RISK FACTORS ASSOCIATED WITH CHILDHOOD ASTHMA AMONG CHILDREN AGED 1-12 YEARS IN RAWALPINDI

Abstract

Objective: To explore various risk factors associated with childhood asthma in Rawalpindi garrison and city among children 1-12 years old.

Study Design: Case Control study

Place and Duration of study: Pediatric departments of Military Hospital (MH) and Combined Military Hospital (CMH) Rawalpindi from 1st Aug to 30th Nov 2009.

Patients and Methods: A total of 128 children with diagnosis of asthma presenting in outpatient and indoor pediatric departments of MH and CMH Rawalpindi between ages of 1-12 years were included. Age, gender and socioeconomically matched 112 children without diagnosis of asthma were included as controls. A predesigned questionnaire containing various factors associated with childhood asthma was filled by the researcher by detailed interview with either of parents. Data was analyzed by SPSS version 15 and chi-square test was applied to determine significance. p value < 0.05 was considered significant.

Results: Out of 15 risk factors studied 8 were found significantly associated with childhood asthma. Significant factors were education of any of the parents more than matric, history of fever at least three times in last year, use of antibiotics, history of hay fever, raised IgE levels, exposure to passive smoking, living in urban areas and family history of asthma(p value<0.005). Non significant factors were mode of delivery, exclusive breast feeding for more than 3 months, partial breastfeeding for more than 6 months, history of eczema, atopy, history of viral respiratory infections in infancy and less than three number of rooms at home. Male preponderance was noted amongst cases.

Conclusion: Education of parents, fever, antibiotics, hay fever, raised IgE levels, exposure to passive smoking, living in urban areas and family history of asthma proved to be significant risk factors which are similar to those reported in other studies. However, difference was found in other factors. Recognition of these factors can help to optimize management of asthma in children in this area.

Article

INTRODUCTION

Prevalence of asthma is increasing all over the world and is greater in children than adults1. International Study of Asthma and Allergies in Childhood (ISAAC), which involved 155 centers in 56 countries found great disparities (as high as 20 to 60-fold difference) in asthma prevalence across the world, with increasing trend towards more developed and westernized countries2. World Health Organization (WHO) reports that some 8% of the Swiss population suffers from asthma today, compared with just 2% some 25–30 years ago3. Although asthma is more common in affluent countries, it is by no means a problem restricted to developed world. WHO estimates that there are between 15 and 20 million asthmatics in India. Westernization only however does not explain the entire difference in asthma prevalence between countries, and the disparities may also be affected by differences in genetic, social and environmental risk factors4. Studies have yielded important clues about some key risk factors. The strongest risk factor for developing asthma is a family history of atopic disease5. Other risk factors studied are environmental pollution, urbanization, breast feeding, education of parents, use of antibiotics, IgE levels, socioeconomic status etc. Majority of studies to determine various risk factors associated with childhood asthma have been done in western world. However some studies have been done in India6. A few studies have been done in our country at Lahore, Hyderabad and Karachi7. In Pakistan we have diversity in environmental, genetic, racial, cultural, educational and behavioral factors due to its geographical make and structure. So naturally risk factors can be different when compared with developed world as well as within different parts of country. Through this study we have tried to highlight these risk factors in our population residing in Rawalpindi garrison and city. This will help to have better understanding of risk factors in childhood asthma in our local population and adopt preventive strategies in future specifically relevant to local requirements.

PATIENTS AND METHODS

This case control study was conducted at Pediatric outpatient and indoor departments of Military hospital (MH) and Combined military hospital (CMH) Rawalpindi from 1st Aug to 30th Nov 2009. A total of 128 children with diagnosis of asthma presenting in outpatient and indoor paediatric departments of MH and CMH Rawalpindi between ages of 1-12 years were included. Age, gender and socio economically matched 112 children without diagnosis of asthma were included as controls. Informed consent was obtained from parents of diagnosed children for inclusion in study. A predesigned questionnaire mentioning various factors affecting childhood asthma was filled by the researcher by detailed interview with either of parents. Interview was done in the language which parents understood the best. Risk factors studied were gender, exclusive breast feeding (EBF) more than 3 months, partial breast feeding (PBF) more than 6 months , mode of delivery – spontaneous vaginal delivery (SVD) or lower segment cesarean section (LSCS), education of parents-whether of parents educated more than matric level, history of fever at least three times in last one year, use of antibiotics in last year, history of hay fever, history of eczema, number of rooms at home (more than 3 or less than 3), history of smoking at home by any family member, IgE levels, living in urban, periurban or village area, family history of asthma or other allergic diseases in grandparents, parents, siblings or cousins, history of atopy and viral respiratory infections in infancy. IgE levels were done by ELISA in all participants by taking 2 ml serum.

Data was analyzed using SPSS version 15. Descriptive statistics were used to describe the data. Frequency and percentages were used to describe the categorical variables. Chi-square test was used to compare the variables between cases and controls. Odds ratio(OR) with 95% confidence interval(CI) was calculated through 2×2 table. p value < 0.05 was considered as significant.

RESULTS

This study included 128 cases and 112 controls. Age ranged between 1-12 years. They included 84 (65.6%) male and 44 (34.4%) female children among cases while 68 (60.7%) male and 44 (39.3%) female children among controls (p=0.431). Statistical analysis revealed 8 factors having significant association.

Education of parents was a significant risk factor as 86 (67.2%) parents in cases while 52 (46.4%) parents in controls were educated more than matric level (p-value 0.001). History of fever at least three times in the last year is also a significant factor as 102 (79.7%) cases while 34 (30.4%) controls had fever more than 1000 F at least three times in last year (p-value <0.001). Similarly 123 (96.1%) cases and 93 (83%) controls had used antibiotics in the last year (p value<0.001). Use of antibodies is also a significant risk factor. Sixty cases (46.9%) were found to suffer from hay fever symptoms while only 8 (7.1%) controls had positive history of hay fever (p-value<0.001). Family history of asthma was found more frequently higher among cases i.e 86 (67.2%) them control 22 (19.6%) (p-value <0.001). It was found that 73 (57%) cases and only 22 (19.6%) controls had raised IgE levels (> 120 units) (p-value <0.001). IgE levels was also a significant risk factors.

Exposure to cigarette smoke among cases was 87 (68%) while in controls 62 (55.4%) children had exposure to passive smoking in home environment (p-value 0.045). Living urban was a significant risk factors since 110 (85.9%) cases while 82 (73.2%) controls lived in urban or peri urban areas. (p-value 0.014) (Table-1).
Prevalence of asthma in children is variable worldwide. Studies have reported it to be 4.1% in Indonesia2, 32.1% in Costa Rica8 and 4-20% in India,9. In Pakistani children, a research done in 1997 revealed 10% of children suffering from this disorder10. This study was repeated in 2006 and it showed that the prevalence had increased to 18% among children of 13-14 years age groups10. Although, precise reasons for this increase are unknown, it is likely that a number of environmental factors are at least partly responsible.

Several studies have reported an association between childhood asthma family history and asthma5. A study by Yahya reported 47% of asthmatic children to have family history of asthma11. The present study confirms these findings in Rawalpindi area also. In Africa, asthma is more common in children who live in urban areas12. This study also supports these findings. Children who live on farms are protected against the development of asthma and atopic diseases, probably by bacterial endotoxins as proposed in Hygiene Hypothesis. The role of place of residence, gender, therefore, lifestyle is illustrated by the doubling or tripling of the prevalence of respiratory symptoms in children, who immigrated to Australia 5 to 14 years ago from countries in which the prevalence of asthma was low13.

There is increasing evidence that substandard housing conditions correlate with high rates of asthma. Jafari et al. found in their study that 81% of asthmatics lived in cramped, congested houses14. But in this study no significant difference for asthma association was found in children living in smaller houses as compared to those living in larger houses. This may be indirect evidence that living conditions and ventilation status is satisfactory even in lower socioeconomic group in this part of country. Conflicting data have been found in international studies on this topic. Mitchell et al. from New Zealand found a higher prevalence of wheezing in children from families with low socioeconomic status15. While an Italian study found that urbanisation and socioeconomical status had little impact on the prevalence of wheezing or asthma, but might influence the management of asthma16.

Exposure to tobacco smoke is reported to be clearly associated with the development of asthma17. Rathore, mentioned 36.59% asthmatic children having cigarette smoke exposure18. In this study, this particular risk factor was found to be significant.

Results of present study do not show significant association of absence of EBF or PBFs as a risk factor for asthma. We studied the effect of EBF (for at least 3 months) and PBF (for at least 6 months). In literature controversial association of breast feeding with asthma has been reported. Zeiger et al. critically evaluated 16 studies, out of which nine prospective studies showed benefit and seven showed lack of effect19. A study by Wright et al. has demonstrated that breast feeding was most protective against wheezing and lower respiratory tract illness early in life20. The protective role of human breast milk immunoglobulins, especially serum IgA, in inhibiting absorption of antigenic substances has been documented in human neonates21. However the relationship between breastfeeding and asthma is unclear.

Male to female ratio amongst cases in our study was 1.9:1. This is in accordance with the previous studies which also depicted male preponderance ranging from 1.4:1 in the United States22 to over 2:1 from New Zealand23 and 1.4:1 in India24. This may be related to a greater degree of bronchial lability in males. Gerrard et al. have reported significant association between asthma and history of hay fever24 and same is supported by this study.

Interestingly education of either of parents more than matric grade was found to be a significant risk factor for asthma. Although it seems to be an odd finding but similar findings have been reported in an Indian study by Awasthi et al.25. Since there is no plausible direct link of education of parents with asthma in children, there are likely to be unmeasured confounders associated with life-style. Our findings are in contrast to study by Coledon, et al. from Costa Rica26.

Antibiotics use in early life has been associated with development of asthma in various studies. It is thought that antibiotics use makes individual susceptible to asthma by modifying the gut flora and thus the immune system26. Antibiotics use has been identified as a significant risk factor for asthma in our study also. This finding is consistent with an Indian study done in Lucknow25. Promotion of rational use of antibiotics may reduce the risk of asthma and should be encouraged.

History of atopy in the individual and family has been strongly associated with asthma in different studies as mentioned by Istanbul study27. Several studies have reported an association between childhood asthma and family history of asthma5. In a study Yahya reported 47% of asthmatic children to have family history of asthma11. The present study confirms these findings in Rawalpindi area also. In Africa, asthma is more common in children who live in urban areas12. This study also supports these findings. Children who live on farms are protected against the development of asthma and atopic diseases, probably by bacterial endotoxins as proposed in Hygiene Hypothesis. The role of place of residence, gender, therefore, lifestyle is illustrated by the doubling or tripling of the prevalence of respiratory symptoms in children, who immigrated to Australia 5 to 14 years ago from countries in which the prevalence of asthma was low13.

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that living conditions, mode of delivery, eczema and atopy breast feeding, viral respiratory infections in infancy, having insignificant association with childhood asthma, which is different from other reported studies. Further larger studies are recommended in this part of country to define risk factors associated with childhood asthma more precisely.

Reference