ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 8, Issue, 11, pp.41150-41153, November, 2016

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

RESEARCH ARTICLE

DETERMINATION AND ASSESSMENT OF IMPACT OF ENVIRONMENTAL TRIGGERS/ ALLERGENS AND ASTHMA SEVERITY IN CHILDREN IN A TERTIARY CARE TEACHING HOSPITAL

[1,*]Jasmin Elizabeth Thomas, [1]Ammu, A., [1]Josna James, [1]Merin Joseph, [2]Muraleetharan, G., [1]Apollo James and [1]Sivakumar, T.

[1]Department of Pharmacy Practice, Nandha College of Pharmacy, Erode, India
[2]Department of Paediatrics, Perundurai Medical College, India

ARTICLE INFO

Article History:
Received 17th August, 2016
Received in revised form
20th September, 2016
Accepted 23rd October, 2016
Published online 30th November, 2016

Key words:

Asthma, Children,
Environmental triggers.

ABSTRACT

The present study is to assess the association between environmental triggers and asthma severity in children. The parental questionnaire was obtained from 500 respondents (202 non asthmatic & 298 asthmatic) between the age of 2-15. The questionnaire consists of patient demographic details, socio economic status, family history of asthma/atopy and environmental risk factors which leads to asthma exacerbation. Most of the patients were diagnosed with controlled (45%) or uncontrolled (15%) asthma. In controlled asthmatic, about 40.99% of the patients were within the age between 2-5 where as in uncontrolled asthmatic 36.88% belongs to the age between 6-10.The family history of asthma were significant among 27.5%. Boys have more predominance of asthma incidence than girls. Majority of the asthmatic patient were reported with lower socio economic status. There was no significant association between domestic animals, rat/mice, cockroach allergy, mould /dampness, exposure to parental smoking, vegetation and development of asthma in paediatrics. The study suggests that there is a positive relationship between seasonal exacerbation, dust allergy and outdoor pollutants with the asthma severity in children.

Citation: Jasmin Elizabeth Thomas, Ammu, A., Josna James, Merin Joseph, Muraleetharan, G., Apollo James and Sivakumar, T., 2016. "Determination and assessment of impact of environmental triggers/ allergens and asthma severity in children in a tertiary care teaching hospital", *International Journal of Current Research*, 8, (11), 41150-41153.

INTRODUCTION

Asthma is a chronic inflammatory disorder which result in the airway inflammation and obstruction by the interaction of many cell and cellular elements such as mast cells, neutrophilis, eosinophils, T-lymphocytes, airway macrophages and epithelial cells. In the susceptible individuals, these triggers cause symptoms such as recurrent episodes of wheezing, breathlessness, chest tightness and coughing particularly at night or in the early morning (Sharad Karki *et al.,* 2014). The inflammatory cell infiltration, oedema, smooth muscle hypertrophy and hyperplasia result in the contraction of airway smooth muscle and swelling of airway wall which leads to airflow obstruction(excessive airway narrowing) in asthma. Inflammatory mediators such as leukotrienes, prostaglandins, bradykinin, adenosine as well as various chemotactic agents that attract eosinophils and neutrophils which thereby causes airway inflammation (Shaji and Lodha, 2008). The risk factors of asthma may be hereditary or environmental triggers. The common triggers are allergens (pollens, moulds, house dust mite, animals), industrial chemicals (isocyanides containing paints), drugs (aspirin, ibuprofen), foods (nuts, fish, seafood, dairy products) cold air, exercise, hyper ventilation, viral respiratory tract infection and emotion or stress (Seema Sharma, 2011; Bracken *et al.,* 2002). India accounts for third of the world's asthma patients and is considered as a leading non-injury cause of hospitalization for the children aged 0-15 years (Gurkan *et al.,* 2000). It also increase the healthcare burden and also the most common medical cause of missed school days. WHO estimate shows that about 300 million people in the world currently have asthma and by the year 2025 there may be an additional 100 million persons with the symptoms of asthma (Mohamed *et al.,* 2007). In India, 10-15% of children between the age of 5-11 show symptoms of asthma (Jindal*,* 2007). In children the indoor asthma allergens (smoke, cockroaches, mites, moulds, cats and drugs) have significant influence for the exacerbation of the asthmatic symptoms. The other factors which influence the asthma exacerbation are lower socioeconomic status, family history, gender and increase in age (Kathleen Belanger *et al.,* 2003).

****Corresponding author: Jasmin Elizabeth Thomas,***
Department of Pharmacy Practice, Nandha College of Pharmacy, Erode, India

MATERIALS AND METHODS

A hospital based observational study was carried in the rural area of Tamilnadu, over a period of six months. Children with

the age group of 2-15 years of age, who have attended the Outpatient department and respiratory illness patients in Inpatient department were included in our study. Patients with immuno compromised, children with other systemic disorders, patients below 2 and above 15 years were excluded from the study. Data's were collected by using a well structured questionnaire which contains demographic data's and questions pertaining to causative environmental factors and asthma severity. The study was approved by the Institutional Ethical Committee. The data were statistically analyzed by using statistical software statistical package for social science Version 22. The data were presented in percentage along with appropriate graphs and charts. The association between the groups were tested by using one way ANOVA. The level of significance was on 0.05. All p-values below the level of significance was considered as significantly positive relation.

RESULTS

Parental questionnaire responses were obtained from 500 patients. The study was conducted between January 2015-July 2015. Among 500 participants 41% (n= 202) non asthmatics, 45% (n=222) controlled asthmatics and 15% (n= 76) uncontrolled asthmatics were found. Most of the patients were under regular treatment and presented with controlled symptoms of asthma. Majority of the paediatric patients under controlled asthma were in the age between 2-5 and in uncontrolled asthmatics more number of patients were between the age of 6-10 (Table 1).

Maximum number of male subjects were reported with increase symptoms of asthma (Figure 1). Family history of bronchial asthma was observed in 27.5% of patients (p=0.024). First degree relatives including father and mother were amongst the most common relationships (Figure 2). According to the socioeconomic status, 72% of patients belongs to lower class, 23% were from middle class and only 5% of the patients belong to upper socioeconomic status (Figure 3). Analysis of risk factors proved that about one half of the study population shows increased symptoms of asthma while exposed to dusty areas (p=0.000). These was more significant in patients with controlled asthma (64.86%) where as 60.56% uncontrolled asthmatics suggests positive correlation (Figure 4).

Analysing the seasonal exacerbation, winter followed by rainy seasonal has significant (p=0.000) relation with exacerbation of asthma symptoms. In controlled asthmatics 177 patients (79.2%) and 59 subjects (77.6%) of uncontrolled asthmatics was associated with seasonal trigger (figure 5). In case of common indoor allergens our study revealed that only less number of patients have the presence of rat/mice (p=0.802), cockroaches (p=0.195) and domestic animals (p=0.868) in their home. This triggers showed negative significant relation with asthma severity. Similarly exposure to parent smoking was less associated with asthma exacerbation in controlled groups 63 (28.37%) patient were exposed to parental smoking where as in uncontrolled asthmatics, only 18 (23.68%) participants have the incidence of exposure to parental smoking.

Table 1. Agewise distribution of paediatric patients

Age(In Years)	Percentage of Non-Asthmatic	Percentage of Controlled Asthma	Percentage of Uncontrolled Asthma
2-5	50% (101)	40.99% (91)	32.89% (25)
6-10	28.71% (58)	38.25% (85)	36.82% (28)
11-15	21.28% (43)	20.7% (46)	30.24% (23)

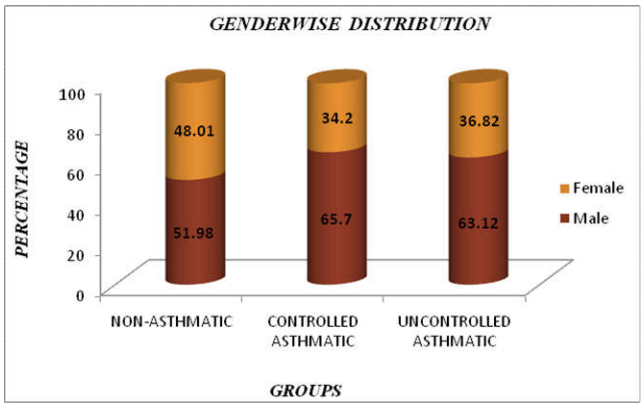

Figure 1. Genderwiise distribution of patients

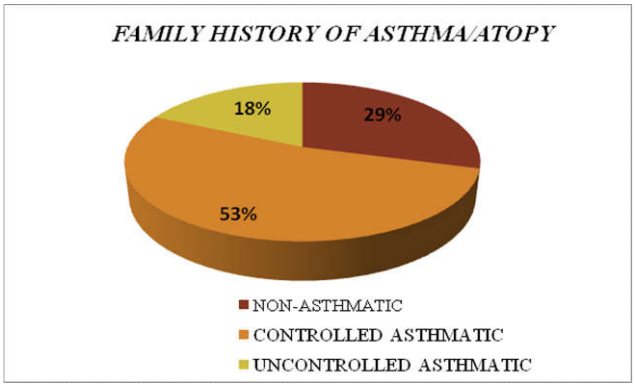

Figure 2. Family history of asthma/atopy in patients

No relationship was found with the presence of moisture /mould in the house. The outdoor pollution such as market pollution, traffic pollution may also cause asthma to some extend. Asthma exacerbation 62.16% controlled asthmatic and 67.1% of uncontrolled asthmatics reported outdoor pollution triggered asthma (p=0.000). We observed in significant association between the vegetation such as pollen grains in exacerbating the symptoms of asthma (p=0.076).

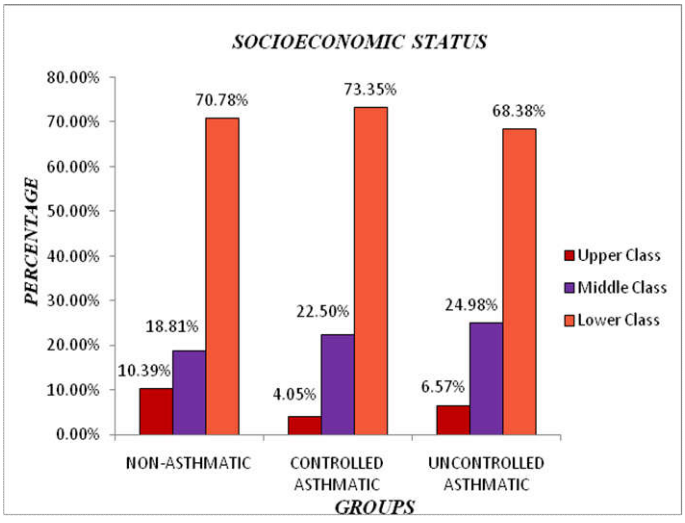

Figure 3. Socioeconomic status of patients

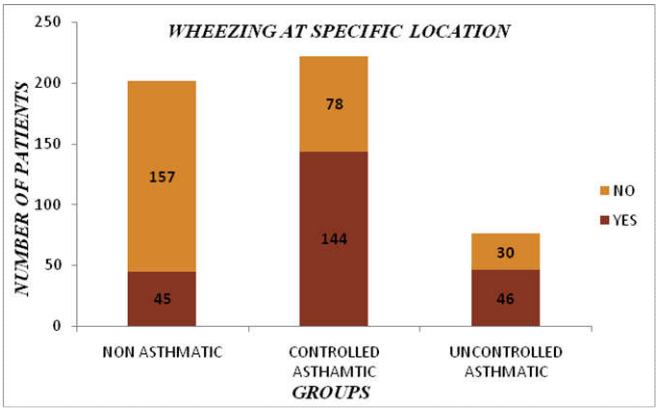

Figure 4. Patients with wheezing at specific location

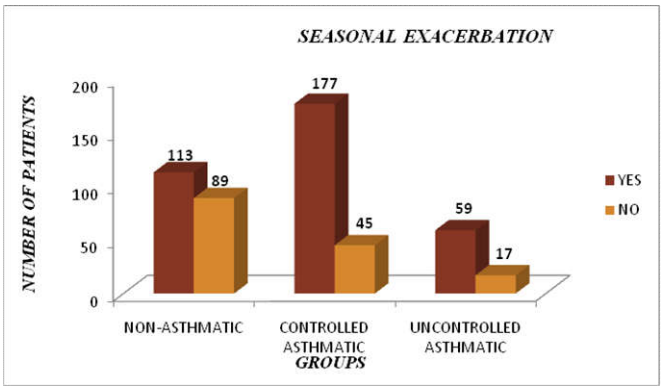

Figure 5. Seasonal exacerbation in patients

DISSCUSSION

Asthma is the most common chronic disease which is reported very high in minority population and people with low exposure status. The prevalence of asthma is increased in children which result in high mortality and morbidity across the world. In this study, our objective was to assess the correlation of asthma with environmental triggers. Being a questionnaire study, our study was based on self reported answers by the respondent rather than any skin allergy testing. *Behl et al.* in their questionnaire based study reported the male predominance of the disease (Behl *et al.,* 2010). Similar results were obtained in the study of *Schatz et al* who performed a cohort study demonstrated that among US in-patients with acute asthma, male children are more common than female children, while women are more common in adults (Schatz *et al.,* 2006). Gender have a significant relation with asthma severity. Our study revealed that family history of bronchial asthma have no significant relationship with the asthma exacerbation. *Salome Abbott et al.* in their study conclude that maternal atopy or a history of symptoms suggestive of allergic diseases were not good predictors of atopic asthma in children which supports our result (Salome Abbott *et al.,* 2013). Social status had a highly significant correlation with the asthma severity. The findings in our study where similar to the previous study in socioeconomic status and childhood asthma. *Dawson et al.* found that children in the lower social classes had more severe asthma than children in the highest social class in a survey of childhood asthma in Aberdeen, Scotland (Dawson *et al.,* 1969). Our study data suggests a strong link between dust exposure and increase in the asthma symptoms. Many previous publication reported that people living in an environment surrounded dusty area, fumes or smoke led to a higher risk of asthma (Mohamed *et al.,* 2007; Eagan *et al.,* 2002). *Gergen et al.* in his study concluded that the asthma symptoms and healthcare utilization were more prominent in the fall-winter season (*Gergen et al.,* 2002). Another study by *Khot et al.* reveals there was a fall-winter exacerbation of wheezing in the inner-city children (Khot *et al.,* 1984). Similarly, in this study more number of patients with seasonal exacerbation shows the increased symptoms of asthma during rainy or winter season. The results of the present study are inconsistent with the evidence that maternal smoking have significant correlation with asthma exacerbation and severity. *Prasad et al.* found that there is no association between occurrences of asthma with presence of smokers in the family (Prasad *et al.,* 2007). A study by *Kattan et al.* Demonstrated the effect of environmental tobacco smoking (passive smoking) in the urban children population and concluded that there is no effect of ETS on increasing the symptoms (Kattan *et al.*, 2007). Our study shows the absence of an association between domestic animals, cockroaches, rat/mice with asthma. *Gent et al.* found no associations of cockroach allergen in house with asthma severity in children with, or without, specific sensitization (Gent *et al.,* 2009). Another prospective paediatric cohort study reported that the role of environmental exposures is unclear in high-risk population and there is no association with dog, mouse, rat, and cockroach exposures and the development of asthma in paediatrics (Jonathan *et al.,* 2012). The study suggests that certain outdoor pollutants such as traffic, market pollutants have a highly significant association with the exacerbation of asthma and severity. In our study vegetation, mold/dampness in house did not demonstrate significant association with asthma severity.

Conclusion

In the present study we concluded that seasonal exacerbation, dust allergy and certain outdoor pollutants (market pollutants, traffic) has a significant association with asthma severity whereas other environmental factors included in the study does not show any correlation with asthma exacerbation in paediatric population. Early detection, pharmacological treatment, life style modification, avoidance of triggers and non pharmacological approach have the evidence to make a better outcome.

Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication.

REFERENCES

Behl, R. K., Kashyap, Malay Sarkar, 2010. Prevalence of bronchial asthma in school children of 6-13 years of age in Shimla city. *The Indian Journal of Chest Disease And Allied Sciences*, vol.52.

Bracken, M.B., Belanger, K., Cookson, W.O., Triche, E., Christiani, D.C., Leaderer, B.P. 2002. Genetic and prenatal risk factors for asthma onset and severity: a re-view and theoretical analysis. *Epidemiologic Reviews*, 24:176-189.

Dawson, B., Illsley, R., Horobin, G., Mitchell, R. 1969. A survey of childhood asthma in Aberdeen. *Archives Disease of Childhood Asthma*, 44:135-136.

Eagan, T.M., Bakke, P.S., Eide, G.E., Gulsvik, A. 2002. Incidence of asthma and respiratory symptoms by sex, age and smoking in a community study. *European Respiratory Journal*, 19:599-605.

Gent, J.F., Belanger, K., Triche, E.W., Bracken, M.B., Beckett, W.S., Leaderer, B.P. 2009. Association of paediatric asthma severity with exposure to common house hold dust allergens. *Environmental Research,* 109:768-774.

Gergen, P.J., Mitchell, H., Lynn, H. 2002. Understanding the seasonal pattern of childhood asthma: result from the National cooperative inner-city Asthma study (NCICAS). *Journal of Paediatrics,* 141:631-6.

Gurkan, F., Ece, A., Haspolat, K., Derman, O., Bosnak, M. 2000. Predictors for multiple hospital admissions in children with bronchial asthma. *Canadian Respiratory Journal*, 7:163–6.

Jindal, S.K. 2007. Asthma control in the first decade of 21 century. *Indian Journal of Medical Research,* 125:604-607.

Jonathan, M., Gaffin, Amy S. Paller, Joseph F. Fowler Spergel, Mark Boguniewicz, *et al*. 2012. Effect of cat and day care exposures on the risk of asthma in children with atopic dermatitis. *Allergy Asthma Procedings*, 33:282-288.

Kathan, M., Gergen, P.J., Eggleston, P., Visness, C.M., Mitchell, H. E. 2007. Health effects of indoor nitrogen dioxide and passive smoking on urban asthmatic children. *Journal of Allergy And Clinical Immunology*, 120:618-24.

Kathleen Belanger, Beckett, W., Triche, E., Bracken, M. B., Holford, T., Ren, P. *et al*. 2003. Symptoms of wheeze and persistent cough in the first year of life: associations with indoor allergens, air contaminants, and maternal history of asthma. *American Journal of Epidemiology*, 158:195–202.

Khot, A., Burn, R., Evans, N., Lenny, C., Lenny, W. 1984. Seasonal variation and time trends in childhood asthma in England and Wales. *British Medical Journal,* 289:235-7.

Mohamed A. Tageldin, Gamal S. Aly, Salah Mostafa, Hany Khalil, 2007. Epidemiological study of risk factors in paediatric asthma. *Egyptian Journal of Paediatric Allergy And Immunology*, 5: 11-19.

Prasad, R., S.K. Verma, S. Ojha, V.K. Srivastava, 2007. A questionnaire based study of bronchial asthma in rural children of Lucknow. *Indian Journal of Allergy And Asthma Immunology*, 21:15-18.

Salome Abbott, Piet Becker, Robin J Green, 2013. The relationship between maternal atopy and childhood asthma in Pretoria, South Africa. *International Scholarly Research Notices Allergy*.

Schatz, M., Clark, S., Camargo, C. 2006. A Jr . Sex differences in the presentation and course of asthma hospitalizations. *Chest*, Jan ;129(1):50-55.

Seema Sharma, Mangla Sood and Ashwani Sood, 2011. Environmental risk factors in relation to childhood asthma in rural area. *Current Paediatric Research*, 15: 29-32.

Shaji, J., Lodha, S. 2008. Management of asthma :a review. *Indian Journal of Hospital Pharmacy*, 45:88-100.

Sharad Karki, Rajesh Kumar, Ipseeta Ray Mohanty, N. C., Mohanty, Y. A. Deshmukh, 2014. Assessment of impact of environmental causative factors on severity of asthma in children. *MGM Journal of Medical Science*, 1:151-155.

****