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A Study of Association of Body Mass Index with Severity of Bronchial Asthma

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ABSTRACT

n	Background: Asthma is estimated to affect 5%–10% of people in various societies. Atopy is caused by a combination of genetic and environmental variables, the most important of which is a family history of the disease. High and low birth weights, preterm birth, smoking mothers, salty diet, and obesity are all risk factors.
-2022	Patients and Methods: This is an observational study conducted from November 2018
-2022	to December 2019, at a 750 bed Multi-Specialty Teaching Hospital. In total, 175 bronchial asthma patients in the age group 18–60 years with high BMI coming to the outpatient department were included in the study. Patients were divided into five categories of bronchial asthma by severity. History was taken from all patients, and baseline investigations including complete blood count, chest X-ray, ECG, and spirometry were performed.
22.133480.1449	Results: In this study of 175 subjects, 100 [57%] were females and 75 [43%] were males. Symptom-wise distribution breathlessness was dominated by 120 [68,57%].
hor	wheezing and night wheezing accounts for 25 [18.29%] and 15 [8.57%] each had
)gmail.com	cough and previous hospitalization. FEV1% distribution was dominated with mild accounting for 68.57%, followed by moderate 17.14%, moderately severe 5.71%,
G, Poovitha M, of Association of with Severity of IJMA 2022 May; 4	severe 8.57% and very severe 5.71%. The presence of history based on various BMI levels did not show any statistically significant correlation. The mean value of FEV1% is calculated based on BMI variations. It shows statistically significant [p <0.05].
1: 10.21608/IJMA.	Conclusion: Association of body mass index with relation to the morbidity of the patients though few patients had symptoms it did not conclude to be statistically significant. Concerning the severity as with high BMI, the severity of asthma was high, which was statistically significant.

Keywords: Asthma; Obesity; Body Mass Index.



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INTRODUCTION

Asthma is a prevalent and possibly lifethreatening chronic condition that places a significant financial and social burden on individuals, their families and society. It produces respiratory symptoms, activity limitations, and flareups [attacks] that occasionally need immediate medical attention and can be deadly. In India, asthma and obesity are serious public health issues. Both of these disorders are more common lately. These circumstances have been linked in a number of works of literature. Obesity is a major contributor to asthma, according to several recent researches, and it also explains the considerable link between BMI and asthma development. Weight gain has even been shown in certain trials to trigger asthma symptoms, whereas weight loss reduces symptoms. The incidence of this condition has been estimated to be between 5% and 10% in various societies ^[1].

Atopy is caused by a combination of genetic and environmental variables, the most important of which is a family history of the disease. High and low birth weights, early birth, smoking mothers, salty diet, and obesity are all risk factors ^[1].

Obesity is a key risk factor for asthma in children and adults, as well as a disease modifier. Obesity is characterized by a BMI threshold; current research suggests that BMI z-scores, particularly among children and adolescents with extreme obesity, is misleading ^[2–4].

Obesity is defined as a BMI of 30 kg/m2 or higher in adults, yet a single BMI might indicate dramatically different physiology and metabolic health. While serum interleukin [IL-6] [a marker of metabolic health produced by macrophages in adipose tissue] is a marker of asthma severity, some individuals with BMIs in the non-obese range have elevated IL-6. Sideleva *et al.* ^[5] found that adipose tissue inflammation is increased in obese individuals with asthma compared to obese controls ^[6].

THE AIM OF THE STUDY

In obese people, metabolic dysfunction is more significant than fat accumulation. However, most asthma studies have conflated BMI with metabolic dysfunction caused by obesity. In this study, we looked at the morbidity of bronchial asthma patients concerning BMI, as well as the influence of BMI on the severity of bronchial asthma.

PATIENTS AND METHODS

This is an observational research that was undertaken on patients with asthma who visited Sri Venkateshwaraa Medical College Hospital and Research Centre, Ariyur, Puducherry, medicine and pulmonology OPD. The current study was conducted from November 2018 to December 2019 at Sri Venkateshwaraa Medical College Hospital and Research Center's 750-bed Multi-Specialty Teaching Hospital. This research comprised a total of 175 patients.

All bronchial asthma patients in the 18–60-yearold age range with a high BMI who come to the outpatient department and are prepared to offer written informed permission are eligible.

Exclusion criteria included patients who were unwilling to participate in the research, were under the age of 18 and had concomitant diseases such as ischemic heart disease and congestive cardiac failure.

Data collection tools and procedure: History to be taken from the patients, baseline investigations including complete blood count, chest X-ray, EC and spirometry. Patients to be divided into five categories of bronchial asthma by severity based on studies conducted by Pellegrino *et al.* ^[7] published in European Respiratory journal and adapted by ATS [American thoracic society].

Degree of severity	FEV1 % [predicted]
Mild	> 70
Moderate	60–69
Moderately severe	50–59
Severe	35–49
Very Severe	< 35

To calculate Body mass index according to Quetelet index by the formula BMI= weight [in kg] / height [in m²]

Classification BMI [Kg/m2]

- <18.5 underweight
- 18.5 to 22.9 Normal
- >23 Overweight
- 23 to 24.9 at risk
- 25 to 29.9 obese
- >30 morbidly obese

According to the data obtained, the relationship between body mass index and severity of bronchial asthma was analyzed for significance.

Statistical analysis:

Categorical variables were expressed as frequency and percentage and continuous variables were expressed as mean and standard deviation. Association between categorical variables was analyzed by Chi-square test. A p value <0.05 was considered as statistically significant. Data analysis was performed using SPSS ver 22.0.

RESULTS

In this study of 175 subjects, 100 [57%] were females and 75[43%] were males. Out of 175 subjects, age variations from 18–60 years were included in the study in which age between 41–50 years were more with 37.71% and 51–60 years were 25.71%, 31–40 years [24.58%] and 18–30 years were 12%.

In this study of 175 subjects, we have included subjects with BMI from 23 to 40. Among the study subject's distribution of BMI, 73.14% were with 25–30, followed by 17.72% with 23–24.9 and less than 10% were with 30–40.

 Table [1]: Age and Gender wise distribution of study population

AGE [IN YEARS]	GENDER		[%]
	MALE	FEMALE	
18–30	06	15	12
31–40	27	16	24.58
41–50	20	46	37.71
51–60	22	23	25.71
Total	75	100	100

 Table [2]: Body mass index distribution of the study population

BMI [Kg/m ²]	No. of patients	Percentage
23–24.9	31	17.72
25–30	128	73.14
30.1–35	09	5.14
35.1–40	07	4.0
Total	175	100%

Table [3]: FEV1% wise distribution

FEV1%	No. of patients	Percentage
Mild [>70]	120	68.57
Moderate [60–69]	20	11.42
Moderately severe [50–59]	10	5.71
Severe [35–49]	15	8.57
Very severe [<35]	10	5.71
Total	175	100%

Table [4]: BMI vs. FEV1%					
BMI	FEV1%	p value			
23–24.9	87.85±2.97	< 0.00179			
25–30	58.66±1.79	< 0.00248			
30.1–35	41.2±0.97	<0.00114			
35.1–40	30.7±0.49	< 0.0043			

P value <0.05 [Statistically significant]

DISCUSSION

Asthma and obesity are common illnesses with severe public health consequences, and a growing body of evidence implies a link between the two. There are several studies that discuss the association between asthma severity and obesity prevalence, but there are few and limited data on the relationship between asthma severity and obesity, which was the study's goal.

In this study of 175 subjects, 100 [57%] were females and 75[43%] were males. As older literature says it is more common in females in the adult onset, hence, our study is dominated by the female population. Similarly, in a study by Taylor *et al.* ^[8] 983 were male and 2112 were females. In various studies related to asthma female dominated the study subjects compared to male.

In this study of 175 subjects, age variations from 18–60 years were included in the study in which age between 41–50 years were more with 37.71% and 51–60 years were 25.71%. From the data, we assume that late-onset asthma was more among our study group. A similar study by Taylor *et al.* ^[8] was with 18–24 years [363 patients], 25–44 years [1182 patients] and 45–64 years [1157 patients].

In this study of 175 subjects, we have included subjects with BMI from 23 to 40. Among the study subject's distribution of BMI, 73.14% were with 25-30, followed by 17.72% with 23-24.9 and less than 10% were with 30-40. A similar study by Nystad et al. ^[9] shows that Overweight [body mass index: 25– 29] men and women had relative asthma risks of 1.27 [95 percent confidence interval [CI]: 1.13, 1.43] and 1.30 [95 percent CI:1.17, 1.45], respectively, as compared to people with a BMI of less than 25 [weight [kg]/height [m]2]. Numerous articles which describe about the association of Asthma and obesity that has similar observation are, E. Rand Sutherland et al. [10] in his studies of carefully pheno-typed prevalent asthma, effect of body mass index and disease status appears modest.

In this study of 175 subjects, duration of asthma was more interesting fact was subjects with <5 years were 50 [28.57%], 6–10 years were 80 [45.71%], 11–15 years were 28 [16%], and more than 15 years were 17 [9.71%]. A similar study by Nystad *et al.* ^[9] shows that the duration of asthma 15-year total of 135,405 persons.

In this study of 175 subjects, it was surprising fact that less than 50% of the subjects were using long-term inhalers and more than 50% did not use inhalers in the treatment schedule.

In this study of 175 subjects, symptom wise distribution breathlessness was dominated by 120 [68.57%], wheezing and night wheezing accounts to 25 [18.29%] and 15 [8.57%] each had cough and previous hospitalization.

In this study of 175 subjects, FEV1% distribution was dominated with mild accounting for 68.57%, followed by moderate 17.14%, moderately severe 5.71%, severe 8.57% and very severe 5.71%.

In this study, we calculated the various BMI levels. It does not show any statistically significant correlation. The mean value of FEV1% is calculated based on BMI variations. It shows statistically significant [p < 0.05].

Limitation does not apply to all epidemiologic studies of the obesity asthma relationship, however, in those that used measured rather than self- reported height and weight to define BMI ^[11–13], there was still a significant association between elevated BMI and asthma. Perhaps more limiting factor concerning the generalizability of many of these studies is the use of a self-reported physician's diagnosis of asthma, rather than formal physiologic evaluation to determine cases, particularly because respiratory symptoms classified as asthma could be dyspnea, due to obesity-related physiologic impairment rather than true asthma ^[14, 15].

Conclusions:

Association of body mass index with relation to the morbidity of the patients, though few patients had symptoms, did not conclude to be statistically significant. Concerning the severity as with high BMI, the severity of asthma was high, this was statistically significant.

Source[s] of support:

NIL

Conflicting Interest:

NIL

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