Asthma and Body Mass Index among Schoolchildren in a Developing Country

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Background

- Asthma is one of the most common chronic diseases among children worldwide.
- The burden of this disease extends beyond economic costs. Youth with asthma have a high rate of anxiety, depressive disorders and functional impairment.

Background

- Concurrent rise in asthma and obesity rates has prompted researchers to investigate associations between the two disorders.
- Several studies of varying study designs have been done in several countries.
- Studies have reported a positive association between asthma and obesity in children (with associations more pronounced in girls than in boys) while others have shown no association.

Background

- Few studies have investigated the temporal relationship – some have found BMI to be a risk factor for incident asthma (positive dose-response relationship).
- A recent meta-analysis of prospective cohort studies of obesity and incident asthma in adults found the association to be similar for men and women.
- Few prospective studies have demonstrated improvement in lung function for subjects who have lost weight.

Background

Plausible explanations include dietary, lifestyle, developmental, immunologic, genetic, and hormonal factors.

Objectives

1. Estimate the prevalence of asthma diagnosis, wheezing and wheezing severity among 13-14 years old in Lebanon.

2. To examine the association of BMI with asthma diagnosis, wheezing and wheezing severity.

Methods

- The present study was cross-sectional in design.
- A random sample of fifty-five private and public schools from different regions in Lebanon were contacted in spring 2005 to take part in this study.

Methods

A convenient sample of 13 schools (3 public and 10 private) from five Lebanese provinces accepted to take part in the study.

- Beirut: 3
- Beirut Suburbs: 5
- Beka': 2
- South: 2
- North: 1

Methods

- Study approved by IRB, Ministry of Education and the administrations of schools.
- The study was conducted using the ISAAC procedures and questionnaires: (i) a core questionnaire, (ii) an environmental questionnaire, and (iii) a video questionnaire.
- The ISAAC Arabic version questionnaire was administered.

Methods

- 7th and 8th grade classes, with 13-14 years old students, were visited and asked to participate in the study.
- Two trained research assistants were available to answer questions and guide the video questionnaire in accordance to ISAAC procedure.

Methods

Dependent variables

Asthma and wheezing:

- Ever having been diagnosed with asthma
- wheezing in past year

Severity of wheezing:

- Speech-limiting wheeze past year
- Woken by wheeze past year

Methods

Main independent variable

BMI (CDC categorization for children and teens):

- Underweight
- Healthy weight
- At risk of overweight
- Overweight.

Methods

Other independent variables

- Sex
- Class
- Geographic area of residence
- Type of school
- Passive smoking
- Environmental pollution *(do busses and trucks pass by your house during the 5 working days- never, rarely, frequently versus all day long).*

Methods

- Chi square tests were performed to assess difference in BMI categories, asthma diagnosis, wheezing and wheezing severity among males / females.

- Logistic regression analyses were performed separately for males / females.

Results

- Total of 3153 students were selected for the present study.
- 2146 (68%) had complete information for the outcome variables, age, height, weight and sex and thus considered for analyses.

Results

Table 1- Characteristics of study participants

		%
Sex	Males	51
	Females	49
School	Public	43
	Private	57
Classes	7th grade	48
	8th grade	52

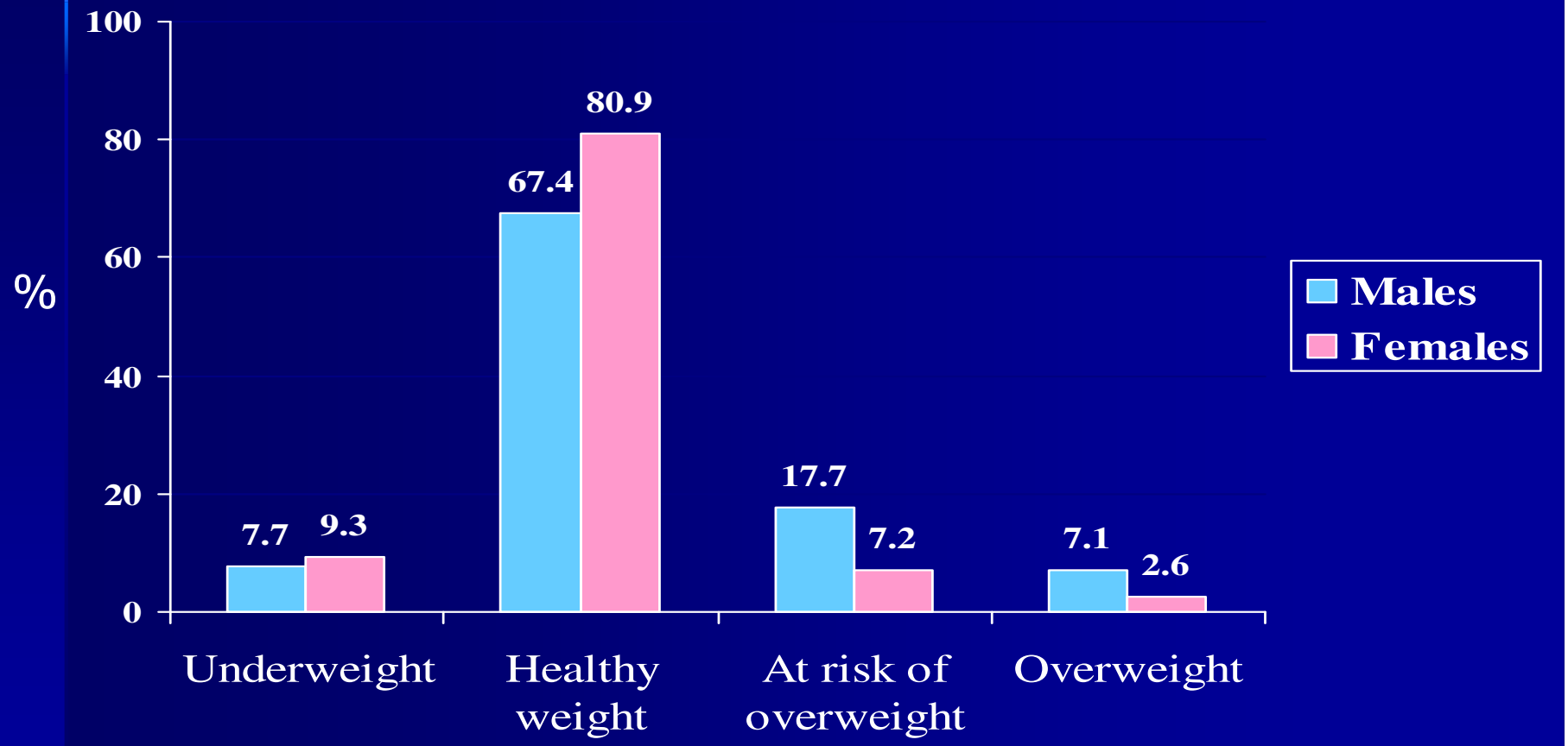
Results

Table 1- Characteristics of study participants (Cont.)

		%
Geographic area of residence	Beirut	19
	Beirut suburbs	32
	Bekaa	24
	South	14
	North	10
Passive smoking	Yes	70
	No	30
Environmental pollution *do busses and trucks pass by your house during the 5 working days*	Never / rarely	41
	Frequently	33
	All day long	21

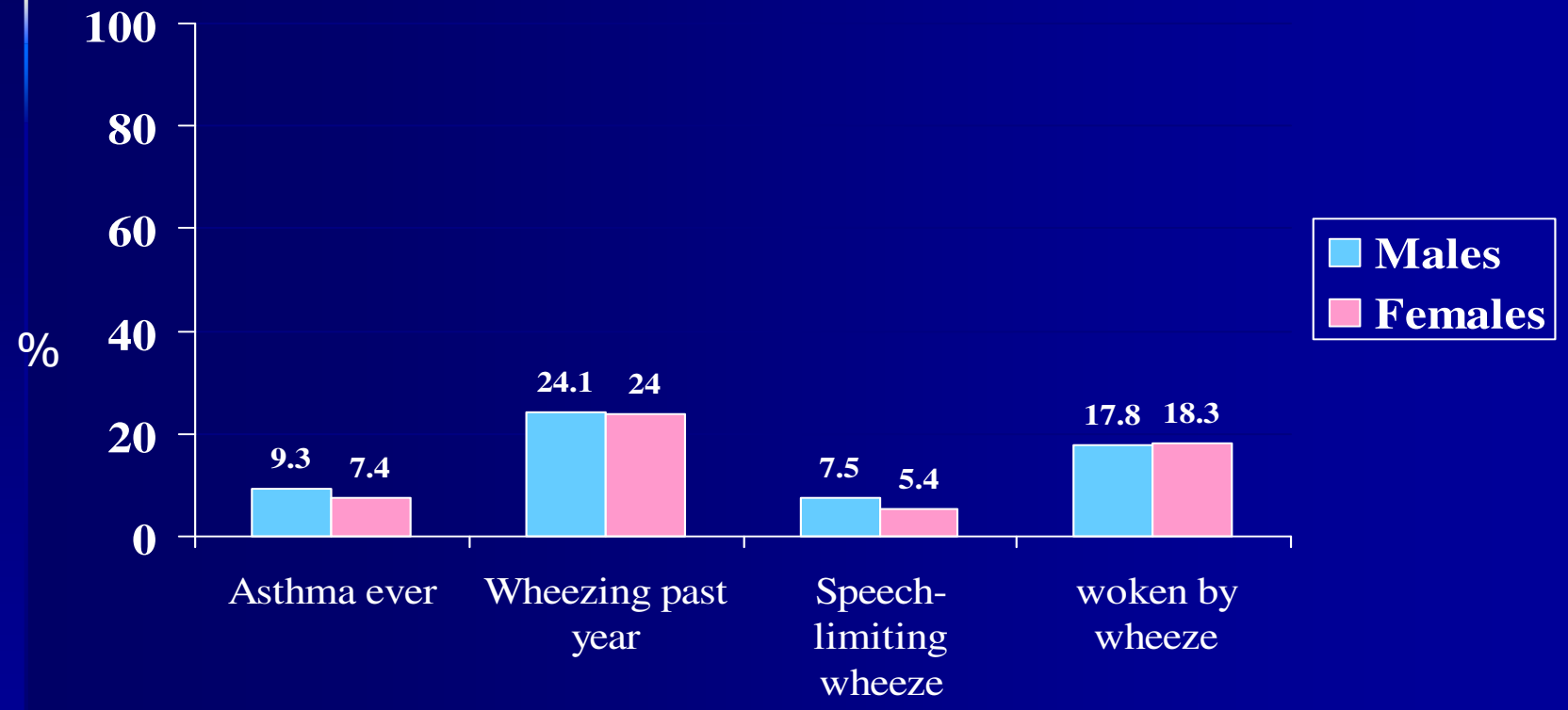
Results

Figure 1- Distribution of BMI by sex



Results

Figure 2- distribution of asthma and wheezing by sex



Results

Logistic regression – Asthma ever

	Males OR (95% CI)	Females OR (95% CI)
Underweight	1	1
Healthy weight	2.2 (0.8-6.2)	1.2 (0.5-3.2)
At risk of overweight	1.2 (0.4-4.1)	1.1 (0.3-4.1)
Overweight	2.3 (0.6-7.9)	0.6 (0.1-5.5)

Adjusting for class, geographic area of residence, type of school, passive smoking and environmental pollution

Results

Logistic regression – Wheezing past year

	Males OR (95% CI)	Females OR (95% CI)
Underweight	1	1
Healthy weight	2.4 (1.2-4.9)	1.0 (0.6-1.7)
At risk of overweight	2.6 (1.2-5.6)	0.9 (0.4-1.8)
Overweight	4.0 (1.7-9.1)	1.4 (0.5-3.6)

Adjusting for class, geographic area of residence, type of school, passive smoking and environmental pollution

Results

Logistic regression – Speech limiting wheeze last year

	Males OR (95% CI)	Females OR (95% CI)
Underweight	1	1
Healthy weight	1.6 (0.5-5.5)	0.8 (0.3-2.1)
At risk of overweight	2.1 (0.6-7.5)	0.8 (0.2-3.0)
Overweight	4.7 (1.2-17.4)	2.9 (0.7-11.7)

Adjusting for class, geographic area of residence, type of school, passive smoking and environmental pollution

Results

Logistic regression – Woken by Wheeze last year

	Males OR (95% CI)	Females OR (95% CI)
Underweight	1	1
Healthy weight	2.0 (1.0-4.2)	0.9 (0.5-3.8)
At risk of overweight	2.0 (0.9-4.5)	0.8 (0.4-2.0)
Overweight	3.8 (1.6-9.1)	1.4 (0.5-3.8)

Adjusting for class, geographic area of residence, type of school, passive smoking and environmental pollution

Discussion

- Although the prevalence of ever having asthma was only 8%, the prevalence of asthma symptoms was on the high range of international prevalence.
- No significant association was noted between BMI and asthma. However, results suggest an association between BMI and wheezing / wheezing severity (specifically for males).

Discussion

Limitations

- Inability of selecting a random sample of schools from all the Lebanese provinces.
- Information was available for only 68% of the sample.
- Cross-sectional study design / reverse causality.
- Information bias.

Discussion

Strengths

- Large sample size (separate analysis for males / females).
- Considered children from all over Lebanon.
- Used ISAAC questionnaires.

Discussion

Recommendations

- More efforts are needed not to leave cases of asthma undiagnosed.
- Preventative interventions addressing asthma and weight gain may be worthwhile in developing countries.
- Prospective epidemiological studies are needed in these regions to explore the association between BMI and asthma, and to assess gender differences.

Acknowledgement

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Thank you