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A Study of Prevalence of Obesity in Patients of Bronchial Asthma Attending The Chest Department At Rims,Imphal,Manipur.India.

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Abstract:
Objective: *To study the prevalence rate of obesity in patients of bronchial asthma attending the chest department at Regional Institute of Medical Sciences,Imphal,Manipur.India.*
Methods: *In a cross-sectional study, I recruited patients with age more than 18 years and older with confirmed bronchial asthma diagnosis at Respiratory Medicine department,RIMS,Imphal,Manipur.Nutritional status was classified by body mass index (BMI).*
Result: *150 patients were included in this study.Mean age was 35 ± 1.24 years and there were 82 (54.7 %) female patients. Among female,asthma was more common in housewife (30.7 %).Mean BMI was 26.87 ± 4.18 and 60 (40.00 %) were classified as normal weight,49 patients (32.67 %) as overweight and 41 patients (27.33 %) as obesity.*
Conclusion*: The prevalence rate of obesity in this study was 27.33 %.Female asthma patients were more likely to be obese than male asthma patients.*
Keywords*: Obesity,Body Mass Index.*

I. Introduction

Asthma is one of the most common chronic diseases globally and currently affects approximately 300 million individuals. According to National Family Health Survey – 2 (NFHS-2) report, the estimated prevalence of asthma in India is 2468 per 1,00,000 population. The prevalence among male was slightly higher than among females. Many factors contribute to the risk of developing asthma that include family history of atopic disorders, diet, indoor and outdoor allergens, viral infections, infant feeding habits, passive smoking, obesity and exposure to environmental dusts. This study was conducted to find out the relationship between obesity and asthma as certain mediators such as leptins which are raised in obese patients, may affect airway function and increase the likelihood of asthma development [7] and hypercholesterolemia is also a potential risk factor for asthma independent of obesity. Also, obesity alone is found to be an important risk factor for asthma, particularly in women and asthmatic patients show an atherogenic lipid profile which could also increase the risk of cardiovascular disease.

Obesity is defined as a state of excess adipose tissue mass. The most widely used method to gauge obesity is the Body Mass Index (BMI) which is equal to weight/height^2 (in kg/m^2).

Table A: Body mass index and its references

Body mass index (kg/m^2)	References
<18.5	Underweight
20-24.9	Healthy
25-29.9	Overweight
30-34.9	Obese
35-39.9	Severely obese
>40	Extreme obesity

Most prospective studies show that obesity is a risk factor for asthma and have found a positive correlation between baseline body mass index and the subsequent development of asthma. Furthermore, several studies suggest that whereas weight gain increases the risk of asthma, weight loss improves the course of the illness. Different factors could explain this association. Obesity is capable of reducing pulmonary compliance, lung volumes, and the diameter of peripheral respiratory airways as well as affecting the volume of blood in the lungs and the ventilation-perfusion relationship. Furthermore, the increase in the normal functioning of adipose tissue in obese subjects leads to a systemic proinflammatory state, which produces a rise in the serum concentrations of several cytokines, the soluble fractions of their receptors, and chemokines.[10]

II. Aims And Objects

The aim of this study is to find out the prevalence rate of Obesity in patients of Bronchial Asthma attending the Respiratory Medicine Department at RIMS, Imphal.

III. Materials And Methods

It is a cross-sectional study conducted in the Department of Respiratory Medicine, Regional Institute of Medical Sciences, Imphal, Manipur for a period of two years from October 2013 to September 2015.Inclusion criteria: Male and female patients of more than 18 years of age with symptoms of breathlessness, wheeze, cough and chest tightness in whom there is more than 12% or more and 200 ml increase in Forced Expiratory Volume in 1 minute (FEV1), 15 min after an inhaled short – acting β2 – agonist is diagnosed as a case of asthma and was included in the study.

Exclusion criteria: Patients with co-morbid conditions such as hypertension, diabetes mellitus, hypercholesterolemia, coronary artery disease and alcoholic liver disease and uncooperative patients. Sample size and sampling: Taking prevalence rate of 6.7% [16] sample size was calculated as Sample size= $z^2 \times pg/e^2$ $=3.9x6.7x93.3/4^2$ =153 where z = 1.96, p =percentage, g= (100-p), e = standard error. In this study, a sample of 150 asthma patients attending Department of Respiratory Medicine, R.I.M.S. Imphal, Manipur was included by consecutive sampling.

Study variables were age, sex, religion, occupation, address, weight, height, BMI, marital status, duration of asthma.Study tools: 1. Spirometer: Model- RMS Helios 701. Serial number: HELS/112254/401. Manufacturer: Recorders & Medicare Systems. 2. Others: Nebulizer (HANDYNEB, Nulife Global Medical Devices Pvt. Ltd. India), Nebulisation mask, salbutamol 2.5mg respules, Weighing machine (Crown Ramon Surgical Co. India), Measuring scale in centimetre/metre. Written informed consent was taken from each participant before the start of the study.

Those patients who were willing and volunteered to participate in this study were subjected to thorough general physical and clinical examinations. Detailed histories regarding the nature of symptoms like breathlessness, cough, sputum production, wheeze, chest tightness, etc. were obtained. History of allergy, history of smoking, history of alcoholism and history of previous similar illness were also noted. Height, weight and the vital signs including blood pressure, pulse rate and temperature were measured. Chest x-ray and ECG were taken. Clinical examination of the respiratory system was carried out. Laboratory tests: 1. Routine blood tests were done.

2. Measurement of obesity: By using the body mass index (BMI) according to World Health Organisation (WHO) criteria, the nutritional status of the patients were calculated as BMI=weight (in Kg)/height^2 (in metre) Analysis: Analysis was done with IBM SPSS Version 16. Descriptive statistics like mean and percentages were used. Chi-square test was used for analysis. Probability of p-value <0.05 was taken as significant. Ethical issue: The study was conducted with due approval of the Institutional Ethics Committee. Written informed consent was taken from the individual participants.

IV. Results And Observation

The results of this study are as follows:

Table 1: Age distribution of the respondents

Age in years	**Number**	**Percentage**
0-10	0	0
11-20	11	7.3
21-30	45	30.0
31-40	46	30.7
41-50	30	20.0
51-60	14	9.3
>60	4	2.7
Total	**150**	**100.0**
Mean ±SD	35±1.24	

Majority of the asthma patients aged 31years to 40 years which accounted for 60.7%. Mean age was 35 years with a standard deviation of 1.24 years.

Table 2: Sex distribution of the respondents

Sex	**Number**	**Percentage**
Male	68	45.3
Female	82	54.7
Total	**150**	**100.0**

Female constitutes majority of the asthma patients in this study which accounted for 54.7% of the cases as shown in table 2.

Table 3: Distribution of the respondents by address

Address	Number	Percentage
Imphal West	72	48.0
Imphal East	26	17.3
Thoubal	20	13.3
Bishenpur	16	10.7
Churachandpur	5	3.3
Senapati	4	2.7
Tamenglong	4	2.7
Outside Manipur	3	2.0
Total	**150**	**100.0**

Most of the patients with asthma attending Department of Respiratory Medicine were from Imphal West (48%) followed by Imphal East (17.3%) and Thoubal (13.3%) as shown in table 3.

Table 4: Distribution of the respondents by religion

Religion	Number	Percentage
Hindu	106	70.7
Christian	24	16.0
Muslim	20	13.3
Total	**150**	**100.0**

Table 4 shows that majority of the asthma patients were Hindu (70.7%) followed by Christian (16.0%) and Muslim (13.3%).

Table 5: Distribution of the respondents by occupation

Occupation	Number	Percentage
Housewife	46	30.7
Student	39	26.0
Business	21	14.0
Farmer	20	13.3
Teacher	8	5.3
Shopkeeper	7	4.7
Army	6	4.0
Govt. Employed	3	2.0
Total	**150**	**100.0**

Most of the asthma patients were housewives (30.7%) followed by student (26%), business (14%) and farmer (13.3%) as shown in table 5.

Table 6: Distribution of the respondents by marital status

Marital status	Number	Percentage
Married	106	70.7
Unmarried	44	29.3
Total	**150**	**100.0**

Majority of the asthma patients were married which accounted for 70.75 of cases as shown in table 6.

Table 7: Distribution of the respondents by weight and height

Variable	Mean ± SD
Weight (Kg)	63.28 ± 9.62
Height (Meter)	1.5 ± 0.07

The mean weight of the respondents is 63.28 kg with a standard deviation of 9.62 and the mean height is 1.5 meters with a standard deviation of 0.07 meter.

Table 8: Distribution of the respondents by BMI

BMI	Number	Percentage
<18.5 (underweight)	0	0.0
18.5-24.9 (normal)	60	40.00
25-29.9 (overweight)	49	32.67
≥30 (obese)	41	27.33

Total	**150**	**100.0**
Mean ± SD	**26.87 ± 4.18**	

Majority of the asthma patients have normal BMI (40.0%) as shown in table 8. Forty one cases (27.33%) were found to be obese so, prevalence of obesity among asthma patients in this study is 27.33%. Mean BMI was 26.87 with a standard deviation of 4.18

Table 9: Distribution of the respondents by duration of asthma

Duration of asthma	Number	Percentage
0-5 years	58	38.7
5.1-10 years	75	50.0
>10 years	17	11.3
Total	**150**	**100.0**
Mean ± SD	**7.09 ± 4.03**	

Table 9 shows that majority of the patients had asthma for more than 5 years to 10 years which accounted for 50% of cases.

Table 10: Relationship between age and obesity in asthma patients

Age in years	Obesity		Total (%)	Chi-square test
	No (%)	Yes (%)		
11-20*	11 (100)	0 (0.0)	11 (100.0)	
21-30*	35 (77.8)	10 (22.2)	45 (100.0)	Value=7.04
31-40	25 (54.3)	21 (45.7)	46 (100.0)	p-0.07
41-50	24 (80.0)	6 (20.0)	30 (100.0)	
51-60#	10 (71.4)	4 (28.6)	14 (100.0)	
>60#	4 (100.0)	0 (0.0)	4 (100.0)	
Total	**109 (72.67)**	**41 (27.33)**	**150 (100.0)**	

*&# are clubbed together for analysis

Obesity among asthma patients tends to increase with age till age group 31-40 years then again decrease with older age group as shown in table 10. This finding is found to be statistically insignificant (p>0.05).

Table 11: Relationship between sex and obesity in asthma patients

Sex	Obesity		Total (%)	Chi-square test
	No (%)	Yes (%) (%)		
Male	56 (82.3)	12 (17.6)	68 (100.0)	Value=5.38
Female	53 (64.6)	29 (35.4)	82 (100.0)	p-value=0.01
Total	**109 (72.67)**	**41 (27.33)**	**150 (100.0)**	

Table 11 shows that female asthma patients were more obese then male patient (35.4% vs 17.6%). This finding is found to be statistically significant (p<0.05).

Table 12: Relation between marital status and obesity in asthma patients

Marital status	Obesity		Total (%)	Chi-square test
	No (%)	Yes (%) (%)		
Married	72 (67.9)	34 (32.1)	106 (100.0)	Value=6.43
Unmarried	37 (84.0)	7 (15.9)	44 (100.0)	p-value=0.04
Total	**109 (72.67)**	**41 (27.33)**	**150 (100.0)**	

Married patients tend to be significantly (p<0.05) more obese than unmarried patients as shown in table 12.

Table 13: Relation between duration of asthma and obesity in asthma patients

Duration of asthma	Obesity		Total (%)	Chi-square test
	No (%)	Yes (%) (%)		
0-5 years	41 (70.6)	17 (29.4)	58 (100.0)	Value=2.78
5.1-10 years	54 (45.3)	21 (54.7)	75 (100.0)	p-value=0.24
>10 years	14 (82.4)	3 (17.6)	17 (100.0)	
Total	**109 (72.67)**	**41 (27.33)**	**150 (100.0)**	

Obesity is less among patients with asthma more than 10 years but the finding is statistically insignificant (p>0.05) as shown in table 13.

V. Discussion

Most prospective studies show that obesity is a risk factor for asthma and have found a positive correlation between baseline body mass index and the subsequent development of asthma.[10] This study was conducted in the Department of Respiratory Medicine, RIMS, Imphal during October 2013 to September 2015 including 150 consecutive patients of asthma to find out the prevalence of obesity among the asthma patients.

More than half of the patients were females (54%) and this finding is consistent with studies by Agrawal S et al[11], Forte GC et al[32] and Sposato B et al[28] . And most of these females were housewives which may have been due to greater exposure to fumes and dust at home where chulas are used for cooking. Most asthma patients in this study were from age group 21-40 years. Mean age of the asthma patients was 35 years with a standard deviation of 1.24 years. But in the study by Tavasoli S et al[30] and Forte GC et al[32] mean age was higher ie, 46.5 years and 51.1 years respectively. Gonzalez Barcala FJ et al[17] concluded that obesity was associated with a higher prevalence of asthma in young children but not in adolescents. This similar finding is observed in this study, none of the adolescents were obese. Most of the patients were from Imphal West district, Hindu and married.

Majority of the asthma patients weighted normal (40.0%) followed by overweight (32.67%) and obese (27.33%). The prevalence rate of obesity in this study is 27.33%. Mean BMI was 26.87 with standard deviation of 4.18. The following are various studies of obesity prevalence in asthma

Table 14: Relation between duration of asthma and obesity in asthma patients

Studies	Prevalence
Gennuso J et al[21]	30.6%
Tavasoli S et al[30]	29.3%.
Forte GC et al[32]	29.0%
Nathell L et al[25]	20.7%
Behren JV et al[19]	13.0%
Kajbaf TZ et al[16]	6.7%
Bibi H et al[13]	5.0%

From the above table, it is seen that the studies conducted by Gennuso J et al[21], Tavasoli S et al[30] and Forte GC et al[32] had similar findings with this study. Other studies had lower prevalence compared to this study. Obesity among asthma patients tends to increase with age till age group 31-40 years then decrease with advancing age but this is found to be statistically insignificant. Female asthma patients were significantly more obese than male patients in this study (35.4% vs 17.6%). This finding is supported by Tavasoli S et al[30] where mean body mass index of females with asthma was significantly higher than males. Similar findings that female asthma patients were more obese were observed in the studies by Mishra V[14], Veqa-Robledo GB et al[24] , Shaheen SO et al[33] and Mathew AC et al[34].

Half of the patients had asthma for more than 5 years to 10 years. Mean duration of asthma was 7 years. Obesity was seen more in patients suffering from asthma for more than 5 years to 10 years. Obesity was also seen in asthmatic patients having duration of illness of 0 to 5 year. So,in the middle and early stage of disease,there is chance of obesity. Obesity is less among patients with asthma more than 10 years but the finding is statistically insignificant ($p<0.05$).

VI. Conclusion

A cross sectional study was conducted to assess the prevalence of obesity among 150 Bronchial Asthma patients attending the Chest Department of RIMS, Imphal from October 2013 to September 2015. This study found out that asthma patients were more common in the age group of 21-40 years and also more among females. Among females asthma was more common in housewives. Married people were more likely to have asthma in this study. The prevalence rate of obesity in this study was 27.33 %. Female asthma patients were more likely to be obese than male asthma patients. And married asthma patients tend to be more obese than unmarried asthma patients. Duration of asthma had no relation with obesity in this study.

VII. Summary

A cross sectional study was conducted to assess the prevalence of obesity among 150 Bronchial Asthma patients attending the Chest Department of RIMS, Imphal from October 2013 to September 2015. The type of sampling used was consecutive sampling. This study used Body Mass Index (BMI) according to World Health Organization (WHO) criteria as the tool for measuring obesity. Analysis was done with IBM SPSS Version 16 and data were described using mean and percentages. Chi-square test was used for test of significance. Ethical approval was taken before the study from the institutional ethics committee. Informed consent was taken from all the participants.

This study found out that asthma patients were more common in the age group of 21-40 years and also more among females. Among females, asthma was more common among housewives. Married people were more likely to have asthma in this study. The prevalence rate of obesity in this study was 27.33 %. Female asthma patients were more likely to be obese than male asthma patients. This finding is consistent with many studies.[30,32] And married asthma patients tend to be more obese than unmarried asthma patients. Duration of asthma had no relation with obesity in this study.

Obesity has many consequences like myocardial infarction, stroke, hypertension, diabetes mellitus, obstructive sleep apnea etc. In order to stop these consequences there is a need to search for causes of obesity and its effects, including obesity in asthma. It is also recommended to perform better studies with controls and with bigger sample size to support this finding.

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