Risk Factors for Poor Asthma Control and Breakthrough Attacks

Ajoy Samuel Mammen[a], Madhu K[a], M Raveendran Nair[b], P Ravindran[a]

a. Pulmonary, Critical Care and Sleep Medicine Department, Cosmopolitan Hospital, Trivandrum;
b. Pulmonary Medicine Department, Ray Mayo Clinic, Attingal, Trivandrum*

ABSTRACT

Published on 27th September 2018

Asthma is one of the most common chronic diseases worldwide with an estimated 300 million affected individuals. Prevalence is increasing in many countries, especially in children. Asthma is a major cause of school and work absence. Health care expenditure on asthma is very high. Asthma[1] symptoms may be triggered by factors which are well known such as viral infections, allergens,[9-11] tobacco smoke,[5-8] exercise and stress.

Keywords: Asthma, Poor Asthma Control, Breakthrough Attacks

*See End Note for complete author details

INTRODUCTION

Asthma is a heterogeneous disease, usually characterized by chronic airway inflammation.

It is defined by the history of respiratory symptoms such as wheeze, shortness of breath, chest tightness and cough that vary over time and in intensity, together with variable expiratory airflow limitation.

Risk factors for poor asthma control are:

- Any asthma flare-up during the previous 12 months
- Other concurrent chronic lung disease
- Poor lung function (even if few symptoms)
- Peripheral blood eosinophilia (suggests eosinophilic airway inflammation)
- Difficulty perceiving airflow limitation or the severity of exacerbations
- Exposure to cigarette smoke (smoking or environmental exposure)
- Socioeconomic disadvantage
- Use of illegal substances
- Major psychosocial problems

Asthma flare ups are more likely when asthma is uncontrolled. Some drugs can induce or trigger asthma, e.g. antibiotics,[2-4] beta blockers, and (in some patients) aspirin or other NSAIDs. Asthma flare ups (also called exacerbations or attacks) may occur, even in people taking asthma treatment. When asthma is uncontrolled, these episodes are more frequent and more severe, and may be rarely fatal.

OBJECTIVES

Primary Objective: To assess risk factors for poor asthma control and breakthrough attacks.

Secondary Objectives:

1. To identify patients at risk of breakthrough attacks
2. To counsel the patient on self management program so that he/she himself will be able to predict an impending episode.

Study Design: Prospective Observational Analytical study.

Study Setting: Pulmonary, Critical care & Sleep Medicine, Cosmopolitan Hospital, Trivandrum, a tertiary care centre.

Time Frame of the Study: Time taken for the study was 1 year (October 2014 –October 2015)

Sample Size: A total of 200 patients were selected for the study.

Sampling Strategy: All cases of asthmatic exacerbations of whichever grade were included in the study.

Inclusion Criteria: All consenting patients attending

Cite this article as: Mammen AS, Madhu K, Nair RM, Ravindran P. Risk Factors for Poor Asthma Control and Breakthrough Attacks. Kerala Medical Journal. 2018 Sep 27;11(3):72–5.

Corresponding Author:
Dr Ajoy Samuel Mammen, Prasanthi Uppukkeril, Thazhakara P.O, Mavelikara. 690102, Alapuzha District, Kerala.
E-mail: ace.bac@gmail.com

the OPD of the department and the emergency department with acute asthma will be recruited

Exclusion Criteria: Non consenting patients, Children below 14 years of age, Adults above 40 years of age and smokers.

Method of Study: Before recruiting patients, all consenting patients were examined; PEFR estimated and administered the routine treatment to reverse the asthma attack. Informed consent was then obtained and the questionnaire (A locally adapted modified version of the questionnaire used in BRFSS/asthma survey adult questionnaire – 2006) was administered .In the questionnaire the consenting participants are made to answer 'yes' or 'no' to questions addressed in the questionnaire. The questions consist of the drugs used in asthma, the compliance, the triggering factors, socioeconomic factors and the economic burden of the treatment etc.

Patients included in the study were those attending the OPD of the department and the emergency department with acute asthma. Non consenting patients, children below 14 years of age, adults above 40 years of age and smokers were excluded from the study. This study was conducted in accordance with the permission of institutional review board and ethical committee review board who accepted the protocol for the study. Data was entered in Microsoft Excel transported to statistical software (SPSS version 16 for Windows) and analyzed.

This study will help to understand the risk factors for the poor asthma control and breakthrough attacks existing in the community so that it can be addressed

RESULTS AND STATISTICS

Major risk factors statistically significant among patients (n=200) were age (OR 17.3 CI: 7.3 - 40.8), BMI (OR 8.4 CI: 3.4 - 20.8), those with sneezing or itchy eyes (OR 2.4, CI: 1.9 - 2.9), passive smoking (smokers excluded from recruiting, OR 5.3, CI: 1.1 - 26.6), self confidence of not having a severe asthma attack (OR 15.6, CI: 7.3 - 33.1),difficult to control asthma(taking 3 or more drugs for asthma control(OR 20.6 ,CI: 9.7 - 43.5), going to bed in full stomach (OR 3.4, CI: 1.4 - 8.1). Less important risk factors were sex, taking less than 3 drugs, people taking drugs for allergic rhinitis and asthma, living near roadside, quarrel with family members, awareness regarding the use of medications.

DISCUSSION

All 200 recruited patients take medicines for their asthma control. Out of them, 31 (15.5%) take oral medicines alone, 100 (50.0%) take inhalers alone and 69 (34.5%) take both. 76(38%) had > 2 breakthrough attacks and 124(62%) had <2 breakthrough attacks in a year.

Reasons for breakthrough attacks

Age and breakthrough attacks: 68(63.6%) of people above 30 years of age had >2 breakthrough attacks in a year when compared to 8(8.6%) of those below 30 years of age. (OR, C.I = 17.3(7.3-40.8))

Body Mass Index (BMI) against breakthrough attacks: It is seen that the higher the BMI, the more chance of having an asthma breakthrough attack. (OR, C.I= 8.41(3.4-20.8))

Drug taking habits and breakthrough attacks

One drug and breakthrough attacks – 21(16%) had >2 breakthrough attacks and 110(84%) had<2 breakthrough attacks in a year.

More than one drug and breakthrough attacks – 55(79.7%) had >2 breakthrough attacks and 14(20.3%) had <2 breakthrough attacks in a year.

Taking more than 3 drugs and breakthrough attacks – 55(79.7%) had >2 breakthrough attacks in a year while 14(20.3%) had <2 breakthrough attacks in a year. (OR, C.I = 20.5(9.7-43.5))

Increase in dose of medications used and breakthrough attacks - 67(35.5%) needed increase in dose of drugs for asthma control. (OR, C.I = 16.5(2.0 - 133.2))

Habits and breakthrough attacks

Alcohol intake – 9(90%) of those who take alcohol had >2 breakthrough attacks in a year when compared to those who don't take alcohol, who have 67(35.3%) risk.

Going to bed after eating full stomach and breakthrough attacks – 16(64%) of those who go to bed after full stomach had >2 breakthrough attacks in a year when compared to 60(34.3%) of those who do not go to bed with full stomach. (OR, C.I = 3.4(1.4 - 8.2))

Exposures and breakthrough attacks

Passive smoking – 6(75%) patients who have exposure to passive smoking had >2 breakthrough attacks in a year compared to 70(36.5%) of those who are not exposed to passive smoking. (OR, C.I = 5.3(1.1 - 26.6))

Exposure to biomass – Those who were exposed to biomass 19(51.4%) had >2 breakthrough attacks a year when compared to 57(37%) of those who were not exposed.

Exposure to dust – 13 (48.1%) who were exposed to dust had > 2 breakthrough attacks in a year when compared to 63(36.4%) of those who were not exposed.

Environmental pollution – 41(41.4%) of those living near road side had >2 breakthrough attacks and 35(34.7%) of those living near factory had >2 breakthrough attacks.

Miscellaneous factors and breakthrough attacks

Antihypertensive- 24(88.9%) of those who take anti hypertensives had >2 breakthrough attacks while 52(30.1%) of those not taking any anti hypertensives had >2 breakthrough attacks.

Confident of not having severe asthma attack – Out of 100 persons who were confident that they will not have severe asthma, 65(65.7%) had >2 breakthrough attacks in a year while 34(34.3%) had <2 breakthrough attack in a year. (OR, C.I = 15.6(7.3 - 33.1))

Weight gain – Those who have gained weight 11(100%) had >2 breakthrough attacks in a year. (OR, C.I = 0.3(0.3-0.4)).

Quarrel with spouse or family members – Out of 6 persons having quarrel with spouse or family members 3(50%) had >2 breakthrough attacks in a year.

Financial problem – Out of 110 people having financial problem, 50(45.5%) had >2 breakthrough attacks in a year while 60(54.5%) had <2 breakthrough attacks in a year. (OR, C.I = 2.1(1.1 - 3.7).

Awareness regarding use of devices – Out of 55 patients who had awareness about the use of devices 16(29.1%) had >2 breakthrough attacks in a year while 39(70.9%) had <2 breakthrough attacks in year. Out of 145 patients who did not have awareness about the use of devices, 60(41.4%) had >2 breakthrough attacks while 124 (62%) had <2 breakthrough attacks in a year.

Dust allergy and breakthrough attacks -124(62%) patients had positive dust allergy history while 76(38%) did not have a history of dust allergy. It is seen that the relationship between those with history of dust allergy and breakthrough attacks is not statistically significant. (OR, CI = 114.7(15.4 - 852.9)).

Sedatives – 9(90%) of those taking sedatives had >2 breakthrough attacks. 67(35.3%) of those not taking any sedatives had >2 breakthrough attacks (OR, C.I = 16.5(2.1 - 133.2))

Clinically and statistically significant study variables are presented in two tables **(Table 1 & 2)**.

Table 1. Showing factors which are clinically and statistically significant for asthma breakthrough attacks - Major Factors

Parameter	Odds ratio (Confidence interval)
Age	17.3(7.3-40.8)
BMI	8.41(3.4-20.8)
Taking 3 or more drugs for asthma control	20.5(9.7-43.5)
Going to bed in full stomach	3.4(1.4 - 8.2)
Those with sneezing or itchy eyes	2.4(1.9 - 2.9)
Passive smoking	5.3(1.1 - 26.6)
Confident of not having severe asthma attack	15.6(7.3 - 33.1)

Table 2. showing factors which are statistically significant but not clinically significant for asthma breakthrough attacks - Minor Factors

Parameter	Odds ratio (Confidence interval)
History of food allergy	3.2(1.4 - 7.1)
Weight gain	0.3(0.3-0.4)
Financial problem	2.1(1.1 - 3.7)
History of dust allergy	114.7(15.4 - 852.9)

CONCLUSION

The major risk factors which were statistically and clinically significant for breakthrough attacks of asthma were age, BMI, taking 3 or more drugs for asthma control, those with history of sneezing or itchy eyes, going to bed in full stomach, passive smoking and confident of not having a severe asthma attack.

These were highly significant for a breakthrough attack and can be classified as primary risk factors.

There are some statistically significant parameters which were not clinically significant. They are history of food allergy, weight gain, financial problem, history of dust allergy. These were not clinically significant as some of them were part and parcel of asthma syndrome. Hence they can be classified as secondary risk factors.

Certain parameters taken for the study were not found to be statistically significant. They are awareness regarding use of devices, quarrel with spouse or family members, exposure of biomass fuels, exposure of dust, environmental pollution.

END NOTE

Author Information

1. Dr. Ajoy Samuel Mammen, DNB DTCD MNAMS FICM FCCP, Junior Consultant, Pulmonary Critical Care and Sleep Medicine, Cosmopolitan Hospital, Trivandrum

2. Dr. Madhu K, DNB MNAMS FCCP, Senior Consultant, Pulmonary Critical Care and Sleep Medicine, Cosmopolitan Hospital, Trivandrum
3. Dr. M Raveendran Nair, MD FCCP, Senior Consultant, Rayo Mayo Clinic, Attingal, Trivandrum
4. Dr. P Ravindran, MD FCCP, Chairman , Pulmonary Critical Care and Sleep Medicine, Cosmopolitan Hospital, Trivandrum

Editor's Remarks: This prospective observational analytical study based on 120 patients aims to suggest factors behind poor asthma control and breakthrough attacks. Several interesting facts are highlighted. Nice paper worth reading.

Conflict of Interest: None declared

REFERENCES

1. Global Initiative for Asthma [Internet]. Global Initiative for Asthma - GINA. [cited 2019 Feb 18].
2. Kozyrskyj AL, Ernst P, Becker AB. Increased risk of childhood asthma from antibiotic use in early life. Chest. 2007 Jun;131(6):1753–9.
3. Kummeling I, Stelma FF, Dagnelie PC, Snijders BEP, Penders J, Huber M, et al. Early life exposure to antibiotics and the subsequent development of eczema, wheeze, and allergic sensitization in the first 2 years of life: the KOALA Birth Cohort Study. Pediatrics. 2007 Jan;119(1):e225-231.
4. Alm B, Erdes L, Möllborg P, Pettersson R, Norvenius SG, Aberg N, et al. Neonatal antibiotic treatment is a risk factor for early wheezing. Pediatrics. 2008 Apr;121(4):697–702.
5. Stein RT, Holberg CJ, Sherrill D, Wright AL, Morgan WJ, Taussig L, et al. Influence of parental smoking on respiratory symptoms during the first decade of life: the Tucson Children's Respiratory Study. Am J Epidemiol. 1999 Jun 1;149(11):1030–7.
6. Lewis S, Richards D, Bynner J, Butler N, Britton J. Prospective study of risk factors for early and persistent wheezing in childhood. Eur Respir J. 1995 Mar;8(3):349–56.
7. Lau S, Nickel R, Niggemann B, et al. The development of childhood asthma: lessons from the German Multicentre Allergy Study (MAS) Paediatr Respir Rev. 2002; 3:265–72.
8. Tariq SM, Hakim EA, Matthews SM, Arshad SH. Influence of smoking on asthmatic symptoms and allergen sensitisation in early childhood. Postgrad Med J. 2000 Nov;76(901):694–9.
9. Tariq SM, Arshad SH, Matthews SM, Hakim EA. Elevated cord serum IgE increases the risk of aeroallergen sensitization without increasing respiratory allergic symptoms in early childhood. Clin Exp Allergy. 1999 Aug;29(8):1042–8.
10. Wickman M, Ahlstedt S, Lilja G, van Hage Hamsten M. Quantification of IgE antibodies simplifies the classification of allergic diseases in 4-year-old children. A report from the prospective birth cohort study--BAMSE. Pediatr Allergy Immunol. 2003 Dec;14(6):441–7.
11. Karmaus W, Arshad H, Mattes J. Does the sibling effect have its origin in utero? Investigating birth order, cord blood immunoglobulin E concentration, and allergic sensitization at age 4 years. Am J Epidemiol. 2001 Nov 15;154(10):909–15.