

Disparities in health care utilization among Latino children suffering from asthma in California

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Objectives: To examine any racial and ethnic differences in health care utilization among children with asthma by application of the Aday and Anderson's behavioral model of health care utilization.

Methods: The California Health Interview Survey (CHIS) is a noninstitutionalized household survey of California residents conducted biannually since 2001. Cross-sectional survey data were analyzed to identify differences by race and ethnicity among children with asthma. After adjusting for sample weights and design effects, children with asthma comprised a sample size of 400,000 in the 2007 CHIS database. Disparities in health care utilization across all racial and ethnic categories were analyzed using multivariate logistic regression analysis.

Results: Latino children with asthma were 49% more likely to have visited an emergency department in the previous year ($P < 0.05$) and 57% less likely to have visited a doctor ($P < 0.05$) compared with non-Latino children with asthma, after controlling for confounding variables. Furthermore, Puerto Rican children were 72% more likely to have visited an emergency department ($P < 0.05$) in the previous year and 38% less likely to have visited a doctor ($P < 0.07$) compared with non-Puerto Rican children.

Conclusion: This study provides evidence of disparities in health care utilization among Latino children overall as well as in Latino children belonging to different subgroups suffering from asthma. Examining factors leading to differences within the Latino subgroups could help to guide the tailoring of interventions and health care programs for children with asthma, thereby improving access to health care services for this underrepresented minority.

Keywords: racial disparities, Latino children, Puerto Ricans, Cuban Americans, CHIS, Mexican Americans, asthma

Background

Asthma, a chronic respiratory disease characterized by attacks of difficulty breathing, is one of the leading chronic childhood diseases in the US and a major cause of disability.¹ Asthma not only limits a child's ability to engage in certain activities but also is associated with significant direct and indirect medical costs. Asthma emerged as an important public health issue during the 1980s, and its prevalence among children aged 0–17 years had more than doubled by 1996. Although there has been some stabilization in asthma prevalence rates in recent times, it still affected approximately 7 million (9.3%) children in the US in 2008.¹

Various surveys conducted regionally and nationally indicate ethnic and racial disparities in asthma-related prevalence, diagnosis, morbidity, and mortality between Latinos and non-Latinos, as well as in the different Latino subgroups

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(Mexican/Mexican American, Puerto Rican, Cuban/Cuban American or Dominican, and South/Central/Other Latin American). Studies have consistently shown asthma prevalence rates among Latino children to be higher than those in non-Latino Caucasian children.²⁻⁵ Looking further at the disparities within the Latino population, the studies have shown asthma to be generally more prevalent among Puerto Rican children than in non-Puerto Rican Latino children. In 2002, Cloutier et al reported that asthma prevalence rates among Puerto Rican children were 125% higher than in non-Latino Caucasians, and 80% higher than in non-Latino African American children.⁶ Further exploring the impact of the disease in children, other studies have found that Puerto Rican children with asthma experience greater functional morbidity, missed more school days, and had more frequent exacerbations compared with other ethnic groups.^{6,7} Asthma mortality rates are also higher among Puerto Ricans than in other racial and ethnic groups.⁸ National and regional age-adjusted asthma-related mortality data collected by the National Center for Health Statistics (NCHS) in 1990–1995 revealed that the annual mortality rate was 40.9 per million for Puerto Ricans, followed by 38.1 per million for non-Latino African Americans, 15.8 per million for Cuban Americans, 14.7 per million for non-Latino Caucasians, and 9.2 per million for Mexican Americans. Similar mortality estimates were recorded among different Latino subgroups in 2004 as well.^{8,9} These disparities between different racial groups (eg, Caucasians, Latinos) and subgroups (eg, Puerto Ricans, Cubans, Mexicans) indicate a need to investigate possible contributing factors.

Studies exploring the factors contributing to this racial disparity show that lack of insurance, not having US citizenship, eligibility restrictions, administrative barriers, lack of documentation, parental confusion about eligibility for Medicaid or the State Children's Health Insurance Program, and fear of jeopardizing immigration status are associated with low access to health care among Latino children.^{8,10,11,12} Other factors, eg, lack of knowledge about asthma and how to address it, may also be obstacles to the effective management of childhood asthma.⁷ Medication intake behavior that might delay treatment efficacy might be influenced by cultural beliefs and norms about asthma and use of varied asthma management strategies by the family.¹³⁻¹⁵

The 1999 National Health Interview Survey (NHIS) analyzed ethnic and racial differences in asthma diagnosis in Latino children aged 3–17 years and, controlling for factors like gender, parental education, and place of residence, there was high reporting of wheezing among the Puerto

Rican subgroup of children.¹⁶ Since 2000, ambulatory care, which includes nonurgent physician and hospital outpatient department visits, has significantly increased despite relatively stable asthma prevalence. Physician visits account for the majority of ambulatory care visits for asthma. In 2004, 6.5 million visits for asthma occurred in physicians' offices compared with 0.5 million visits to hospital outpatient departments. Children in all the Latino subgroups (Mexican/Mexican American, Puerto Rican, Cuban/Cuban American or Dominican, and South/Central/Other Latin American) had fewer physician visits compared with non-Latino Caucasian children. Also, Latino children who were not US citizens had a lower likelihood of physician visits compared with native or foreign-born Latino children with US citizenship. Puerto Ricans and other Latino subgroups had a higher likelihood of an emergency department visit compared with those of Mexican ancestry.¹⁷ Carr et al found that, after controlling for income, Latino and African American children had higher rates of hospitalization compared with non-Latino Caucasian children in many states.¹⁸

Data illustrate differences in the quality of care and treatment offered to Latinos. There is consistent evidence of racial and ethnic disparities in childhood asthma, especially among Latino subgroups such as Puerto Ricans.¹⁸ However, health care utilization among children belonging to the Latino subgroups remains understudied. While designing asthma interventions, combining these subgroups under the single umbrella of Latino ethnicity might obscure the underlying differences in asthma burden between the various Latino subgroups.¹⁶ This study seeks to identify differences in the utilization of health care services arising out of the impact of race/ethnicity among Latino and non-Latino children suffering from asthma. This study also investigates racial and ethnic differences in health care utilization in children with asthma who belong to different Latino subgroups.

Materials and methods

Data

Data for this analysis were taken from the 2007 California Health Interview Survey (CHIS), conducted by the University of California at Los Angeles Center for Health Statistics.¹⁹ The survey comprised a household telephone interview that collected information in a cross-sectional manner on health, demographics, and socioeconomic status from noninstitutionalized people. A probability random digit dial sampling design was used to represent the state's population and featured an oversampled population of African Americans and Latinos in order to capture the racial and ethnic disparities

among the minority populations.¹⁹ In 2007, this survey collected a large amount of household, adult, and child data biannually from up to 53,000 households, including 12,526 children. The interviewers conducted the telephone survey in both the Spanish and English languages, thereby accommodating any cultural differences in health care utilization arising due to language barriers among Latinos. The overall screener response rate (ie, success in the process of introduction of the survey in the randomly selected household and random selection of an adult to complete the interview) was 35.5%, and the overall adolescent response rate (ie, success in completing the extended interview with the randomly selected person) of completed extended interviews was 73.7%. The data obtained from the extended interview completion process were used in the study. The response rates were consistent with those of general telephone surveys and similar to other recent major telephone health surveys conducted in California.²⁰ In order to limit any concern that children might not be able answer the questions in the survey, the questions concerning the child were asked of an adult in the house, most often a parent/guardian or other family member acquainted with the health of the child.

According to the inclusion criteria, the study consisted of children aged 0–11 years with a current diagnosis of asthma. The age range of 0–11 years was selected because that was the only age range covered in the dataset. Children aged 0–11 years who had been diagnosed with asthma were selected. Among those with a lifetime asthma diagnosis, only children identified as currently having asthma were included in the analysis.²¹

Measures

Differences in health care utilization were assessed by using two dependent variables. The first dependent variable was the number of emergency department visits made in the past year by the child and this was dichotomized into no emergency department visits and one or more emergency department visits.¹⁶ The second dependent variable measured the receipt of nonurgent care by the child, as defined by visits to health professionals, including physicians, nurse practitioners, or physician assistants in the past year.²²

Model

Independent variables were selected from the multivariate framework based on Aday^{23,24} and Anderson's²⁵ behavioral model of health care utilization. This model has been widely used to study health care-seeking behavior and determinants of health care utilization. The model focuses on understanding various characteristics associated with at-risk populations

and populations suffering from chronic conditions. According to this model, there are predisposing, enabling, and need-related factors. Predisposing factors determine the intent of an individual or a group leading to utilization of health care services. Enabling factors influence the patient's ability to access health care services. Need-related factors represent an individual's perception of his/her own health and the perception of the health care provider of the individual's health.^{23–25}

Child race/ethnicity categories included non-Latino Caucasians, non-Latino African Americans, and other non-Latinos. Respondents identified as Latino were further divided into four subgroups, ie, Puerto Ricans, Cubans/Cuban Americans or Dominicans (Republic), Mexicans/Mexican Americans, and Central/South/Other Latin Americans. The remaining independent variables were possible covariates.

Predisposing factors included gender (female/male), mother's education (a high school degree or equivalent, college degree, and graduate or professional degree), and age (0–3, 4–6, 7–9, and 10–11 years). Need factor was measured by assessing child health status (poor, good, or excellent). Those characterized by poor health status were considered to have a high need for care, whereas those with a similar or an improved health status were considered to have a low need for care. Enabling factors were characterized as factors that affected the use of health care services, and included federal poverty level measured by family income, parental health insurance coverage, and use of an asthma management plan for the child. Income was categorized into families with a federal poverty level between 0% and 99%, those with a federal poverty level between 100% and 299%, and those

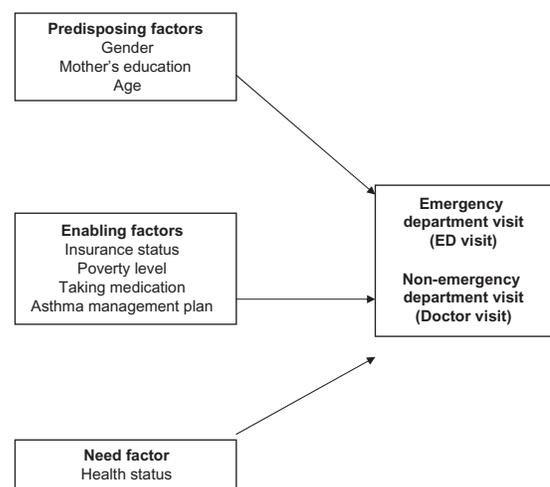


Figure 1 Aday-Anderson behavioral model for health care utilization.²⁵

with a federal poverty level greater than 300%. Parents who had any form of insurance like Medicare, Medicaid, private insurance, Indian Health Service, Veterans Affairs, other public insurance, other government insurance, or single insurance plans were classified as insured. The uninsured category included individuals that answered “none” to the question asking them about the type of insurance covered.^{8,19,26}

Statistical analysis

The sample consisted of 1229 children with current asthma diagnosis aged 0–11 years and was classified under two categories, ie, ever been told they had asthma and still had asthma. Chi-squared tests were used to examine bivariate associations between the predictor variables and the use of emergency department care as well as between the predictor variables and the nonurgent care. The independent variables were listed under the categories of race/ethnicity, gender, age, child health status, maternal education, poverty level, parental health insurance coverage, use of an asthma management plan, and use of preventive medication in the past year.

Multivariate analyses were also conducted in order to examine the effects of race and Latino ethnicity on health care use among children with asthma, using separate logistic regression analyses and simultaneously controlling for enabling, predisposing, and need factors. Variables having significant ($P < 0.05$) bivariate associations with the dependent variables were included in the multivariate analyses. In addition, based on evidence from previous studies,^{10,11,16,18} variables associated with health care utilization in children suffering from asthma were also included in the multivariate analyses in order to control for any possible confounding in the study. All odds ratios (OR) and P values were reported.

The full model was fitted into both the analyses. Initial analyses for both dependent variables (use of emergency department and nonurgent care) categorized ethnicity as Latino versus non-Latino. Subsequent analyses of both dependent variables used the four Latino subgroups.

Weighting was used in the CHIS dataset to measure collective statistics representative of the entire state. In particular, sample weighting compensated for differences in probabilities of sample selection and differences in the sampling rates of the households and persons interviewed. Weighting also reduced any bias arising from different characteristics of respondents and nonrespondents. Weighting reduced variance among the data collected, as well as compensating for undercoverage of the sample population while administering the survey. The sample weights used for statistical analysis in the study were created by CHIS.¹⁹

Although the model used variables from the child, adult, and family level, more emphasis was placed on the child-level survey. Therefore, weights from the child-level survey were used as recommended in the literature.²²

Results

The descriptive statistics of the children suffering from asthma are listed in Table 1. Among the sample of 12,000 children obtained from the CHIS database, about 1029 children had been diagnosed with asthma once in their lifetime and also reported still having asthma. When the data for the children who still had asthma at the time of the survey were analyzed, weighted results showed that approximately 45.6% of Latino parents reported that the child visited the emergency department at least once. Also, about 16.7%

Table 1 Weighted characteristics of ethnicity among children with asthma in California (values expressed as percentages)

Variables	Ethnicity		P value ¹
	Latino n = 618	Non-Latino n = 611	
Health care utilization in the past year			
Had at least one doctor visit	45.61	47.61	<0.01
Had at least one emergency department visit	16.71	12.24	0.12
Number of doctor visits	50.36	49.64	<0.09
Predisposing factors			
Male	49.79	53.58	0.41
Education			<0.01
High school graduate	26.71	10.1	
College	21.53	30.63	
Graduate school	1.91	9.12	
Age (years)			0.15
≤3	13.07	8.88	
4–6	10.91	12.43	
7–9	15.20	16.80	
10–11	11.18	11.53	
Enabling factors			
Health insurance	48.37	48.34	0.28
Poverty level			<0.01
0%–99%	15.57	7.23	
100%–299%	21.56	13.69	
≥300%	13.23	28.72	
Taking medication for asthma	16.49	13.23	0.13
Asthma management plan for child	24.70	23.33	0.64
Need factors			
Self-reported health status			<0.01
Excellent	27.13	32.82	
Good	15.47	13.35	
Poor	7.76	3.46	

Notes: Date source: California Health Interview Survey (CHIS) 2007. ¹P values are based on Chi-square test for categorical variables and Student's *t*-test for continuous variables (linearized standard error is in parentheses) comparing Latino and non-Latino children residing in California (aged ≤11 years).

of Latino parents reported using nonurgent care for their children. Most of the parents reported that their child/children were in comparatively good or excellent health as opposed to the previous year. The majority of children in the sample had parents who were insured and had a federal poverty level between 0% and 99% per year. In the children with asthma, although 75% of the children did not use an asthma management plan, nearly 16.5% used preventive medications. A lower rate of health care utilization was evident from the fact that Latino children were significantly less likely to report at least one doctor visit in the previous year compared with non-Latino children ($P < 0.01$). In contrast, differences in emergency department utilization were not statistically significant between Latino and non-Latino children. Dissimilarities between the Latino and non-Latino children ($P < 0.01$) may also persist because of the notably significant self-reported differences between education and poverty level. Several variables were not significantly associated with

Latino subgroups in the multivariate model presented in this study, but they were still included in the multivariate model because they were found to be significant predictors in some of the previous studies cited in the literature.^{8,15,17}

Logistic regression was conducted and its results are shown in Table 2. Non-Latino children were categorized as the reference group. After controlling for potential confounding variables, Latino children with asthma still had a higher risk (OR = 1.49, confidence interval [CI] 1.43–1.54) for an emergency department visit and a lower risk (OR = 0.43, CI 0.18–0.98) for a doctor visit. After controlling for independent variables, Puerto Rican children with asthma were 72% (OR = 1.72, CI 1.09–2.32) more likely to have at least one emergency department visit and 38% (OR = 0.62, CI 0.32–0.93) less likely to have at least one doctor visit compared with other Latino subgroups. Children with asthma and at a poverty level of 100%–299% and $\geq 300\%$ comprised 52% and 55% of the sample, respectively, and were less likely to

Table 2 Multivariate analyses (weighted)

Variables	Logistic estimation (odds ratio)							
	Emergency department visit ¹		Emergency department visit ¹		Doctor visit ²		Doctor visits ²	
Latino versus non-Latino	1.49	**			0.43	**		
Latino subpopulations (Puerto Rican versus non-Puerto Rican)			1.72	**			0.62	*
Predisposing factors								
Male	0.92		0.88		1.40		1.17	
Mother's education								
High school graduate	–		–		–		–	
College	1.25		1.25		3.78	**	3.54	***
Graduate school	0.68		0.66		5.95	**	5.44	**
Age (years)								
≤ 3	–		–		–		–	
4–6	0.33	***	0.30	***	3.27	*	2.53	
7–9	0.27	***	0.25	***	1.23		0.93	
10–11	0.35	***	0.36	***	0.54		0.36	
Enabling factors								
Health insurance	1.27		1.26		1.38		1.27	
Poverty level								
0%–99%	–		–		–		–	
100–299%	0.48	*	0.55	*	0.21	**	0.26	**
$\geq 300\%$	0.45	*	0.44	**	0.27	**	0.33	*
Taking medication for asthma	1.65	*	1.59	*	1.12		1.21	
Asthma management plan for child	1.57	*	1.36		1.88		2.17	*
Need factors								
Self-reported health status								
Poor	–		–		–		–	
Good	0.79		0.77		2.59		2.28	
Excellent	0.51		0.48	*	1.43		1.22	
Constant	–		–		–		–	

Notes: *Significant at the 10% level; **Significant at the 5% level; ***Significant at the 1% level. ¹had at least one doctor visit in the past year; ²had at least one emergency department visit in the past year.

have at least one emergency department visit compared with children with asthma and a poverty level of 0%–99%.

Discussion

Analysis of the 2007 CHIS data revealed racial/ethnic differences in the utilization of emergency department and nonurgent care among children with asthma. Latino children suffering from asthma were 49% more likely to have at least one visit to the emergency department compared with 39% (16.71% + 12.24% in Table 1) of all children with asthma. Equally disconcerting was the finding that although 92% (45.61% + 47.61% in Table 1) of all children with asthma reported using nonurgent care in the past year, Latinos were 57% less likely to have used such care in the same time frame. Similar differences can be seen among Latino subgroups as well. Puerto Rican children with asthma were 72% more likely to have at least one emergency department visit in the past year and 38% less likely to use nonurgent care in the past year, respectively, compared with other Latino subgroup children suffering from asthma. Overall, more use of emergency departments and less use of nonurgent care were seen in the Latino children, especially in the Puerto Rican subgroup, who are disproportionately affected by asthma, which could have important policy implications. Studies have shown that regular visits to the primary care physician are more cost-effective than visiting the emergency department. Also, primary care physicians provide comprehensive and continuous care, mostly of a preventive nature, in a better fashion than emergency department physicians, and in accordance with the child's medical history, response to previous treatments, and medication compliance. In turn, this saves patients and the entity providing insurance the extra cost of care provided in the emergency department.^{27,28} Differences in health care utilization among the Latino subgroups might stem from factors that could not be captured by this study.

One of the reasons for reduced use of nonurgent care among Latinos might be their limited English proficiency. Derose and Baker have shown that limited English proficiency among Latinos affects the number of physician visits they make.²⁹ Poor English proficiency is also associated with poor health and the absence of insurance of any type or any regular source of care.²⁹ For these patients, physicians and health care providers can undertake measures like avoiding complicated medical terms, providing instructions in simple language, asking the patient to repeat the instructions given for administering the medication, and distribution of low-literacy asthma educational materials to the patients.³⁰ Also, patient–provider language barriers can be reduced by

improving workforce diversity, implementing culturally competent staff, and providing communication skills training to the staff.³⁰

The fact that health care utilization by children is largely determined by their parents cannot be ignored. Studies have shown that Latino adults who are immigrants with US citizenship and legal authorization demonstrate less fear while assessing health care services and also make more use of health care services.^{17,31,32}

The differences in smoking behavior seen among the different Latino subgroups might lead to variations in the asthma risk seen in their children. The smoking habit is pronounced among Puerto Rican women aged 12–49 years, 32% of whom smoke, compared with 23% of Cuban American women and 21% of Mexican American women. The secondhand smoke that the child is exposed to or from the mother smoking during pregnancy, which might affect the intrauterine development of the child, might be further factors contributing to asthma risk in these children. Health care providers can thus recommend counseling and smoking cessation programs to the parents of such children.^{30,33}

Disparities in family structure and cultural values can be seen among the different Latino subgroups, eg, the concept of “familismo” comprising intact family structures, social support, and protective social factors, including the presence of two-parent households as seen among Mexican Americans compared with single-parent households as seen in mainland Puerto Ricans. Also, emphasis is placed on higher education among Cuban Americans. All these factors might explain the coping mechanisms required to meet the demands of children with chronic conditions.³³

The interventions designed for targeting asthma should be based on data that are updated and comprehensive in order to provide access to culturally relevant health care services in a timely fashion at both the regional and national level.³⁵ The good news is that as a result of the Healthy People 2010 guidelines, measures that improve data collection on asthma and asthma monitoring were included in the 2007 CHIS database and will be available to track trends and hopefully improvements. In order to reduce disparities, culturally sensitive community-based outreach programs should be designed that educate people about the use of preventive asthma medications and asthma management plans. Asthma management plans must include the updated guidelines recommended for asthma control. School-based interventions, written asthma action plans, and case management should be promoted as per the needs of the community. Parents should be educated about better living conditions,

thereby minimizing the exposure of environmental triggers in schools, workplaces, and homes, in order to reduce the frequency of asthma attacks among the children. These outreach programs might help improve the access, quality, and demand of health care among the poor and uninsured racial and ethnic groups who disproportionately bear the burden of asthma, especially the Puerto Ricans.^{33,34}

Although the study provides important data, it has some limitations. First, the data were reported by an adult who is knowledgeable about the child's health status, and there remains a potential for recall bias. Second, the sampling design of CHIS did not make it possible to calculate estimates smaller than the regional level. The information about the kind of kinship between the parent and child was not captured in this study. The survey did not capture details about the level of knowledge possessed by the parents about the quality of care and treatment received by their children for asthma. Our study also does not capture the legal status of Latino children suffering from asthma. A recent study by Esteban et al showed that the differences in asthma morbidity and use of emergency departments were marked among migrant Latinos and US-born Latinos.³⁵ It is possible that the Latino paradox might exist in this population because California has a large immigrant population.³⁶ The data collected in the study were self-reported, which had certain limitations. Self-reported data might not present an accurate level of need if they exclude a portion of the population with impaired access to care. Despite all these limitations, self-reported data have external validity and are more generalizable because they are representative of diverse patient populations. The CHIS was an appropriate choice because California has the nation's largest Latino population, which amounts to about 13.1 million people, according to the US Census Bureau.^{36,37,38} Also, CHIS oversampled African Americans and Latinos. This ensured a large sample size, which might improve the generalizability of our results. On the other hand, comparable survey studies should be conducted in the states of Texas, Florida, Illinois, and New Mexico, which also hold a considerable population of Latinos, to study further the disparities among the different Latino subgroups, if any. Future studies looking at disparities among the Latino subgroups will help to focus on their distinct needs as well as help in tailoring specific interventions.

Conclusion

The results of this study provide useful information about the current utilization of health care among Latino children with asthma. Furthermore, this study highlights the importance

of examining differences within the Latino subgroups, which can guide the tailoring of interventions and health care programs for children with asthma. Overall, this might be a small step toward a better understanding of the factors that serve as barriers to health care access among Latino children, who are an underrepresented minority population.

Disclosure

The authors report no conflicts of interest in this work.

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