		91.7	91.7		94.1	93.1		94.5	93.1		92.2	93.4	
Maternal education															
High School or Less	87.5	68.7	<0.001	45.1	55.0	<0.001	39	39.6	0.059	73.9	49.9	<0.001	24.2	57.0	<0.001
Some College	8.2	22.2		26.5	29.5		25.7	28.2		15.5	28.9		28.1	26.6	
College+	4.3	9.1		28.4	15.5		35.3	32.2		10.6	21.2		47.7	16.4	
Paternity															
Established	91.7	86.7	<0.001	90.6	86.5	<0.001	95.9	89.6	<0.001	89.8	88.9	<0.001	95.0	87.3	<0.001

Table 1 continued

	Mexican (N = 1,668,200)			Puerto Rican (N = 14,438)			Cuban (N = 5,068)			Central/South American (N = 184,310)			Other (N = 37,139)		
	Foreign (62.7 %)	US (37.3 %)	χ² test P value	Foreign (18.3 %)	US (81.7 %)	χ² test P value	Foreign (31.1 %)	US (68.9 %)	χ² test P value	Foreign (85.7 %)	US (14.3 %)	χ² test P value	Foreign (5.5 %)	US (94.5 %)	χ² test P value
Missing	8.3	13.3		9.4	13.5		4.1	10.4		10.2	11.1		5.0	12.7	
Insurance coverage															
Private	26.0	51.1	<0.001	64.9	62.4	0.015	75.4	72.3	0.019	35.1	61.3	<0.001	82.4	61.7	<0.001
Public	74.0	48.9		35.1	37.6		24.6	27.7		64.9	38.7		17.6	38.3	

χ^2 tests were used to compare the distribution of each birth record covariate for Foreign-born versus. US-born birth mothers within Hispanic-origin groups

foreign-born Puerto Rican, Cuban, and other Hispanic mothers were typically more formally educated and more often privately insured than their US-born counterparts.

Table 2 presents rates per 100 and relative risks of reported maltreatment among Latino infants stratified by maternal nativity. Between 2000 and 2006, 4.4 % (n = 83,348) of children born to Hispanic mothers were reported to child protective services for possible maltreatment before age 1. Across Hispanic-origin groups, infants of US-born mothers were significantly more likely to be reported (7.2 %) than were infants of foreign-born mothers (2.7 %). Variation was observed both between and within foreign-born and US-born Hispanic-origin groups with regard to maltreatment report dynamics: infants of foreign- and US-born Puerto Rican mothers had the highest prevalence of reports (6.2 and 10.0 %) followed by infants of Mexican (2.7 and 7.2 %), Cuban (3.0 and 6.5 %) and Central/South American mothers (2.9 and 4.8 %).

After adjusting for characteristics at birth among the foreign-born cohort, we observed increased risks of reported maltreatment among infants born to Puerto Rican (RR: 2.80; 95 % CI 2.41, 3.24), Cuban (RR: 2.03; 95 % CI 1.53, 2.67), and Central/South American (RR: 1.22; 95 % CI 1.18, 1.25) mothers versus the Mexican-origin group. Differential risks of reported maltreatment given maternal Hispanic origin were also observed in fully adjusted models within the US-born cohort. However, when contrasted with the foreign-born cohort, relative risk estimates were attenuated for infants of US-born Puerto Ricans (RR: 1.59; 95 % CI 1.51, 1.68) and Cubans (RR: 1.43; 95 % CI 1.26, 1.61) and non-significant for Central/South Americans when compared to infants of Mexican origin.

Table 3 presents rates per 100 and relative risks of substantiated maltreatment among Latino infants stratified by maternal nativity. Overall, 1.5 % (n = 29,384) of Hispanic-origin infants born in California between 2000 and 2006 were substantiated as victims of abuse or neglect before age 1. Infants of US-born mothers were more likely to be substantiated than were infants of foreign-born mothers across all groups. Infants of US-born Puerto Rican mothers had the highest prevalence of substantiations (3.7 %) followed by infants of Mexican (2.8 %), Cuban (2.8 %), and Central/South American (1.5 %) origin. Among infants of foreign-born mothers, the substantiation risk was similarly graded.

Consistent with adjusted models of reported maltreatment for foreign-born mothers, infants of Puerto Rican (RR: 3.24; 95 % CI 2.53, 4.17), Cuban (RR: 2.45; 95 % CI 1.49, 4.03), and Central/South American (RR: 1.19; 95 % CI 1.12, 1.26) origin were at increased risk of substantiation relative to infants of Mexican origin. Relative risk measures for substantiation associated with Hispanic origin were similarly attenuated in the US-born cohort when

Table 2 Rates (per 100) and adjusted relative risk of reported maltreatment among infants between birth and age 1 by Hispanic-origin and maternal nativity, California 2000–2006

	Foreign-born mothers (N = 1,208,411)			US-born mothers (N = 663,605)		
	rate per 100	Adj. RR	(95 % CI)	Rate per 100	Adj. RR	(95 % CI)
All Hispanic births	2.7	–	–	7.2	–	–
Origin						
Mexican	2.7	Ref.	–	7.2	Ref.	–
Puerto Rico	6.2	2.80***	(2.41, 3.24)	10.0	1.59***	(1.51, 1.68)
Cuban	3.0	2.03***	(1.53, 2.67)	6.5	1.43***	(1.26, 1.61)
Central/S. American	2.9	1.22***	(1.18, 1.25)	4.8	0.98	(0.93, 1.04)
Maternal age						
≤19 years	4.4	3.04***	(2.91, 3.16)	8.8	1.46***	(1.42, 1.51)
20–24 years	2.6	1.50***	(1.45, 1.55)	7.3	1.05***	(1.02, 1.08)
25–29 years	2.4	1.13***	(1.10, 1.17)	6.5	0.96**	(0.94, 0.99)
30+ years	2.5	Ref.	–	6.2	Ref.	–
Number of Children						
1	1.9	Ref.	–	4.9	Ref.	–
2	2.1	1.61***	(1.56, 1.67)	5.6	1.48***	(1.44, 1.52)
3+	3.8	3.45***	(3.34, 3.57)	12.0	2.82***	(2.75, 2.90)
Prenatal care						
1st Trimester	2.5	Ref.	–	5.5	Ref.	–
2nd Trimester	3.5	1.18***	(1.14, 1.21)	11.8	1.48***	(1.44, 1.51)
3rd Trimester	3.9	1.25***	(1.18, 1.32)	18.0	1.94***	(1.87, 2.01)
No Prenatal Care	6.4	1.99***	(1.89, 2.09)	28.3	2.74***	(2.66, 2.82)
Gender						
Male	2.7	1.03**	(1.01, 1.06)	7.3	1.02	(1.00, 1.04)
Female	2.7	Ref.	–	7.1	Ref.	–
Birth weight						
Low (<2,500 g)	4.4	1.46***	(1.40, 1.52)	12.4	1.38***	(1.34, 1.42)
Normal (2,500–3,999 g)	2.6	Ref.	–	7.0	Ref.	–
Macrosomic (≥4,000 g)	2.5	0.94**	(0.91, 0.98)	5.6	0.85***	(0.82, 0.88)
Birth abnormality						
Abnormality	4.1	1.37***	(1.31, 1.43)	12.1	1.37***	(1.33, 1.41)
None	2.6	Ref.	–	6.8	Ref.	–
Maternal education						
High School or Less	2.9	1.57***	(1.45, 1.71)	9.1	3.62***	(3.35, 3.90)
Some College	1.9	1.49***	(1.36, 1.63)	3.7	2.25***	(2.08, 2.43)
College+	1.0	Ref.	–	1.1	Ref.	–
Paternity						
Missing	6.6	2.45***	(2.38, 2.52)	18.1	2.15***	(2.10, 2.19)
Established	2.4	Ref.	–	5.5	Ref.	–
Insurance Coverage						
Public	3.1	1.39***	(1.35, 1.44)	10.7	1.78***	(1.74, 1.82)
Private	1.8	Ref.	–	3.9	Ref.	–

Ref reference group, *Adj* adjusted, *CI* confidence interval

* *P* < 0.05; ** *P* < 0.01; *** *P* < 0.001

compared to the foreign born cohort. Within the US-born cohort, risk of report substantiation was higher for infants of Puerto Rican (RR: 1.50; 95 % CI 1.37, 1.64) and Cuban (RR: 1.62; 95 % CI 1.33, 1.97) mothers when compared to infants of Mexican heritage but lower for infants of Central/South American (RR: 0.89, 95 % CI 0.80, 0.98) origin.

Table 3 Rates (per 100) and adjusted relative risk of substantiated maltreatment among infants between birth and age 1 by Hispanic-origin and maternal nativity, California 2000–2006

	Foreign-born mothers (N = 1,208,411)			US-born mothers (N = 663,605)		
	Rate per 100	Adj. RR	(95 % CI)	Rate per 100	Adj. RR	(95 % CI)
All Hispanic Births	0.8	–	–	2.8	–	–
Origin						
Mexican	0.8	Ref.	–	2.8	Ref.	–
Puerto Rico	2.3	3.24***	(2.53, 4.17)	3.7	1.50***	(1.37, 1.64)
Cuban	1.1	2.45***	(1.49, 4.03)	2.8	1.62***	(1.33, 1.97)
Central/S. American	0.9	1.19***	(1.12, 1.26)	1.5	0.89*	(0.80, 0.98)
Maternal Age						
≤19 years	1.2	2.89***	(2.67, 3.12)	2.7	1.01	(0.95, 1.07)
20–24 years	0.9	1.72***	(1.62, 1.82)	2.9	0.93***	(0.89, 0.97)
25–29 years	0.7	1.18***	(1.12, 1.25)	2.7	0.90***	(0.86, 0.94)
30+ years	0.7	Ref.	–	2.8	Ref.	–
Number of Children						
1	0.6	Ref.	–	1.5	Ref.	–
2	0.6	1.67***	(1.57, 1.79)	2.0	1.61***	(1.54, 1.69)
3+	1.2	3.82***	(3.58, 4.06)	5.3	3.25***	(3.10, 3.40)
Prenatal care						
1st Trimester	0.7	Ref.	–	1.8	Ref.	–
2nd Trimester	1.1	1.31***	(1.24, 1.38)	4.8	1.75***	(1.68, 1.81)
3rd Trimester	1.4	1.49***	(1.35, 1.64)	8.8	2.64***	(2.49, 2.78)
No Prenatal Care	3.0	2.99***	(2.76, 3.23)	18.4	4.55***	(4.36, 4.75)
Gender						
Male	0.8	1.07**	(1.03, 1.11)	2.8	1.03*	(1.01, 1.06)
Female	0.8	Ref.	–	2.7	Ref.	–
Birth weight						
Low (<2,500 g)	1.7	1.70***	(1.58, 1.83)	6.2	1.57***	(1.50, 1.65)
Normal (2,500–3,999 g)	0.8	Ref.	–	2.6	Ref.	–
Macrosomic (≥4,000 g)	0.6	0.81***	(0.75, 0.88)	1.8	0.73***	(0.68, 0.77)
Birth Abnormality						
Abnormality	1.6	1.64***	(1.53, 1.77)	6.4	1.64***	(1.57, 1.72)
None	0.8	Ref.	–	2.5	Ref.	–
Maternal Education						
High School or Less	0.9	2.39***	(1.98, 2.89)	3.6	5.27***	(4.53, 6.13)
Some College	0.5	2.11***	(1.72, 2.58)	1.2	2.72***	(2.33, 3.17)
College+	0.2	Ref.	–	0.3	Ref.	–
Paternity						
Missing	2.5	3.26***	(3.10, 3.42)	8.6	2.68***	(2.60, 2.76)
Established	0.7	Ref.	–	1.9	Ref.	–
Insurance Coverage						
Public	0.9	1.29***	(1.22, 1.37)	4.3	1.84***	(1.77, 1.90)
Private	0.5	Ref.	–	1.4	Ref.	–

Ref reference group, *Adj* adjusted, *CI* confidence interval

* $P < 0.05$; ** $P < 0.01$; *** $P < 0.00$

As was true in our model of reported maltreatment, initiation of prenatal care after the first trimester, low birth weight, the presence of a birth abnormality, maternal education less than a college degree, lack of established paternity, and public insurance utilization were significant predictors of substantiation.

Discussion

Our study documents significant within-group heterogeneity among Latinos in the risk of reported and substantiated maltreatment, and the maternal, infant, and socioeconomic correlates of CPS-involvement. The prevalence of reported and substantiated maltreatment was significantly lower for infants of foreign born mothers within every Hispanic-origin group, even after adjusting for other factors. This reduced risk of CPS-involvement across Hispanic-origin groups aligns with previous research involving these data that found children of immigrants were less likely to be reported or substantiated as victims of maltreatment than children of US-born mothers [10, 14]. Our findings are also consistent with the broader health literature that has identified health advantages among immigrants in the United States [18]. In this study, infants of foreign-born mothers were more likely to have paternity established at birth and less likely to be born to adolescent mothers, trends we observed across Hispanic origin groups. Yet, important variations also emerged between Hispanic origin groups by a number of other covariates. Notably, infants of Puerto Rican mothers had the highest rates of reported and substantiated maltreatment when compared to other Hispanic-origin and nativity groups. This trend comports with patterns in infant mortality rates that have been observed for Latino subgroups over the past decade [19–21] and with discernible health disparities observed among Puerto Ricans in adult health [11, 22]. Another variation consistent with past research concerns the lower frequency of low birth weight and birth abnormalities among infants born to immigrant Mexican mothers when compared to infants of US-born mothers of the same origin despite lower SES and poorer utilization of prenatal care [23–25]. Our findings suggest that these paradoxical relationships, which historically have been observed in maternal and child health among Mexican-origin populations, also extend to CPS-involvement among infants in the first year of life.

A goal of the study was to determine if Hispanic-origin group disparities exist in the risk of reported and substantiated maltreatment among infants of foreign-born and US-born Latino mothers, after adjusting for covariates. We observed decreased risks of child maltreatment reporting and substantiation among Mexican and Central/South American families when compared to other Latino subgroups. Such differences may be explained by variation in the distribution of unmeasured risk factors for CPS involvement such as substance use and mental health concerns [26, 27] and domestic violence [28–34]. For example, data from national studies suggest that Mexican, Central/South American, and Cuban women are less likely to have a history of substance abuse disorders and

psychiatric disorders when compared to Puerto Rican women [27] with Mexican groups afforded foreign nativity advantages in these conditions [35–37] that are not extended to all other Latino subgroups [18, 26, 36]. Moreover, Mexicans and Central Americans are the largest Hispanic-origin populations within California, and many reside within well-established ethnic communities [38, 39]. Lower rates of reported and substantiated maltreatment among infants of foreign-born Mexicans and US-born Mexican and Central/South Americans, respectively, may be related to the protective benefits that exist within ethnic communities that, despite low SES, confer social support and resources that prevent CPS system involvement [40].

While infants of US-born and foreign-born mothers were characterized by similar risks of CPS-involvement (e.g., young maternal age, the absence of established paternity), the risk associated with low maternal education was substantially higher in the US-born cohort when compared to the foreign-born cohort, even after adjusting for other covariates. Moreover, within the US-born cohort, the relative risk estimates associated with low maternal education were substantially greater than other risks for substantiation. The finding that education is a more powerful determinant of CPS-involvement for US-born Latinos than immigrants is consistent with past research that has identified more modest social gradients in health within foreign-born populations when compared to their US-born counterparts [41, 42]. Modest gradients among immigrants have been attributed to the migration of healthy individuals of limited education (i.e., the "healthy migrant" hypothesis) and the fact that some unhealthy behaviors require a minimum level of income and/or occupational status. Conversely, among infants of US-born mothers, limited maternal education may reflect a number of unmeasured factors that inform parenting capacity including differences in employment conditions and occupational status, cognitive skills, sense of control over life, social-psychological resources, health behavior, and differential diffusion of health information through social networks [43, 44]. Given the role of Hispanic origin and acculturative status in distinguishing gradients, future research is needed to determine how the SES-CPS relationship varies across Latino subgroups by nativity and other markers of cultural orientation [22].

Our results also indicate that Hispanic-origin group differences vary by nativity given that relative risk estimates for CPS-involvement were attenuated in the US-born cohort when compared to the foreign-born cohort. These findings suggest that among immigrants, Hispanic group membership likely captures a host of unmeasured factors related to the distinct histories and migration patterns of Hispanics in the United States. For example, since Puerto Ricans experience fewer obstacles to migration to the US

when compared to other groups, they may share a health profile similar to their islander counterparts. Attenuation of the "healthy migrant" effect may subsequently place Puerto Ricans at greater vulnerability for poorer outcomes when compared to other Hispanic-origin groups [18]. Future research should seek to determine the extent to which these hypotheses explain Hispanic subgroup differences.

Limitations

Despite the strengths of this large-scale, population-based examination of reported and substantiated infant maltreatment, several limitations inherent to administrative data sources must be considered when interpreting findings. First, our analysis is based on a dataset constructed by linking vital birth records to CPS records. Systematic differences in the quality of information collected in these two data sources may have influenced our examination of reported and substantiated maltreatment by Hispanic-origin and maternal nativity. Second, our analysis may suffer from a possible undercount of births to foreign-born mothers arising from initiatives that have reduced immigrant participation in public programs [45–48] and may have had implications for counts of hospital births to foreign-born mothers in California, particularly among women without documentation. Other potential sources of bias stem from variable exposure windows in which an infant could be reported to CPS given differential patterns of eligibility, access, and utilization of various health and social services [49, 50] and the mobility of groups to and from California in cyclical patterns responsive to US labor demand [51, 52].

An undercount of Latino births in the US-born cohort may have also influenced our findings when Hispanic origin was not indicated in the birth record. Survey research suggests that while a majority (51 %) of Latinos identify with their family's country of origin, important differences in self-identification exist based on generation in the US, education level, and language dominance [53]. Notably, nearly half (48 %) of third or higher generation Latinos report "American" when given a choice among Hispanic country of origin, Hispanic/Latino, or American identities [53]. Moreover, it is possible that a single choice from the categories provided in the birth record did not capture the cultural identity of all of the Latina women in the study, leading some women to choose a pan-ethnic "other Hispanic" label.

Finally, this study is only able to address variations in CPS-involvement and assumes that this reflects actual underlying abuse or neglect dynamics. However, it is important to note that substantiation is solely a measure of *observed* maltreatment as determined by a CPS investigator, rather than a measure of *actual* maltreatment in the general population.

A strength of this study lies in its demonstration of the considerable heterogeneity within and between Hispanic-origin/nativity groups. Future research should seek to include elements such as cultural orientation, generation in the US, social support, and citizenship status as well as country specific data for Central and South American regions to better identify important differences among Hispanic-origin groups.

Conclusion

Recognition of the diversity among Latinos in child maltreatment dynamics in prevention strategies is essential to advancing the health and well-being of Latinos throughout the life course. In this study, we observed significant nativity and Hispanic-origin disparities in child maltreatment report and substantiation among Latino children during the first year of life, a critically important developmental period marked by infant dependence on caregivers for survival. Our major findings comport with studies that have observed better health outcomes among foreign-born Latinos when compared to US born Latinos, poorer infant health among Puerto Ricans when compared to other Hispanic-origin groups, and paradoxical birth weight relationships among Mexican-origin populations. The Centers for Disease Control's (CDC) National Center for Injury Prevention and Control recently launched *Essentials for Childhood*, a complement to the Public Health Leadership for Child Maltreatment Prevention Initiative toolkit, which assists state departments in enhancing their child maltreatment prevention efforts through existing public health infrastructure [54]. State and local level information regarding the diversity of Latino children and families that come to the attention of CPS is crucial to the success of this and other strategic prevention strategies. Therefore, replication of these analyses in other states and jurisdictions will be necessary to build knowledge that reflects the heterogeneity of local CPS dynamics and Latino populations. Additional research is also needed to examine the unique composition of SES, cultural, and risk and protective characteristics within each Hispanic-origin/nativity group to inform group specific child maltreatment prevention efforts.

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