



Haitian Caregivers' Knowledge and Attitudes Regarding Childhood Lead Poisoning

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Background and Significance

Childhood lead poisoning is a common, yet preventable, health problem in the United States.¹ Lead poisoning can lead to development delays and behavioral problems.² Lead poisoning affects the neurologic, renal, hematologic systems as well as vitamin D and calcium metabolism.³ Children between the ages of 9 months and 6 years are at higher risk for lead exposure compared to adults because they exhibit more hand-to-mouth activity, absorb more lead than adults, and are still undergoing development.^{1,3} Sources of childhood lead exposure include lead-based paint, soil and dust, drinking water, parental occupations and hobbies, air, food, and some traditional medicines.¹ Main sources of lead exposure in immigrant children may differ from those in US-born children.⁴ Exposure to lead occurs either through ingestion or inhalation.³

The Miami-Dade County Health De-

partment Childhood Lead Poisoning Prevention Program (CLPPP) provides screening⁵ and case management services as well as education to providers and the community. According to Census 2000, only 4% of Miami-Dade County's population is Haitian⁶, while 27% of all cases reported to CLPPP since 1999 were among children of Haitian ethnicity, indicating that Haitian children are more likely to be affected by lead poisoning. In order to better design educational materials to address this health disparity and to have baseline data for evaluation of education and outreach, a survey of parents' knowledge and attitudes about lead poisoning was conducted in neighborhoods in Miami-Dade County, Florida in which education and outreach efforts were to be expanded. These neighborhoods have a high percentage (35%) of people of Haitian origin.⁶ While there have been several previously published studies about parent knowledge and attitudes about lead poisoning in other

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communities⁷⁻¹², there have been no published reports describing Haitian parent knowledge regarding childhood lead poisoning in the US or elsewhere. Therefore, we sought to describe lead poisoning knowledge and attitudes in the targeted study population and to determine if there were differences between Haitian and non-Haitian parents' childhood lead poisoning knowledge.

Methods

The study was a cross-sectional, door-to-door survey, conducted during the summer of 2002 in 6 high-risk census tracts in two contiguous zip codes, 33161 and 33168, of NE Miami-Dade County. These areas were defined as high-risk because of the high percentage of older housing (18% pre-1950 housing, 69% pre-1970 housing, 89% pre-1980 housing).¹³

Based on a 95% confidence level to detect that 40% of residents would have knowledge of lead poisoning with a worst possible result of 30%, a minimal sample size of 91 was needed.

Assuming that roughly 20% of persons would have refused to participate, we increased the sample size to 110. The refusal rate was 30%. To be eligible, survey participants had to be at least 18 years of age and a parent, guardian, or caregiver of at least on one child 6 years of age or younger.

A 52-question anonymous lead poisoning knowledge assessment questionnaire was developed in English, Creole, and Spanish. The survey questions were written at a fifth grade reading level according to the Flesch-Kincaid Grade Level score. The questionnaire included three major knowledge constructs including knowledge about the health consequences of lead poisoning, lead poisoning exposure, and lead poisoning prevention practices. The respondent's perception of lead poisoning and demographic characteristics were also assessed. There were 52 items on the questionnaire, and the interview which was conducted face-to-face lasted 10-15 minutes. The study protocol and questionnaire were approved by the University of Michigan Health Sciences and the Florida Department of Health Institutional Review Boards.

The data was analyzed by using SAS version 9.1. Student t test and Chi square test were used to determine differences between means and proportions. Linear regression analysis was used to examine the association between the total lead poisoning knowledge score and socio-demographic characters. A forward stepwise regression was used, and all variables with *p* values of ≤ 0.05 were included in the final model.

Results

Of the 110 participants, 61% were Haitian, 24% were 18-24 year olds, 50% were mothers, 33% had below high school level education, 12 % had uninsured children, and 65% were non-homeowners (**Table 1**). Haitian caregivers had a lower overall lead poisoning knowledge score (12.6) than non-Haitians (16.5, $p < 0.05$). As seen in **Table 2**, the difference in knowledge scores was most obvious when examining the 'health consequences' (1.4 Haitian vs. 2.4 non-Haitian, $p < 0.05$) and 'exposure' subscales (6.5 Haitian vs. 9.1 non-Haitian, $p < 0.05$). Haitians had less knowledge about the learning and growth problems caused by lead poisoning compared with Non-Haitians. Haitians were significantly less likely to have heard of lead poisoning as compared to Non-Haitians. Similarly, a smaller proportion of Haitians knew about the risks of ingestion and inhalation of lead, the inability to detect lead in the home through sight or smell, the presence of lead in paint, pipes, and water, and that vaccinating children, fully cooking food, and boiling water were not effective lead poisoning prevention strategies (**Table 3**).

In multivariate analysis, being of Haitian ethnicity or having uninsured children were inversely and significantly associated with lead knowledge as compared to those of non-Haitian ethnicity and those whose children have private insurance.



Table 1. Characteristics of participants in survey—Miami-Dade County, Florida 2002

Characteristic	N (%)	Mean knowledge score	Standard deviation	P-value
Age				
18-24	26 (24)	14.4	3.6	0.88
25-34	42 (38)	14.2	4.5	
35-64	42 (38)	13.9	5.2	
Sex				
Male	25 (74)	14.7	5.9	0.39
Female	73 (26)	13.8	4.2	
Ethnicity				
Non-Haitian	43 (39)	16.5	3.9	<.001
Haitian	67 (61)	12.6	4.3	
Education				
Less than High school	36 (33)	13.6	4.5	0.31
High School	29 (27)	13.8	3.9	
More than High school	43 (40)	15.1	4.8	
Relationship of respondent to child				
Non-mother	52 (47)	14.5	5.0	0.45
Mother	58 (53)	13.8	4.2	
Home ownership				
Non-owner	71 (65)	13.4	4.6	0.02
Owner	39 (35)	15.5	4.2	
Health insurance				
Self-pay	12 (12)	10.6	3.3	0.002
Medicaid	60 (60)	14.0	4.3	
Private	28 (28)	16.1	4.9	

Table 2. Lead poisoning knowledge constructs and perceptions of participants by Haitian ethnicity—Miami-Dade County, Florida 2002

Knowledge scores (Maximum possible score)	Non-Haitian	Haitian	P-value*
	Mean (SD)	Mean (SD)	
Health consequences (5)	2.4 (1.4)	1.4 (1.5)	<.001
Exposure (16)	9.1 (2.4)	6.5 (3.3)	<.001
Prevention (8)	4.9 (1.1)	4.7 (0.9)	0.17
TOTAL (29)	16.5 (3.9)	12.6 (4.3)	<.001
Attitudes	No. (%)	No. (%)	P-value**
Think it's a problem			
Don't know	24 (22)	38 (35)	0.86
Yes	19 (17)	28 (26)	
Heard about it			
No/ Don't know	5 (5)	40 (36)	<.001
Yes	38 (35)	27 (24)	
Concerned about it			
No	8 (7)	20 (18)	0.19
Yes	35 (32)	47 (43)	

* P-value as determined by t-test.

**P-value as determined by Chi-square test.



Table 3. Knowledge items responses by participant ethnicity—Miami-Dade County, Florida 2002

Items	Correct Responses, No. (%)		P-value*
	Non-Haitian	Haitian	
Health consequences			
Learning problems	27 (63)	28 (42)	0.03
Growth problems	26 (60)	25 (37)	0.02
Behavior problems	19 (44)	28 (42)	0.80
Allergy problems	12 (28)	7 (10)	0.02
Diabetes problems	20 (47)	8 (12)	<0.001
Exposure			
<i>Route of Exposure</i>			
Through the mouth	40 (93)	40 (60)	<0.001
Through the nose	30 (70)	28 (42)	0.004
Through the skin	8 (19)	9 (13)	0.46
<i>Identifying lead in the home</i>			
Testing for lead	36 (84)	47 (70)	0.11
Seeing lead	34 (79)	29 (43)	<0.001
Smelling lead	31 (72)	24 (36)	<0.001
Presence of headaches	5 (12)	7 (10)	0.85
<i>Sources of lead</i>			
Paint	38 (88)	37 (55)	<0.001
Pipes	35 (81)	37 (55)	0.005
Foil	10 (23)	14 (21)	0.77
Gasoline	11 (26)	11 (16)	0.24
Water	34 (79)	27 (40)	<0.001
Dirt	23 (54)	44 (66)	0.2
Pencils	8 (19)	16 (24)	0.51
Fishing weights	21 (49)	30 (45)	0.68
Dust	28 (65)	37 (55)	0.30
Prevention			
Keep home clean	31 (72)	53 (79)	0.40
Give kids their shots	14 (33)	5 (7)	<0.001
Fully cook food	13 (30)	3 (5)	<0.001
Wash children's hands	38 (88)	64 (96)	0.16
Wash toys	33 (77)	63 (94)	0.008
Keep from chewing on paint	43 (100)	66 (99)	0.42
Boil water	9 (21)	2 (3)	0.002
Give child healthy meals	31 (72)	57 (85)	0.10

*P-value as determined by Chi-square test.

Discussion

There were several limitations in this study. The most important limitation is that the study population was recruited using a convenience sample and may not be a representative of the population in the targeted census tracts. Participants may have been more likely to be people who did not work since they were home while the study was conducted. Thus, they may have lower income and education compared with their working neighbors. Additionally, 30% of respondents refused participation. It is likely that these people were less concerned about lead poisoning leading to our sample having a higher level of concern and knowledge than the targeted community.

The questions about prevention included in the questionnaire concerned practices commonly perceived as good health practices. It seems that the respondents knew about prevention practices in the context of general disease prevention and health promotion, but not specifically in the context of lead poisoning. Respondents did not differentiate between lead poisoning prevention practices and practices which are not effective in preventing lead poisoning. The percentage of Haitian and Non-Haitian respondents that thought shots, fully cooking food, and boiling water were good lead poisoning prevention practices were 93% and 67%, 95% and 70%, 97% and 79% respectively. This occurred either because they were not thinking specifically about lead when answering the questions or because they in fact did not understand why certain prevention practices work to prevent disease. For instance, they may not know the difference between metals and infectious microorganisms or the underlying biological principles of vaccines. While responding to the survey, some people said that they could “kill” the lead if they boiled it or cooked it.

Based on the results of this study, future activities should focus on increasing lead poisoning awareness among the Haitian community. Emphasis should be placed on education concerning the health consequences of lead poisoning, which according to the Health Belief Model¹⁴, should increase their interest in lead poisoning and prevention practices. Furthermore, lead poisoning education efforts

should emphasize the distinction between prevention practices specific to lead poisoning and common health practices that are not effective prevention measures against lead poisoning. Since people who rely on vaccinations, fully cooking their food, and boiling their water may be unaware that their children are still at risk for lead poisoning in spite of these measures, thus having a false sense of security, it is important to get the message out that these practices are not effective ways of protecting a child from lead poisoning.

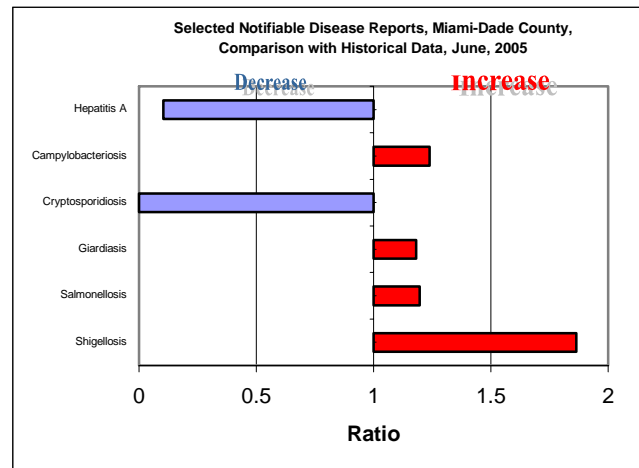
It is also important to note that among those who rent, only one respondent remembered receiving any information, either verbal or written, about lead when they signed their lease. It is possible that some of these participants were notified and either did not understand the information or forgot. This finding should be evaluated in other communities to see if this is a problem elsewhere. If so, the enforcement of the Federal EPA Title X regulation, which requires that a landlord disclose the presence of known lead-based paint and lead-based paint hazards before renting pre-1978 housing¹⁵ should be examined.

The Miami-Dade County CLPPP currently conducts education and outreach in the Haitian community, distributing lead poisoning prevention information in Haitian Creole. In order to provide effective case management services to Haitian children and their families the CLPPP also has a Haitian Creole speaking case manager on staff.



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*Ratio of current month total to mean of 15 month totals (from previous, comparable, and subsequent month periods for the past 5 years).

**TO REPORT ANY DISEASE AND
FOR INFORMATION CALL:**

**Office of Epidemiology and
Disease Control**



Childhood Lead Poisoning Prevention Program	(305) 470-6877
Hepatitis	(305) 470-5536
Other diseases and outbreaks	(305) 470-5660
HIV/AIDS Program	(305) 470-6999
STD Program	(305) 325-3242
Tuberculosis Program	(305) 324-2470
Special Immunization Program	(786) 845-0550



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Monthly Report
Selected Reportable Diseases/Conditions in Miami-Dade County, June 2005

Diseases/Conditions	2005 this Month	2005 Year to Date	2004 Year to Date	2003 Year to Date	2002 Year to Date	2001 Year to Date
AIDS ^{Provisional}	116	758	734	543	562	663
Animal Rabies	0	0	0	0	0	0
Campylobacteriosis	19	66	64	64	47	46
<i>Chlamydia trachomatis</i>	393	1971	1715	1759	1874	1449
Ciguatera Poisoning	0	0	0	0	0	0
Cryptosporidiosis	0	12	7	6	3	8
Cyclosporiasis	0	0	0	0	0	0
Diphtheria	0	0	0	0	0	0
<i>E. coli</i> , O157:H7	0	0	1	0	0	0
<i>E. coli</i> , Non-O157	0	0	0	0	1	0
<i>E. coli</i> , Other	0	0	0	0	0	0
Encephalitis (except WNV)	0	0	1	0	1	0
Encephalitis, West Nile Virus	0	0	0	0	0	0
West Nile Fever	0	0	0	0	0	0
Giardiasis, Acute	29	94	139	77	97	111
Gonorrhea	131	825	618	789	857	717
Hepatitis A	1	27	16	21	65	72
Hepatitis B	3	26	19	29	11	24
HIV ^{Provisional}	148	807	902	843	993	798
Lead Poisoning	16	79	141	110	123	126
Legionnaire's Disease	0	2	4	4	0	0
Leptospirosis	1	1	0	0	0	0
Lyme disease	0	0	1	2	0	1
Malaria	1	1	8	5	5	10
Measles	0	0	1	0	0	0
Meningitis (except aseptic)	4	7	5	2	3	3
Meningococcal Disease	2	5	11	3	11	10
Mumps	0	0	0	0	0	0
Pertussis	2	4	5	1	3	1
Polio	0	0	0	0	0	0
Rubella	0	0	0	0	0	0
Rubella, Congenital	0	0	0	0	0	0
Salmonellosis	49	199	166	197	120	81
Shigellosis	43	156	90	165	99	41
<i>Streptococcus pneumoniae</i> , Drug Resistant	22	30	45	62	72	88
Syphilis, Infectious	14	84	80	81	77	78
Syphilis, Other	47	296	380	452	448	240
Tetanus	0	0	0	0	0	1
Toxoplasmosis	0	0	1	4	11	6
Tuberculosis ^{Provisional}	21	89	91	104	93	57
Typhoid Fever	0	2	1	2	1	0
<i>Vibrio cholera</i> Type O1	0	0	0	0	0	0
<i>Vibrio cholera</i> Non-O1	0	0	0	0	1	0
<i>Vibrio</i> , Other	0	0	0	1	0	0

* Data on AIDS are provisional at the county level and are subject to edit checks by state and federal agencies.

** Data on tuberculosis are provisional at the county level.

