



892 Obesity and Asthma Morbidity in an Inner City Community-Based Cohort: the Chicago Initiative to Raise Asthma Health Equity (CHIRAH)

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ABSTRACT

RATIONALE: Inner city minority populations experience increased rates of obesity and increased asthma prevalence and severity. Using the CHIRAH cohort, we sought to determine whether obesity, as measured by body mass index (BMI), was associated with asthma quality of life (AQOL) and morbidity.

METHODS: This is a cross-sectional analysis of 352 adult subjects (age 30.9±6.1, 77.8% females, FEV1%pred=87.0%±18.5) with self-reported asthma from a community-based Chicago cohort. Outcome variables included AQOL (Juniper Questionnaire) and health care utilization (hospitalizations or ED/urgent care visits) in the previous year. Bivariate tests were used as appropriate to assess the relationship between BMI or obesity status and asthma outcome variables. Multivariate regression analyses were performed, controlling for demographics, income, depression score, and beta-agonist use.

RESULTS: 191 (54.3%) subjects were obese (BMI≥30 kg/m²). Subjects with a higher BMI were older (p=0.008), African American (p<0.001), female (p=0.002), or from lower income households (p=0.002). BMI was inversely related to overall AQOL scores (r = -0.174, p=0.001) as well as to individual domains: symptoms (p=0.009), activity level (p=0.001), environmental stimuli (p=0.001), and emotional status (p=0.046). Multivariate regression revealed a lesser influence of BMI in AQOL (β = -0.015, p=0.019). Obese subjects were more likely to have visited ED/urgent care for asthma than non-obese subjects (OR=1.8, p=0.036). Number of hospitalizations was similar in these two groups.

CONCLUSIONS: In a community-based sample of asthmatic adults, obesity was related to worse asthma-specific quality of life and increased ED/urgent care utilization.

BACKGROUND

Inner city minority populations experience a greater degree of morbidity, mortality and prevalence of asthma. Such populations are also known to be more obese.

There is a known relationship between asthma and obesity:

- The relative risk of asthma in obese cohorts ranges from 1.0 to 3.0.
- Antecedent obesity is associated with an increased annual odds of a new diagnosis of asthma.
- Obesity, as measured by BMI, has been associated with worsened asthma quality of life and increased asthma severity.

AIM

This study examines the role of obesity, as measured by body mass index (BMI), in asthma quality of life (QoL) and asthma severity in a community-based sample of asthmatic adults.

METHODS

The study sample was derived from the CHIRAH study: Chicago Health Initiative to Raise Asthma Health Equity. Participants were identified through population proportionate sampling of Chicago public and Archdiocesan elementary schools.

Inclusion criteria:

- Self reported persistent, symptomatic asthma
- Asthma medication use for at least 8 weeks in the prior year

This was a cross-sectional analysis of 352 adult subjects, age 18-40.

At baseline, face-to-face interviews were carried out in a community setting.

- Height and weight were measured and used to calculate BMI
- Spirometry was performed pre- and post-bronchodilator
- Demographic and socioeconomic variables were gathered in a survey

Bivariate tests, including Chi square, t-tests and Pearson correlations, were used as appropriate to assess the relationship between BMI or obesity status (BMI≥30 kg/m²) and the following asthma outcome variables:

- Juniper Mini Asthma Quality of Life (QoL) Score
- Emergency Room/Urgent Care visits for asthma
- Hospitalizations for asthma

Multivariate regression analyses were then performed, controlling for age, race, gender, income, education, depression score and beta-agonist use.

RESULTS

Table 1: Demographic Characteristics of Sample

Variables	Non-Obese BMI < 30 n=161	Obese BMI ≥ 30 n=191	P value
Age, yr	30.0 ± 6.4	31.7 ± 5.7	0.01
Gender, Female	121 (75.2)	153 (80.1)	0.27
Race, African American	77 (47.8)	127 (66.5)	<0.001
Education			0.10
< High school	22 (13.7)	37 (19.4)	
High school/GED graduate	107 (66.5)	130 (68.1)	
College graduate	32 (19.9)	24 (12.6)	
Medical insurance			0.74
Medicaid	63 (39.4)	82 (42.9)	
Private insurance	76 (47.5)	83 (43.5)	
Self-pay	21 (13.1)	26 (13.6)	
HH Income, per yr			0.09
< \$15,000	38 (23.6)	61 (31.9)	
\$15,000 - \$30,000	45 (28.0)	45 (23.6)	
\$30,000 - \$50,000	25 (15.5)	39 (20.4)	
> \$50,000	53 (32.9)	46 (24.1)	
Duration of Asthma Diagnosis, yr	16.7 ± 9.9	18.9 ± 10.6	0.04
FEV1 mean % predicted pre-bronchodilator	88.2 ± 18.0	86.1 ± 18.8	0.31
Smoking History			0.25
Current Smoker	52 (32.5)	51 (26.8)	
> 100 cigarettes in lifetime	71 (44.4)	73 (38.4)	0.26
CES-D Depression Score	16.3 ± 11.4	15.3 ± 10.4	0.41

Data expressed in mean ± SD or No. (%)

RESULTS

Bivariate Analysis

Figure 1: BMI and Mean Juniper Mini Asthma QoL Score

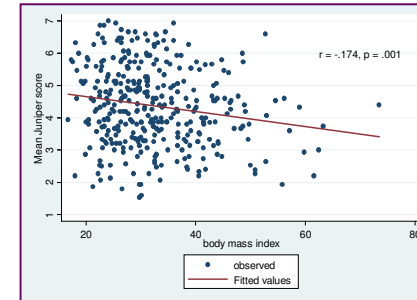
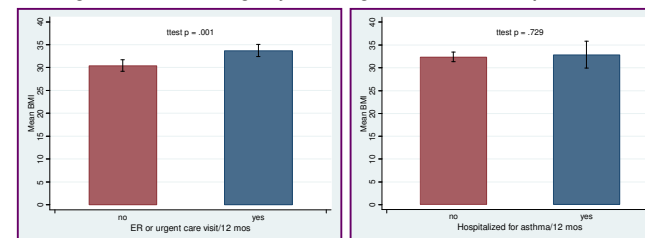


Table 2: BMI and Mean Juniper Mini Asthma QoL Subscale Scores

	r	p value
Symptoms	-.139	0.009
Activity Limitations	-.172	0.001
Emotional Function	-.106	0.046
Environmental Stimuli	-.169	0.001

Figure 2: BMI and Emergency Room/Urgent Care Visits & Hospitalizations



Multivariate Regression Analysis

Table 3- Outcome: Mean Juniper Mini Asthma QoL Score

	β Coefficient	p value
BMI (kg/m ²)	-0.015	0.019
Age (yr)	-0.008	0.434
Sex (female)	-0.254	0.069
Race (AA)	0.099	0.402
Education (college graduate)	0.671	0.003
Income (> \$50,000 per yr)	0.453	0.013
CES-D (total score, 1-20)	-0.036	<0.0001
Beta-agonist use (#days in last 2 weeks)	-0.080	<0.0001

CONCLUSIONS

In a community-based sample of asthmatic adults, subjects with a higher BMI were more likely to be older, African American, female or from lower income households (Table 1).

In this sample, obesity was related to worse asthma-specific quality of life and increased ED/urgent care utilization (Figures 1, 2).
 • BMI was inversely correlated to asthma QoL in all subsets (Table 2)
 • Obese patients were more likely to have visited the ER/urgent care in the last year than non-obese subjects

When co-variables of age, gender, race, education, income, depression and beta agonist use were controlled for, BMI played a minor role in affecting asthma quality of life (Table 3).

DISCUSSION

In this inner-city community based sample, obesity, as measured by BMI, had a minimal influence on asthma specific quality of life and asthma health care utilization.

Given that such a population has known disparities in asthma morbidity and mortality, obesity would be a modifiable risk factor to lower such disparities.

Future studies are needed to further investigate the relationship between obesity and asthma in this population. Differentiating between central obesity and overall obesity, analyzing leptin levels, and investigating genetics related to obesity and asthma may further clarify this relationship.

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