

Prevalence of Obesity and Over Weight in Adult Asthmatics in an Urban Population in India

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Abstract: **Background:** The prevalence of asthma and obesity has increased along with other non communicable disease in the last decade. COPD and Asthma along with obesity are causing significant morbidity and mortality in our country as well as globally. Asthma in obesity is an independent phenotype. With several studies showing a negative impact of obesity on Asthma this has become an important area of research so that early intervention can reverse the metabolic as well as Asthmatic component of this phenotype. **Material and methods:** A total of 180 adult diagnosed asthmatic patients were enrolled into the study at Bhaskar Medical College between 2017 and 2018. In this study we have selected adult asthmatic patients above 12 and below 70 years of age. These patients were known Asthmatics diagnosed and managed as per GINA guidelines since one year. We studied the BMI (Body Mass Index) levels as per WHO guidelines and their distribution among normal over weight and obese groups, along with sex distribution. The control of Asthma was studied as per GINA guidelines among the three groups. **Results:** A total of 180 patients were enrolled out of which 17.77% were obese and 22.2% were overweight. In both the groups female number was higher than males. The percentage of poorly controlled Asthmatics in the obese group was slightly higher 83.3% than normal BMI group 79%. **Conclusion:** Obesity and Asthma phenotype is now an important area of research. Both are increasing in our country. Obesity has negative impact on Asthma and more common in females. The obese Asthmatics should be strongly advised about weight reduction which may help in control of their Asthma.

Keywords: Asthma, BMI and Obesity

1. Background

Asthma in obese population is emerging as an independent phenotype in recent decade. Asthma is a inflammatory disease of airways with reversible airway obstruction effecting all age groups. The most common trigger being the indoor allergen exposure. About one tenth of world asthma patient population lies with India. The prevalence of Asthma in India being 2-12%. [1]

With rising burden of non communicable diseases globally, India is equally effected by this problem. Asthma and COPD are important non communicable contributors to morbidity along with Diabetes, Heart disease and Hypertension. 3% of DALYs (Disability Adjusted Life Year) and 7% of deaths in India are due to Asthma and COPD. [2]

WHO Asthma fact sheet says India is burdened with 15-20 million Asthmatics. Asthma is not a curable disease and can be well controlled with presently available treatments so that patients can have a good quality of life. There is an urgent need to address chronic non communicable diseases including respiratory diseases and obesity. [3]

Cancer, Diabetes, Heart diseases and Lung diseases cause 71% of deaths world wide. India is struggling with malnutrition (low BMI) and its consequences since decades but the urban areas in India are growing fatter since last decade. In the NFHS 4 2014-2015 (National family and Health Survey) assessment of health status of India, DM and HTN were also studied along with obesity- the population of obese male and female has almost doubled since last decade. Percentage of obesity varied in different states. Meghalaya 10.1 % males and 12% females, Andaman and Nicobar 38.2% males and 31.8% females and AP 33.5 males and 33.2 % females. [4]. Obesity is defined by WHO as BMI of 30 and above and it predisposes to Metabolic Syndrome.

Several studies have shown the impact of obesity on Asthma and the strong relationship between the two disorders. Obesity contributes to the poor control of Asthma. With rising trend of obesity in urban areas of India and the rising trend of Asthma in our country it is important area of research to study their relationship, impact on each other and how it can be managed. Both obesity and Asthma are pro inflammatory disease states.

In the US obesity has increased from 12.8 to 22.5% in recent decade. In India one study has shown a prevalence of obesity to be 5-10%. [5]

Gabriele et al in their study of Asthmatic population showed that 35.3% were having normal BMI, 35.7 % were over weight and 29% were obese. [6] It has been reported that obese women are twice likely to report with Asthma than non obese women. [7] Vinod Mishra in his study has shown a strong positive association between obesity and Asthma. [8] Jindal et al in their study has shown that the prevalence of Asthma in India is 2-3.8%. [9]

Impact of Obesity on Lung and Asthma

Higher the BMI the more is the restrictive effect of obesity on lung function. There is moderate decrease of TLC (Total Lung Capacity) and FRC (Functional Residual Capacity) in obese patients. [10] The ERV is decreased and most obese patients breath at closing volume. [11] The rapid muscle fibres of respiratory muscles are shifted to slow muscle fibres. [12]

The physiological changes seen in the respiratory system due to obesity are reversible and improvement is seen with decrease in body weight. [13]

The effect of obesity on bronchial hyperactivity is variable. [14]

Volume 7 Issue 6, June 2018

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Leptin is a satiety hormone and pro inflammatory in nature. Excess production of leptin from adipocytes of the fatty tissue in obese patients lead to inflammation responsible for airway inflammation and poor control of Asthma. Animal studies have shown that leptin can cause airway inflammation by mechanisms independent of TH2.[15,16] Obese patients are rich in adipocytes which are pro inflammatory in nature. IL-6 and TNF alpha levels correlated with the total fat mass in obese population.[17]

Adeponectin which has anti inflammatory action is decreased in obese patients which may contribute to poor control of obese Asthmatics.

Obese asthmatics tend to have low lung function compared to non obese Asthmatics.[18] Various studies have shown the negative impact of obesity on Asthma and they tend to have poor control of Asthma compared to non obese. Peters et al showed that BMI can influence Asthma control.[19]Saint pierre et al showed that obese asthmatics have poor asthma control.[20]

2. Aims and Objectives

To study the prevalence of obesity and over weight in diagnosed cases of adult Asthma from an urban area and assess the level of control of Asthma among the three groups - normal BMI, over weight and obese. The grouping was done as per WHO (World Health organisation) classification of BMI and the level of control of Asthma was done as per GINA (Global Initiative for Asthma) guidelines.

3. Material and Methods

Inclusion and Exclusion criteria

A total of 180 patients were enrolled for the study at Bhaskar medical College between 2017 and 2018. Both male and female subjects were included. Diagnosed Asthmatics above the age of 12 and below 70 years were included. These patients were diagnosed and managed since one year as per GINA guidelines before enrolment into the study. A case of asthma was diagnosed based on clinical history of symptoms after allergen exposure, seasonal variation and confirmation with spirometry which showed 12% reversibility in FEV1 after administration of bronchodilator. Patients of COPD were excluded from the study.

Spirometry was performed with ultrasonographic sensor technology and was calibrated with 3 litre syringe regularly. The test was performed in sitting position after recording the height and weight of the subject. The weight was recorded bare foot in kgs and height was recorded in upright posture in centimetres. Manoeuvres were performed till the graphs were acceptable and a plateau of two seconds was reached. The acceptability criteria was fulfilled. The difference in FVC between two manoeuvres was less than 150 ml. The best of three attempts was considered and FEV1 and FEV1/FVC ratio were recorded. Improvement of 12% FEV1 was diagnostic of Asthma.

BMI was calculated by dividing weight in kgs by height in metres. BMI was graded as per WHO criteria.

WHO grading of BMI	
Under Weight	LESS THAN 18.5
Normal	18.5 - 24.99
Over Weight	25 - 29.99
Obese	30 AND ABOVE

The level of control was calculated by summing up the total symptom score. Each symptom was given one score. Patients with score zero had well controlled Asthma, score 1-2 had partial controlled Asthma and score 3-4 had poor controlled Asthma. This method was followed as per the GINA recommendation.

GINA scoring of symptoms	For Control of Asthma
1	Awakenings at night
1	Day symptoms more than twice a week
1	Using reliever twice a week
1	Symptoms limiting activity

Levels Of Control	Of Asthma - GINA
SCORE 0	WELL CONTROLLED
SCORE 1- 2	PARTIAL CONTROL
SCORE 3 - 4	UNCOTROLLED

4. Results

Total 180 patients	Percentage	Male	Female
Obese	17.77% (32 of 180)	37.5% (12 of 32)	62.5% (20 of 32)
Over Weight	22.22% (40 of 180)	40% (16 of 40)	60% (24 of 40)
Normal	60 % (108 of 180)	39.81% (43 of 108)	60.18% (65 of 108)

A total of 180 patients of Asthma were included. Of which 17.77% were obese. In the obese group 37.5% were males and 62.5% were females. Of the total number 22.22% were overweight and in this group again females were more 60% and males were 40%. In the normal group 60.18% were females and 39.81 were males.

Levels of Control Among	Different Groups Of BMI
BMI Group	Percentage % of patients in each group with partial and poor control
Obese	83.30%
Over Weight	84.09%
Normal BMI	79%

There was not much of a difference in control of Asthma in the three groups of normal BMI over weight and obese in this study. The percentage of Asthmatics with normal BMI who had poor and partial control of Asthma were 79% where as in over weight it was 84.09% and in obese it was 83.3%.

5. Discussion

The prevalence of obesity in Asthma varied in different studies. In a study by Gabriele et al the prevalence of obesity in Asthmatics was 29% and 35.7% were over weight. In this study the obesity in Asthmatics was observed in 17.77% and over weight in 22.22%. Studies have shown that obesity in Asthmatics is more in females and in this study also

percentage of females being obese was higher 62.5% vs 32.5% and the percentage of female Asthmatics who were over weight was also higher 60% vs 40%.

Previous studies have shown that the control of Asthma is difficult in obese patients. In this study the percentage of diagnosed Asthmatics with partial and poor control as per GINA were slightly higher in the over weight and obese group compared to normal BMI group.

6. Conclusion

A strong association exists between obesity which in itself is now a phenotype. The control of Asthma is difficult in obese patients but studies have shown that the physiological effects of obesity on lungs are reversible with reduction of weight. Weight reduction should be strongly recommended in obese patients with Asthma. With increasing trend of Asthma as well as obesity in urban areas of our country this obesity and Asthma phenotype becomes an important area of research.

7. Acknowledgement

I sincerely thank the management of Bhaskar Medical College for giving me this opportunity of conducting research at their centre.

References

- [1] Cavkaytar O, Sekerel BE. Baseline management of asthma control. *Allergol Immunopathol (Madr)* 2012 pii: S0301-0546.
- [2] Reddy K S, Shah B, Varghese C, Ramadoss A. Responding to the threat of chronic diseases in India. *Lancet* 2005; 366: 1744–1749.
- [3] WHO Fact Sheet, June 2018. <http://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases>.
- [4] NFHS - National Family and Health Survey, 2015-2016. rchiips.org/NFHS/NFHS-4Report.shtml
- [5] KAMBOJ, Amit Kumar et al. Overweight and Obesity above 18 years of Age in An Urban Population. *Indian Journal of Community Health, [S.l.]*, v. 29, n. 2, p. 151 - 155, June 2017.
- [6] Gabriele Carra Forte¹; Denis Maltz Grutcki¹; Samuel Millán Menegotto¹; Rosemary Petrik Pereira¹; Paulo de Tarso Roth Dalcin. Prevalence of obesity in asthma and its relations with asthma severity and control *Rev. Assoc. Med. Bras.* vol.59 no.6 São Paulo Nov./Dec. 2013
- [7] Mishra V. *Int J Obes Relat Metab Disord.* 2004 Aug; 28(8):1048-58. Effect of obesity on asthma among adult Indian women.
- [8] Vinod Mishra. Effect Of Obesity On Asthma Among Adult Indian Women, East-West Center Working Papers, Population and Health Series, No. 115 January 2004
- [9] Jindal, S. K.1; Aggarwal, A. N.1; Gupta, D.1; Agarwal, R.1; Kumar, R.2; Kaur, T.3; Chaudhry, K.3; Shah, B.3 Indian Study on Epidemiology of Asthma, Respiratory Symptoms and Chronic Bronchitis in adults (INSEARCH). *The International Journal of Tuberculosis* and Lung Disease, Volume 16, Number 9, 1 September 2012, pp. 1270-1277(8)
- [10] Beuther DA. Obesity and asthma. *Clin Chest Med.* 2009;30:479–88.
- [11] Hedenstierna G, Santesson J, Norlander O. Airway closure and distribution of inspired gas in the extremely obese, breathing spontaneously and during anaesthesia with intermittent positive pressure ventilation. *Acta Anaesthesiol Scand.* 1976;20:334–42.
- [12] Fredberg JJ, Inouye D, Miller B, Nathan M, Jafari S, Raboudi SH, et al. Airway smooth muscle, tidal stretches, and dynamically determined contractile states. *Am J Respir Crit Care Med.* 1997;156:1752–9.
- [13] Hakala K, Stenius-Aarniala B, Sovijarvi A. Effects of weight loss on peak flow variability, airways obstruction, and lung volumes in obese patients with asthma. *Chest.* 2000;118:1315–21.
- [14] Nicolacakis K, Skowronski ME, Coreno AJ, West E, Nader NZ, Smith RL, et al. Observations on the physiological interactions between obesity and asthma. *J Appl Physiol.* 2008;105:1533–41.
- [15] Shore SA, Schwartzman IN, Mellema MS, Flynt L, Imrich A, Johnston RA. Effect of leptin on allergic airway responses in mice. *J Allergy Clin Immunol.* 2005;115:103–9.
- [16] Shore SA. Obesity and asthma: Possible mechanisms. *J Allergy Clin Immunol.* 2008;121:1087–93.
- [17] Tsigos C, Kyrou I, Chala E, Tsapogas P, Stavridis JC, Raptis SA, et al. Circulating tumor necrosis factor alpha concentrations are higher in abdominal versus peripheral obesity. *Metabolism.* 1999;48:1332–5.
- [18] Pakhale S, Doucette S, Vandemheen K, Boulet LP, McIvor RA, Fitzgerald JM, et al. A comparison of obese and nonobese people with asthma exploring an asthma-obesity interaction. *Chest.* 2010;137:1316–23.
- [19] Peters-Golden M, Swern A, Bird SS, Hustad CM, Grant E, Edelman JM. Influence of body mass index on the response to controller agents. *Eur Respir J.* 2006;27:495–503.
- [20] Saint-Pierre P, Bourding A, Chanez P, Daures JP, Godard P. Are overweight asthmatics more difficult to control? *J Allergy.* 2006;61:79–84.

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