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Agreement between Parent and Student Responses to an Asthma and Allergy Questionnaire in a Diverse Inner City Elementary School Population

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School-based parent/student screening surveys provide an inexpensive, non-invasive means to identify children at high-risk for asthma^{1,2}. Our goal was to determine parent/student response agreement to an asthma/allergy survey stratified by age and race. We hypothesized that discordance between parent and student responses would increase with age and that ethnicity (particularly generational language differences in Hispanic families) might increase the discordance of parent/student responses.

A one page, IRB approved, validated^{2–6}, 20 question parent/student asthma/allergy screening survey available in English and Spanish was distributed to all students in five, northeastern, urban, elementary schools from March to June 2008, as part of the School Inner-City Asthma Study (SICAS). SICAS, a longitudinal school/home environment evaluation of students with asthma and associated morbidity, utilized these surveys to identify potential subjects for the longitudinal study. Students and parents were instructed to fill responses independently.

Questions referred to the student's symptoms including frequency of wheezing, difficulty taking a deep breath, persistent cough, and respiratory problems with activity or at night. Allergy questions focused on frequency of nasal, ocular, or skin symptoms. Response categories were a)never, b)sometimes, c)a lot, d)don't know. Binary asthma questions ascertained whether there was a previous doctor's diagnosis of asthma or reactive airway disease, hospitalization for trouble breathing, current asthma medication use and missed days of school due to respiratory problems. Response category options were a)yes, b)no, and

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c)don't know. Observations that were missing or answered as "don't know" were deleted from the analysis. Self-reported race/ethnicity categories were African American, Asian, Hispanic, White, Native American, and Other.

Analyses were done using SAS version 9.1 (SAS Institute, Inc., Cary, NC). The percent of agreement was the sum of parent and student responses that agreed divided by the total number of responses. Kappa statistic and McNemar's test were used to examine agreement beyond expected chance and disagreement, respectively. A test of the difference in proportions was used to determine if there were statistically significant differences between age groups and race.

707 parent/student pair surveys were analyzed. The students' ages ranged from 5 to 15 years average 8.66 ± 1.96 (standard deviation). The cohort was predominantly Hispanic (54%) and African American (27%).

Overall agreement ranged from 81% to 98% for all questions (Kappa of 0.59 to 0.94), except for one. The question, "develops a cough that won't go away?" had 62% agreement (Kappa of 0.31), demonstrating fair agreement.

Table 1 shows the parent/student responses to identical questions by age and race. Direction of disagreement was due to student affirmative responses. Table categories: No/No, No/Yes, Yes/No, and Yes/Yes demonstrate parent/student pairs that responded in this manner. Column 3 (No/No) and column 6 (Yes/Yes) demonstrate parent/student agreement. Column 4 and 5 (No/Yes and Yes/No) demonstrate response disagreement. The kappa statistic decreased and disagreement level increased with age, with similar results by race, but none of these were statistically significant.

Responses to binary asthma questions demonstrated 93%–97% agreement, with good to excellent Kappa (0.75–0.91). Quantitative asthma symptoms demonstrated 81%–86% agreement, with a moderate to good Kappa (0.59–0.7). Chest tightness or cough after activity or night wakening demonstrated 81%–86% agreement, with a moderate to good Kappa (0.59–0.67). Overall, student responses matched their parents' regarding quantitative asthma questions. The most concordant response was seen in asthma medication use (97% agreement, 0.91 Kappa), diagnosis of asthma (96% agreement, 0.89 Kappa), hospitalization for respiratory problems (94% agreement, 0.78 Kappa), and missed school days due to breathing problems (93% agreement, 0.75 Kappa), indicating both parents and students have good recognition of the student's condition.

Discordant responses to the question, "develops a cough that won't go away?" may indicate unclear wording, misinterpretation, or that students may be more in tune with their daily symptoms. Decreased agreement with increasing age may occur due to increased time older students are away from their caregivers. Persistent, indolent symptoms may go unnoticed by the parent, but have significant effects on the child. In contrast, good agreement was seen on hospitalizations or missed school day responses as these likely affect both parties. Parent/student agreement in responses did not differ by race/ethnicity or language of questionnaire (English or Spanish).

Our study generally showed good agreement between parent/student responses for asthma. Disagreement was seen most in responses to questions that were more dependent on self-perception of symptoms but these were not statistically significant. Also, no significant racial/ethnic/language differences in parent/student agreement were seen. This study suggests that screening surveys given to either parent or elementary students may be a simple, cost-effective mechanism for identifying children in an urban school population who may need further evaluation.

Acknowledgments

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Table 1

Parent and student responses to survey questions regarding the student's symptoms.

Question	PARENT		NO		YES		N	Kappa [†]	Percent of Agreement (%)	McNemar
	STUDENT	NO	YES	NO	YES	YES				
Develops a cough that won't go away?	Overall	171	236	17	242	666	0.31	62	189.57 *	
	5-7 y	47	55	3	83	188	0.41	69	46.62 *	
	8-9 y	55	79	9	76	219	0.26	60	55.68 *	
	>10 y	69	102	5	83	259	0.27	59	87.93 *	
	Hispanic	88	120	9	138	355	0.33	64	95.51 *	
	African	45	61	4	59	169	0.31	62	49.98 *	
	Other ⁺	38	55	4	45	142	0.26	58	44.08 *	
	Overall	338	91	38	209	676	0.61	81	21.78 *	
	5-7 y	116	20	9	50	195	0.67	85	4.17 *	
	8-9 y	112	24	11	71	218	0.67	84	4.83 *	
Complains about a chest that feels tight or hurts after activity?	>10 y	110	47	18	88	263	0.51	75	12.94 *	
	Hispanic	187	42	21	115	365	0.64	83	7.00 *	
	African	76	27	8	60	171	0.59	80	10.31 *	
	Other ⁺	75	22	9	34	140	0.52	78	5.45 *	
	Overall	362	64	50	201	677	0.64	83	1.72 *	
	5-7 y	113	13	12	54	192	0.71	87	0.04 *	
	8-9 y	114	21	22	65	222	0.59	81	0.02	
	>10 y	135	30	16	82	263	0.64	83	4.26 *	
	Hispanic	200	32	22	113	367	0.69	85	1.85 *	
	African	75	18	17	57	167	0.58	79	0.03 *	

Question	PARENT		STUDENT		NO		YES		N	Kappa [†]	Percent of Agreement (%)	McNemar
	-----	-----	NO	YES	NO	YES	-----	-----				
Other ⁺			87	14	11	31	143	0.59	83	0.36 [*]		

* Disagreement favors students answering affirmatively while parents answered negatively

+ Other includes White, Asian, Native American, Mixed, multiple race categories

† A kappa value <0.20 was considered poor agreement; 0.21 – 0.40 was fair; 0.41 – 0.60 was moderate; 0.61 – 0.80 was good; >0.81 was excellent