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STUDY ON CLINCIAL ASSOCIATION OF BODY MASS INDEX WITH SEVERE BRONCHIAL ASTHMA IN WOMEN

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Abstract

Background and Aim: Obesity and asthma have become more common in the general population, particularly among women, all over the world. Numerous research has been carried out on association of asthma with body mass index in general. The present study aimed to assess the clinical association of body mass index with severe bronchial asthma in women.

Patients and Methods: This prospective study was conducted on 486 severe bronchial asthma women in the Department of Community Medicine, Lahore General Hospital, Lahore Pakistan from March 2022 to March 2023. All the women with an age range 18-50 years diagnosed of acute bronchial asthma were included. Based on BMI, subjects were divided into three categories: (i) Normal weight (<25 Kg/m2), (ii) Overweight (26-30 Kg/m2), and (iii) Obese (>30 Kg/m2). Respiratory symptoms, medication use, and healthcare utilization were different parameters of severity of asthma measured and recorded.

Results: The overall mean age of enrolled women was 42.14± 7.62 years. Of the total 486 women, the incidence of normal, overweight, and obese patients was 33.7% (n=164), 30.9% (n=150), and 35.4% (n=172) respectively. A significantly positive association is observed between asthma duration and BMI which indicates that chronic asthma women are more prone to gain weight. The incidence of mild, moderate, and severe asthma was 64.2% (312), 28% (n=136), and 7.8% (n=38) respectively.

Conclusion: The present study found that obesity is a risk factor for acquiring weight in asthmatic females. BMI rises with duration of asthma result in increased in asthma symptoms and severity. Patients with a high BMI are more likely to have co-morbid disorders.

Keywords: Severe bronchial asthma, Body mass index, Obesity

INTRODUCTION

Asthma is a chronic respiratory condition characterized by reversible or treatable airway blockage, increased bronchial reactivity, and persistent respiratory tract inflammation [1]. Asthma prevalence is growing worldwide [2]. Asthma is the most common chronic respiratory condition, affecting 358 million people [3]. Asthma incidence has also grown in Pakistan, placing a significant economic burden on people and society [4]. However, the cause of the current increase in asthma prevalence is unknown [5]. Obesity and overweight are the fifth and sixth main causes of mortality worldwide. According to the WHO, overweight and obesity cause around 2.8 million adult deaths per year [6]. Obesity is on the rise and has become a global pandemic, with more than 35% of persons classified as obese or overweight [7]. Obesity and overweight have skyrocketed in recent decades, becoming a public health issue in both developing and industrialized countries [8]. Although the actual incidence of obesity among females in Pakistan is unknown, a recent study done in Peshawar concluded that obesity among women is a severe health problem in the region, and that the degree of obesity in Pakistan is growing at varied rates over time [9]. Globally, a dramatic increase has been reported in the incidence of obesity among asthmatic population. Numerous studies reported that the majority of women gain weight after the diagnosis of asthma [10, 11]. Asthma-related decreases in physical activity do not appear to explain the connection [12]. It is generally known that boys have a higher frequency of asthma than girls [13].

Women have more severe asthma than males, have greater dyspnea, and have higher bronchial hyperresponsiveness (BHR), all of which are poorly understood correlations. Obesity may have a direct impact on the asthma phenotype through mechanical factors such as vulnerability to methacholine and increase resistance to airway [14]. As a result, dyspnea, BMI, BHR, and lung function are various factors that affect the patterns of asthma related sex-oriented. A previous study reported a positive association between severity of asthma and BMI among women [15]. Weight reduction has been shown to improve asthma control and severity, primarily through medication [16]. Diet and exercise-induced weight loss has been shown to alleviate asthma symptoms, reduce peak expiratory flow fluctuation, and enhance spirometric values. Numerous studies has been conducted on correlation of BMI with chronic asthma in general, but very limited investigated focused on their association in women. Therefore, the present study aimed to assess the clinical association of body mass index with severe bronchial asthma.

METHODOLOGY

This prospective study was conducted on 486 severe bronchial asthma women in the Department of Community Medicine, Lahore General Hospital, Lahore Pakistan from March 2022 to March 2023. All the women with an age range 18-50 years diagnosed of acute bronchial asthma were included. All the subjects were divided into three categories: (i) Normal weight (<25 Kg/m2), (ii) Overweight (26-30 Kg/m2), and (iii) Obese (>30 Kg/m2). Respiratory symptoms, medication use, and healthcare utilization were different parameters of severity of asthma measured and recorded. Patients with previous history of cardiac and respiratory issues such as ischemic heart disease, carcinomas, and chronic obstructive pulmonary disease were excluded. During the research period, data on socio-demographics, asthma features, asthma medicines, and the frequency of hospital visits were recorded. Furthermore, the following asthma severity levels were considered in this study: The following categories were evaluated: [1] mild persistent, [2] moderate persistent, and [3] severe persistent.

Descriptive statistics were done in SPSS version 27. Categorical variables were expressed as frequency and percentages whereas continuous variables were described as mean and standard deviation. Group comparison was made using Student t-test. Logistic regression analysis was used for the association of obesity and asthma. Pearson's correlation was used for the association of BMI with asthma related factors. All the descriptive statistics was done taking 95% confidence interval and statistically significant 0.05.

RESULTS

The overall mean age of enrolled women was 42.14± 7.62 years. Of the total 486 women, the incidence of normal, overweight, and obese patients was 33.7% (n=164), 30.9% (n=150), and 35.4% (n=172) respectively. A significantly positive association is observed between asthma duration and BMI which indicates that chronic asthma women are more prone to gain weight. The incidence of mild, moderate, and severe asthma was 64.2% (312), 28% (n=136), and 7.8% (n=38) respectively. Distribution of patients based on their body mass index are illustrated in Figure-1. Table 1 shows the demographic characteristics of the patients. Severity of asthma is depicted in Figure-2. Pearson correlation of asthma with various factors related to body mass index are shown in Table-II. Asthma outcome's comparison with overweight and obese patients are shown in Table-III.

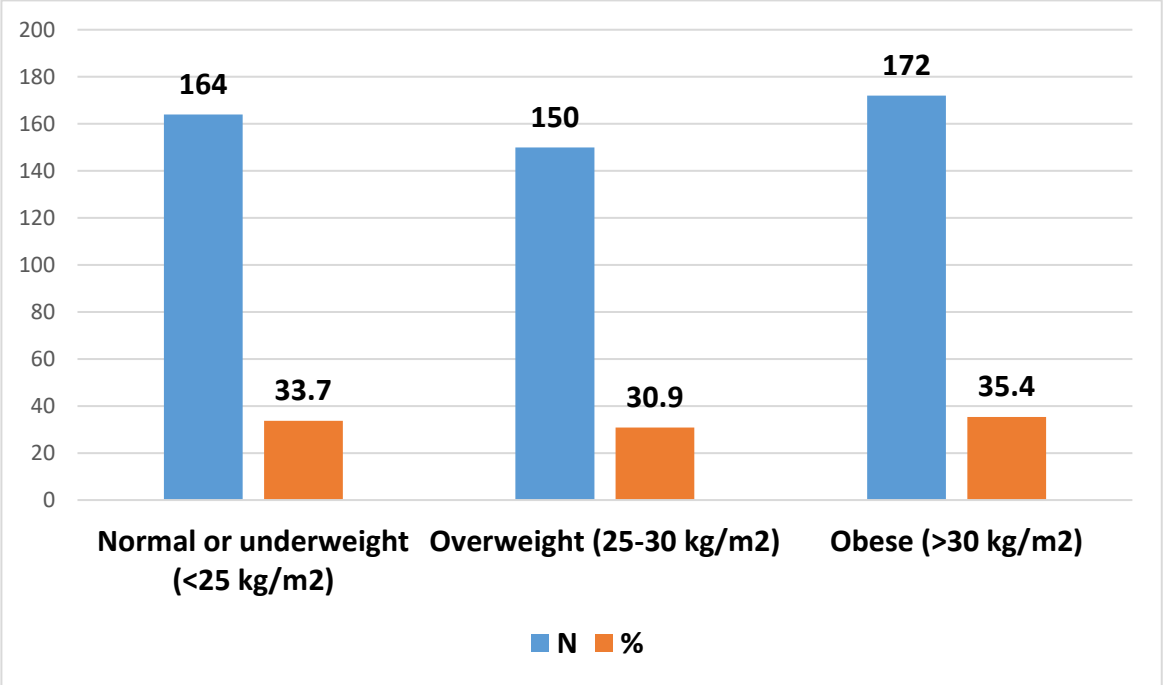

Figure-1 Patients distribution based on BMI (kg/m2)

Table-I demographic characteristics of the patients

Variables	Normal Weight (N=164) N (%)	Overweight (N=150) N (%)	Obese (N=172) N (%)	P-value
Age groups (years)				<0.01
19-30	74 (45.1)	62 (41.4)	31 (18.0)	
31-40	38 (23.2)	26 (17.3)	72 (41.9)	
41-50	32 (19.5)	35 (23.3)	58 (33.7)	
>50	20 (12.2)	27 (18.0)	11 (6.4)	
Education				0.01
Literate	128 (78.0)	108 (72.0)	114 (66.3)	
Illiterate	36 (22.0)	42 (28.0)	58 (33.7)	
Smoking status				<0.01
Current	62 (37.8)	48 (32.0)	50 (29.1)	
Ex-smoker	38 (23.2)	58 (38.7)	44 (25.6)	
Never	64 (39.0)	44 (29.3)	78 (45.3)	
Employment				0.10
Yes	112 (68.3)	92 (61.3)	96 (55.8)	
No	52 (31.7)	58 (38.7)	76 (44.2)	
Family history of asthma				0.89
Yes	60 (36.6)	52 (34.7)	56 (32.6)	
No	104 (63.4)	98 (63.3)	116 (67.8)	

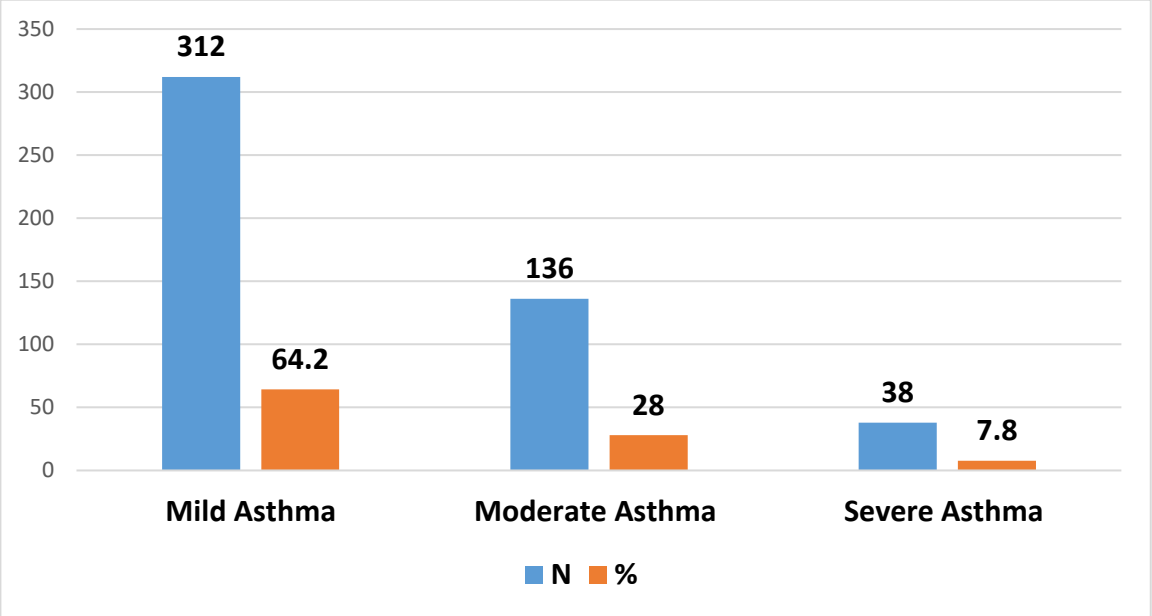

Figure-2 Severity of asthma

Table-II Pearson correlation of asthma with various factors related to body mass index

Variables	Pearson's correlation (r)	P-value	Correlation types
BMI*Asthma duration	0.49	0.57	Strong
BMI*comorbidities	0.11	0.19	Moderate
BMI*lifestyle	-0.21	0.25	Moderate
BMI*Activity limitation	0.22	0.17	Moderate

Table-III Asthma outcome's comparison with overweight and obese patients

Factors	Odd ratio (OR95%CI)	Adjusted OR (95%CI)	P-value
Moderate-severe asthma	3.2 (1.49-7.58)	3.1 (141-7.49)	0.005
Hospital visits>2	1.12 (1.05-1.15)	2.48 (1.21-5.24)	0.011

DISCUSSION

The present study mainly focused on the severe bronchial asthma with increasing weight and obesity among women and found that obesity worsens asthma complications. Moreover, obesity is a risk factor for acquiring weight in asthmatic females. BMI rises with duration of asthma result in increased in asthma symptoms and severity. Patients with a high BMI are more likely to have co-morbid disorders. Asthma is a deteriorating illness combined with obesity causes that causes a slew of health issues. Previous research has found a link between the two disorders. In this study, we discovered a clear positive relationship between BMI and asthma duration, as patients reported weight gain. Obesity and asthma are both frequent disorders and major public health consequences, according to Orfanos. et al. research [17]. Furthermore, obesity appears to be exacerbating asthma. Both disorders may have common environmental and genetic origins.

Many epidemiologic studies have found a significant rise in both obesity and asthma, and both cross-sectional and longitudinal research have sought to establish a relationship between these two chronic diseases [18-20]. Obesity was substantially more prevalent in asthmatic women in the emergency department than in the overall population [21]. The variation in published investigations are may be due to a variety of variables, including limited sample numbers, varying asthma definitions, and varying asthma severity results.

So far, only a few studies have found a relationship between elevated asthma severity and obesity among women [22, 23]. Bantulà et al [24], for example, found that persons with moderate to severe persistent asthma were found in a majority of obese than mild intermittent asthma. Similarly, Wong

et. al colleagues found that overweight and obese patients are more prone to chronic asthma and vice versa [25].

Obesity exacerbates asthma complications, and there is a relationship between obesity and asthma. As the duration of asthma grows, so does the BMI, resulting in worsening symptoms, activity constraints, and a deterioration in lifestyle. Numerous findings prompted us to investigate the possibility of sex confounding in the obesity-PEF result. We verified, as previously reported in another group of ED patients [26], that women were nearly twice as prevalent as males among ED patients with acute asthma, and that women presented with a greater initial proportion of predicted PEF. In a previous study, we discovered that women were more likely than males to report severe asthma symptoms and activity limits at identical levels of airway blockage [27].

CONCLUSION

The present study found that obesity is a risk factor for acquiring weight in asthmatic females. BMI rises with duration of asthma result in increased in asthma symptoms and severity. Patients with a high BMI are more likely to have co-morbid disorders.

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