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Is Rural School-aged Children's Quality of Life Affected by Their Responses to Asthma?

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Abstract

The unpredictable nature of asthma makes it stressful for children and can affect their quality of life. An exploratory analysis of 183 rural school-aged children's data was conducted to determine relationships among demographic factors, children's responses to asthma (coping, asthma self-management), and their quality of life (QOL). Coping frequency, asthma severity, and race/ethnicity significantly predicted children's asthma-related QOL. Children reported more frequent coping as asthma-related QOL worsened (higher scores). Children with more asthma severity had worse asthma-related QOL. Post-hoc analyses showed that racial/ethnic minorities reported worse asthma-related QOL scores than did non-Hispanic Whites.

Asthma affects 6.5 million children making it the most common chronic health problem of childhood (Akinbami, 2006; Brim, Rudd, Funk, & Callahan, 2008). Asthma episodes can be triggered by a variety of stimuli including aeroallergens, strong odors, perfumes, weather conditions (e.g. cold temperatures, high humidity), exercise, air quality (e.g. ozone levels, proximity to high vehicular exhaust), colds and influenza infections, and heightened emotions (American Academy of Allergy Asthma and Immunology [AAAAI], 2004; Wood et al., 2007). Given this variety of triggers, the onset and frequency of asthma episodes are somewhat unpredictable. This can be especially challenging and stressful for children and can affect their quality of life (Barton, Clarke, Sulaiman, & Abramson, 2003). The purpose of this paper is to present an exploration of the relationships between children's responses to asthma (e.g. coping, self-management) and their quality of life.

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Literature Review

Children use diverse strategies in response to asthma symptoms. These strategies allow children to avoid triggers, cope with their anxieties related to asthma, and initiate asthma self-management behaviors. Studies of children's coping with asthma, asthma self-management, and asthma-related quality of life will be discussed.

Coping with Asthma

Experiencing asthma symptoms, the hassle of taking daily medications, and exclusion from age-appropriate activities are all sources of stress for children with asthma (AAAAI, 2004; Walsh & Ryan-Wenger, 1992). Past experience, support from others, and expectations or beliefs about personal capabilities for managing asthma can influence the child's coping response (Bandura, 2004; Barton et al., 2003). Coping strategies have been categorized as approach (e.g. problem-solving, seeking support) or avoidant (e.g. denial, distraction) responses (Barton et al., 2003; Ryan-Wenger & Walsh, 1994; Schreier & Chen, 2008).

In a study of 553 Dutch youth with asthma wherein coping strategies were rated on frequency of use, investigators found that youth used approach or active coping strategies most often when dealing with asthma symptoms followed by use of avoidant coping strategies ($m = 2.19$, $sd = .07$ versus $m = 1.91$, $sd = .69$, respectively) (Van de Ven, Engels, Sawyer, Otten, & Van Den Eijnden, 2007). Some research suggests that avoidant coping may negatively affect patient outcomes due to long-term lack of vigilance in dealing with asthma symptoms (Barton et al., 2003; Nazarian, Smith, & Sliwinski, 2005). Increased use of avoidant coping has also been found to be inversely related to psychological functioning, children's quality of life, and mothers' quality of life (Marsac, Funk, & Nelson, 2006).

However, other studies involving urban children with asthma, suggest that both avoidant coping and approach coping may be used by children as a coping "toolbox" to assist them in self-managing their asthma and increasing their level of participation in childhood activities (Mitchell & Murdock, 2002). In one study of 31 urban children, during low levels of asthma-related stress, high use of avoidant as well as approach coping were found to be associated with lower levels of social withdrawal, which supports a coping "toolbox" theory (Greene, Murdock, & Mitchell, 2006).

Researchers have also compared coping strategies used by boys and girls when responding to their asthma symptoms. In a rural community sample ($n = 84$) of school-age children, Sharrer and Ryan-Wenger (1995) found that boys most frequently used physically oriented activities (e.g. playing active games, video games, sports) as a way to distract them or avoid dealing with a stressor. In contrast, girls tended to use more emotional strategies (e.g. pray, write in a diary) or sought support from family and friends (e.g. talk to someone) as ways to deal with stressors. In addition, younger children tended to use more avoidant strategies while older children increased their use of problem-solving strategies.

As Ryan-Wenger and Walsh (1994) note, there are many situations beyond children's control and they may choose to avoid directly confronting the situation by employing distraction activities (e.g. playing video games, watching television, listening to music). Therefore, coping strategies should not be conceived as being good nor bad, rather they are inherently neutral.

Asthma Self-Management

As school-age children mature, the focus of asthma management in the home shifts from parents delivering the care to parents supervising their children as they take on greater responsibility for self-managing their asthma (Horner, 1998). Asthma self-management

requires knowledge of asthma signs, asthma symptoms, and asthma triggers; and requisite skills to manage acute episodes (Butz et al., 2005; McQuaid et al., 2001).

Studies designed to improve asthma self-management have been found to improve asthma-related quality of life and asthma control (Clark, Mitchell, & Rand, 2009). Cicutto et al. (2005) compared asthma-related quality of life and other health outcomes between children ($n=132$) who received a school-based asthma education program and children ($n=124$) in the comparison group who received usual care. The asthma education intervention led to significant improvements in the children's asthma-related quality of life, absenteeism, and urgent health care visits for asthma.

Intervention studies designed to increase children's knowledge of asthma management behaviors have been conducted since the mid-1980's (see Clark et al., 1984). Coffman, Cabana, and Yelin's (2009) systematic review of 24 studies of asthma education programs for school-aged children found the programs significantly improved children's asthma self-management, medication adherence with controller medications, use of peak flow meters, and avoidance of asthma triggers. Asthma education led to improvements in children's quality of life in four of eight studies that measured this outcome.

Asthma-Related Quality of Life

Asthma symptoms, activity limitations, and social and emotional functioning can negatively affect the child's quality of life (Peeters, Boersma, & Koopman, 2008; Yang, Chen, Chiang, & Chang, 2005). Guyatt, Juniper, Griffith, Feeny and Ferrie (1997) examined changes in 7- to 17-year old children's asthma symptoms over 3 monthly clinic visits. Children's self-assessment of their physical status and the impact on their well-being were correlated with objective measures of pulmonary function. The change in children's ratings of asthma symptoms was significantly correlated with their asthma-related quality of life ($r's=.54$ to $.74$) and peak expiratory flow scores ($r's=.17$ to $.49$).

In one of the few studies of quality of life in a stress-coping model conducted with children, Peeters et al. (2008) found that children who primarily reacted emotionally when experiencing asthma-related limitations also had lower quality of life. Activity limitations were associated with increased asthma severity and the use of avoidant coping, but avoidant coping did not predict the children's quality of life. Goldbeck, Koffmane, Lecheler, Thiessen, and Fergert (2007) also found that children's emotional reactions were significantly inversely associated with their quality of life scores but that their asthma severity was not related to quality of life.

Given the extent of asthma among school-age children, quality of life is a key measure of illness impact (Peeters et al., 2008; Yang et al., 2005). This analysis was undertaken to explore associations between children's responses to asthma (e.g. coping and asthma self-management) and their quality of life.

Methods

This exploratory analysis was conducted on the baseline data collected from 183 school-age children who were participants in a longitudinal study and who had a diagnosis of asthma and lived in a rural area of central Texas. The rural areas have a residential density of 295 per square mile. The sample was composed of 46% Hispanic (all but one were Mexican American), 31% White, and 22% African American children, with 108 (59%) boys and 75 (41%) girls, who were an average of 8.78 years old ($sd = 1.24$). The following research questions were addressed:

- What are the relationships among children's coping with asthma, asthma self-management, and asthma-related quality of life?
- To what extent does children's coping and asthma self-management influence their quality of life?
- Does the child's age, gender, race/ethnicity, family socioeconomic status, or severity of chronic asthma add to the variance in quality of life beyond that predicted by children's coping and asthma self-management?

Study Procedures

Administrators of rural school districts reviewed the proposed study and provided letters indicating their willingness to participate in the study. The study was then reviewed and approved by the Institutional Review Board.

Sampling and Enrollment Procedures—The sample size needed for the proposed analyses were based on a power level of .80 to detect a moderate effect size using a .05 significance level with 9 predictor variables is 131 participants (Cohen, 1988; Field, 2005; Steiger & Fouladi, 1992). Sample inclusion criteria were: (a) having a diagnosis of asthma on the school health record, (b) has had asthma symptoms in the previous 12 months, and (d) speaks either English or Spanish. The sample exclusion criterion was: Does not have significant co-morbidity that would preclude participation in classes (e.g., severe cerebral palsy, oxygen dependent conditions such as cystic fibrosis or bronchopulmonary dysplasia).

Letters of invitation were mailed from schools to families of eligible children. Interested parents could return a stamped response-postcard to the school nurse authorizing the release of their contact information to the investigators. The investigators contacted the families who gave permission to be contacted to explain the study, verify that sample criteria were met, and to schedule a home visit meeting. At the first home visit the study procedures were discussed, families' questions were answered, and parental consent and child assent were obtained from those families who agreed to participate.

Data Collection Procedures—All of the instruments were translated into Spanish, back translated, and then the instruments were field tested by bilingual community residents to verify clarity and comprehensibility of the translations (Horner, Surratt, & Juliusson, 2000). Data were collected from the family caregiver who managed the child's asthma and from the child with asthma. A majority of family caregivers were mothers, but two grandmothers and one single father were the primary caregivers in three of the families. A majority of the parents had completed a high school (42%) or higher education levels (42.5%), and 62.7% were married. The child completed self-report questionnaires with the assistance of a graduate research assistant who read scale directions and items aloud. The child then marked responses in the booklet.

Background information: Demographic data including parent's age, education level, occupation, and marital status, and child's age, gender, grade level, race/ethnicity were obtained. Family socioeconomic status (SES) was calculated based on the parent's education level and occupation using Hollingshead's (1975) Four Factor Index calculation, which yields a continuous variable (possible range of 8 – 66; $\alpha = .69$). Asthma history including age at diagnosis, asthma triggers, and asthma severity were collected. Asthma severity was measured with the 3-item *Severity of Chronic Asthma* (SCA) scale. Parents were asked to indicate the frequency of daily symptoms, activity limitations, and nights disrupted by asthma symptoms. The 4-point ordinal scale ranges from 1 for “0–2 times per week,” to 4 for “constant” and corresponds to national asthma guidelines (AAAAI, 2004).

Horner, Kieckhefer, and Fouladi (2006) found statistically significant associations between the SCA scores and children's asthma morbidity in terms of emergency department visits ($r = .39$), hospitalizations ($r = .38$), and school absenteeism ($r = .32$). The 3-item scale has strong item-to-total scale correlations.

Coping: Coping was measured with the 26-item *Schoolager's Coping Strategies Inventory* (SCSI: Ryan-Wenger, 1990). The SCSI lists varied strategies such as “talk to someone,” “run or ride my bike,” and “pick on someone.” The SCSI has two 4-point response scales (frequency of use and effectiveness) for each item. The children were directed to indicate on a frequency scale of 1 (never) to 4 (most of the time) how often they used the coping strategies for asthma and to rate how well the strategies worked also using an effectiveness scale ranging from 1 for not used, 2 for used, does not help to 4 for helps a lot. Responses were summed and then a mean score was derived. In a methodological study with 250 White children, internal consistency was adequate for scores on the frequency scale ($\alpha = .76$) and the effectiveness scale ($\alpha = .77$: Ryan-Wenger, 1990).

Asthma self-management: Self-management of asthma includes actions to prevent and to treat asthma symptoms. Children's asthma self-management was measured with the Asthma Inventory for Children, a 15-item questionnaire with a 5-point Likert scale with 1 for never, to 5 for always. Responses were summed and then a mean score was derived. Higher scores reflect more frequent performance of asthma prevention and/or treatment behaviors. The tool had good internal consistency in a sample of 71 school-age children ($\alpha = .71$) (Kieckhefer, 1987).

Quality of life: The child's asthma-related quality of life was measured with the 23-item Pediatric Asthma Quality of Life (PAQOL) scale (Juniper et al., 1996). The original 7-point response scale proved difficult to reliably and meaningfully translate into Spanish for the children and so a simpler 5-point scale was used. The 5-point scale ranged from 1 for “none or never” to 5 for “always.” The PAQOL consists of three subscales with good intraclass correlations for the 10-item asthma symptom subscale ($r = .93$), the 5-item activity limitations subscale ($r = .84$), and the 8-item emotional functioning subscale ($r = .89$). Responses were summed and then a mean score was derived for the total scale and for each subscale. Higher scores indicate greater bother or more frequent symptoms or activity limitations. In a study with 52 children (ages 7–17 years) who had asthma, changes in quality of life could be detected over a 9-week intervention period as a result the treatment ($p < .0001$: Juniper et al., 1996). The PAQOL scale is a widely used scale. It has been translated into more than 40 languages and continues to demonstrate internal consistency of the total and subscales comparable to the original scale (see Reichenberg & Broberg, 2000; Tauler et al., 2001; Wood et al., 2007).

Data Analysis—Composite scores were computed for those individuals who answered at least 90% of the items. For scales with 9 or fewer items complete data were required for composite score calculation. In those cases with less than 10% of missed items, a within-subject mean imputation was used to substitute for the missing item and the composite score was then calculated. Associations between variables were assessed with Pearson Product Moment Correlations. Regression analyses were run first to determine whether asthma coping and asthma self-management had an influence on asthma-related quality of life. This analysis was followed by a series of regression analyses that included age, gender, race/ethnicity, asthma severity, socioeconomic status in addition to coping and asthma self-management as the independent variables that were regressed onto the total PAQOL, and each of the three PAQOL sub-scales (i.e., activity limitations, emotional functioning, asthma

symptoms). No heteroscedasticity was identified and no observations were signaled for exclusion from the analyses as multivariate outliers or influential points.

Findings

Descriptive data for the measures are reported in Table 1. The frequency and effectiveness of children's coping were significantly correlated with asthma self-management, asthma-related quality of life total score and all of the sub-scales (see Table 2). Higher scores on the quality of life scale indicate greater bother with symptoms, activity limitations, and emotional functioning. Children reported higher coping with increased quality of life reports. However, asthma self-management was only significantly correlated with the activity limitations PAQOL sub-scale. Asthma severity was significantly correlated with PAQOL total and sub-scales but not with any other variable. Again, greater asthma severity was associated with worse asthma-related quality of life. Children's age was inversely significantly correlated with total PAQOL meaning that younger children reported to be more bothered and worried about their asthma. Socioeconomic status was inversely significantly correlated with the emotional functioning PAQOL subscale meaning that children from poorer families reported worse quality of life.

Step-wise multiple regressions were run to answer the third research question regarding the influence of the child's age, gender, race/ethnicity, family socioeconomic status, asthma severity, coping, and asthma self-management on children's asthma-related quality of life. The first regression analysis to determine to what extent coping and asthma self-management influenced asthma-related quality of life (total score) showed that only the frequency of children's coping accounted for 11% of the variance in asthma-related quality of life $F(1,176) = 20.78, p < .001$. The series of regression analyses with activity limitations PAQOL, emotional functioning PAQOL, asthma symptoms PAQOL, and total PAQOL as the dependent variables are shown in Table 3. Coping frequency was the first variable to load in the models of emotional functioning PAQOL, asthma symptom PAQOL, and total PAQOL, whereas asthma severity loaded first on the model of activity limitations PAQOL. Both coping frequency and asthma severity loaded onto the four models. Race/ethnicity loaded onto emotional functioning PAQOL as the second variable and loaded onto the total PAQOL model. The models were statistically significant. The child's age, gender, family socioeconomic status, and asthma self-management did not have a statistically significant influence on the PAQOL total or sub-scale scores.

Post hoc analyses were run to further explore the significant findings in these analyses. ANOVA were run to examine differences in PAQOL total and subscale scores, coping frequency, and asthma severity between racial/ethnic groups (see Table 4). Hispanic and African American children had significantly higher (worse) PAQOL total scores and higher asthma symptoms PAQOL scores than did non-Hispanic White children. Both Hispanic and African American children reported they were more bothered by their asthma in general and specifically more bothered by their asthma symptoms than the non-Hispanic White children. Hispanic children had significantly higher (worse) emotional functioning PAQOL than did non-Hispanic White children. Neither coping frequency nor asthma severity were statistically significantly different between racial/ethnic groups.

Given the significant inverse correlations found between children's age and total PAQOL, and between SES and emotional functioning PAQOL, additional post hoc analyses were run. Younger children (ages 6–8 years) had significantly higher (worse) total PAQOL scores, activity limitations PAQOL scores, and asthma symptoms PAQOL scores than did older (ages 9–12 years) children. There were no significant differences in PAQOL total and subscale scores between poorer and non-poor families. However, SES was found to be

significantly different between racial/ethnic groups with Hispanics having the lowest average SES at 27.93 ($sd=11.14$), followed by African Americans at 36.36 ($sd=9.75$), and then non-Hispanic Whites at 40.20 ($sd=10.63$) $F(2,169)=22.99, p<.001$.

Discussion

Children who live in rural areas are faced with environmental and resource risk factors that can make asthma management especially challenging (Butz et al., 2005). The findings from the regression models support the importance of coping frequency and asthma severity in children's perceptions of their asthma-related quality of life. In each of the models, either coping frequency or asthma severity were the first variables that loaded in the models, contributing significantly to the explanatory power of asthma-related PAQOL total and subscale scores. These findings are consistent with those of other studies that found that psychological adjustment and quality of life of children with asthma were influenced, in part, by coping (Lima, Guerra, & de Lemos, 2010; Peeters et al., 2008). However, the children's asthma self-management did not contribute to their PAQOL scores in this analysis of their baseline data. The literature shows variable impact of asthma self-management on quality of life (see Coffman et al, 2009).

Interestingly, race/ethnicity also entered into two of the models: total and emotional functioning PAQOL. Together, these three variables — coping frequency, asthma severity, and race/ethnicity — explained 11 to 18 percent of the variability in children's asthma-related quality of life. Given that more than 80 percent of the variability remains unexplained, there clearly are other influences on children's asthma-related quality of life that were not captured by the measures of this study. Other study limitations included the use of a convenience sample that restricts generalizability of the data to others who share these same characteristics.

A unique finding in this study was the significantly worse emotional functioning reported by the Hispanic children in comparison to the non-Hispanic White and African American children. The emotional function PAQOL subscale items addressed how often children feel angry, worried, concerned, or troubled because of their asthma and how often they feel frightened by an asthma attack (Juniper, 1996). One salient question is then, why did Hispanic children report these negative emotions occurring more often than non-Hispanic white children? The answer could potentially be rooted in the degree of family stressors. Worse emotional functioning scores of Hispanic children with asthma may reflect a “filtering down effect” as parents express anxiety to their children while trying to tackle barriers such as knowledge deficits, limited resources, and lack of extended family support (Flores 1998; Lee et al., 2006; Zayas & McLean, 2006). In qualitative studies of Hispanic parents of children with asthma, parents reported feelings of fear, lack of knowledge of what to do, and feelings of being alone during their children's asthma attacks (Berg et al., 2007; Mosnaim et al., 2006).

Both Hispanic and African American children rated their asthma symptoms worse than did the non-Hispanic White children. Coping frequency and asthma severity were the factors that loaded onto the asthma symptom PAQOL model. Asthma severity scores, while not statistically significantly different between racial/ethnic groups, were highest among Hispanic children followed by African American children and then non-Hispanic White children. Our findings of higher asthma severity in children from racial/ethnic minority groups are consistent with other studies of childhood asthma (Akinbami, 2006; Brim et al, 2008).

In addition to their child's asthma severity, many Hispanic and African American parents are faced with substantial stressors such as lack of resources and social support systems when dealing with their children's asthma (Berg et al., 2007; Lee et al., 2006). As evidenced in our study, Hispanic families had significantly lower SES scores followed by African American families and then non-Hispanic White families. This finding is particularly noteworthy, given the fact that poor children have been shown to be “especially vulnerable to the effects of pediatric asthma and are at increased risk for difficulties in daily functioning” (Josie, Greenley, & Drotar, 2007). In addition, low SES status may foster poor housing conditions that may potentially exacerbate asthmatic symptoms in children (Mosnaim et al., 2006) and thereby contribute to worse asthma symptoms quality of life.

Since we found a statistically significant relationship between age and total PAQOL, we examined in more detail the influence of the child's age on quality of life (Table 4). The data show a clear pattern of poorer asthma-related quality of life in younger children (aged 6 to 8 years) compared to older children (aged 9 to 12 years) that was statistically significant for all of the PAQOL subscales except for emotional functioning. However, the data for emotional functioning show the same pattern of worse functioning in the younger aged group, although the difference between age groups was not statistically significant. This finding suggests that closer attention should be given to younger children who may have more adjustment difficulties to asthma effects on quality of life. Previous research has found that asthma symptoms, particularly those that are subclinical, may go unrecognized in younger children. These children naturally reduce their physical activity levels which negatively affects the quality of their lives (Brasholt, Baty, & Bisgaard, 2010).

Implications

Nurses and other healthcare providers need to assess the impact of asthma on children's quality of life. Attention needs to be paid to how children are responding to asthma and determine the affect of asthma on their emotional health. Furthermore, given the economic disparities faced by racial/ethnic minority families there is a need for careful assessment of how families are dealing with the work of managing their children's asthma. Making resources such as translators, translated materials, transportation to the clinic/office, and assistance in obtaining medications and inhalation equipment available to families who may be challenged by the burden of asthma management could contribute to improvements in children's asthma-related quality of life. In addition, asthma self-management education that is tailored to the child's developmental level could be an important resource to help children learn about and cope with their asthma.

Further research is needed to determine what other factors might influence children's asthma-related quality of life. Clearly children do not manage asthma by themselves. Rather, their parents initially provide care and later begin supervising self-management activities as their children mature. It is possible that the parents' skills and confidence in managing asthma may influence children's perceptions of their quality of life. Future research should explore the combined influence of parental and child factors on children's asthma-related quality of life.

In addition, future research should consider the influence of area of residence on children's asthma-related quality of life since asthma triggers vary by residential area. For example, urban residents more frequently report cockroach and house dust mite allergies, while more rural residents report they are allergic to storage mites, dog dander, ragweed, and timothy grass (Ernest & Cormier, 2000; Taskey & Craig, 2001).

This study confirms and expands on findings reported by other authors. The limited amount of variance in quality of life that was explained by coping frequency, asthma severity, and

race/ethnicity indicate that other factors also contribute to children's quality of life and merit further investigation. Although our results are preliminary, these findings are important and should be taken into account when intervening with children who have asthma.

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Table 1

Variable Descriptives

Variable	Mean	SD	SE	Min	Max	Alpha
Coping Frequency	2.06	.44	.03	1.00	3.27	.83
Coping Effectiveness	2.18	.45	.03	1.00	3.12	.82
Asthma Management	3.77	.58	.04	1.71	5.00	.76
Total Quality of Life (QOL)	2.19	.83	.06	1.00	4.48	.91
QOL – Activity Limitations	2.28	.98	.07	1.00	5.00	.70
QOL – Emotional Functioning	1.99	.93	.07	1.00	4.63	.82
QOL – Asthma Symptoms	2.32	.92	.07	1.00	4.50	.82

Table 2

Pearson's Correlations Between Variables

Variable	2	3	4	5	6	7	8	9	10
1) QOL Total Score	.82(.000)	.90(.000)	.92(.000)	.33(.000)	.30(.000)	.14	.28(.000)	-.09	-.15(.04)
2) QOL Activity Limitations		.67(.000)	.64(.000)	.21(.006)	.22(.003)	.15(.04)	.31(.000)	-.07	-.13
3) QOL Emotional Functioning			.70(.000)	.29(.000)	.26(.000)	.14	.21(.005)	-.17(.02)	-.12
4) QOL Asthma Symptoms				.32(.000)	.29(.000)	.10	.23(.002)	-.02	-.14
5) Coping Frequency					.83(.000)	.26(.000)	-.02	-.10	-.03
6) Coping Effectiveness						.25(.001)	-.02	-.14	-.06
7) Asthma Management							.06	-.02	.008
8) Asthma Severity								-.13	-.02
9) Socioeconomic Status									.09
10) Child's Age									

Legend: SES = Socioeconomic Status, QOL = Quality of Life; (significance)

Table 3

Quality of Life (QOL) Total and Sub-scales Regression Models

Model 1: Quality of Life Total Scale						Model 2: Emotional Functioning QOL Subscale					
Variables	B	SE	Beta	P	R ²	Variables	B	SE	Beta	P	R ²
Step 1						Step 1					
Constant	1.005	.28	-	<.001		Constant	.80	.33	-	.02	
Coping Frequency	.02	.005	.31	<.001	.10	Coping Frequency	.02	.006	.28	<.001	.08
Step 2						Step 2					
Constant	.40	.32	-	.21		Constant	.37	.35	-	.29	
Coping Frequency	.02	.005	.32	<.001		Coping Frequency	.02	.006	.26	<.001	
Asthma Severity	.14	.04	.26	<.001	.16	Race/Ethnicity	.24	.08	.23	.002	.13
$\Delta R^2 = .065$ for Step 2 ($p < .001$)						$\Delta R^2 = .052$ for Step 2 ($p = .002$)					
Step 3						Step 3					
Constant	.23	.33	-	.49		Constant	-.03	.38	-	.95	
Coping Frequency	.02	.005	.31	<.001		Coping Frequency	.02	.006	.27	<.001	
Asthma Severity	.13	.04	.23	.00		Race/Ethnicity	.21	.08	.20	.006	
Race/Ethnicity	.13	.07	.14	.05	.18	Asthma Severity	.10	.05	.17	.03	.16
$\Delta R^2 = .02$ for Step 3 ($p = .05$)						$\Delta R^2 = .03$ for Step 3 ($p = .03$)					
Model 1 Anova: $F(3,162) = 11.95, p < .001$						Model 2 Anova: $F(3,163) = 10.04, p < .001$					
Model 3: Asthma Symptoms QOL Subscale						Model 4: Activity Limitations QOL Subscale					
Variables	B	SE	Beta	P	R ²	Variables	B	SE	Beta	P	R ²
Step 1						Step 1					
Constant	1.00	.32	-	.002		Constant	1.54	.20	-	<.001	
Coping Frequency	.02	.006	.31	<.001	.09	Asthma Severity	.17	.05	.26	.001	.07
Step 2						Step 2					
Constant	.44	.37	-	.23		Constant	.71	.38	-	.06	
Coping Frequency	.03	.006	.31	<.001		Asthma Severity	.17	.05	.27	<.001	
Asthma Severity	.13	.05	.21	.005	.14	Coping Frequency	.02	.006	.19	.01	.11
$\Delta R^2 = .04$ for Step 2 ($p = .005$)						$\Delta R^2 = .036$ for Step 2 ($p = .01$)					
Model 3 Anova: $F(2, 163) = 12.95, p < .001$						Model 4 Anova: $F(2, 164) = 9.68, p < .001$					

Legend: B = Unstandardized coefficient; SE = Standard Error; Beta = Standardized coefficient; F = F statistic; P/p = significance; R^2 = regression statistic/ variance; Δ = change. Note: child's age, gender, family socioeconomic status, and asthma self-management were included in the analyses but were found to be non-significant in these regressions.

Table 4

Post Hoc Analyses

	Racial/Ethnic Group Differences						
	Non-Hispanic White		Hispanic		African American		p
	M	SD	M	SD	M	SD	
QOL Total Score	1.90	.65	2.31	.85	2.35	.91	5.33 (2,176) .006
QOL Activity Limitations	2.00	.85	2.37	.99	2.42	1.03	3.11 (2,177) .05
QOL Emotional Functioning	1.67	.68	2.17	.99	2.05	1.00	5.25 (2,177) .006
QOL Asthma Symptoms	2.02	.73	2.41	.95	2.55	1.00	4.72 (2,176) .01
Coping Frequency	2.02	.41	2.05	.44	2.11	.45	.72 (2,173) .49
Asthma Severity	3.84	1.25	4.40	1.56	4.13	1.62	2.38 (2,176) .09
	Child 6–8 years		Child 9–12 years				
QOL Total Score	2.38	.83	2.06	.80			7.12 (1,180) .008
QOL Activity Limitations	2.49	1.02	2.12	.93			6.43 (1,181) .01
QOL Emotional Functioning	2.14	.95	1.88	.89			3.62 (1,181) .06
QOL Asthma Symptoms	2.52	.93	2.18	.89			6.04 (1,180) .02

Legend: QOL = quality of life, M = mean, SD = standard deviation, F = F statistic, df = degrees of freedom, p = significance