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A Study on Risk Factors of Bronchial Asthma Among Children Attending Pediatric Outpatient Department of B. S. Medical College, Bankura

Original Article 3

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Abstract:

Background: As a part of short-term research studentship program (STS) of Indian council of Medical Research, the study was conducted under Department of Community Medicine, B S Medical College, Bankura**Objectives:** To find out risk

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& triggering factors associated with the development of bronchial asthma in pediatric patients **Methods:** A matched case-control study was conducted at Pediatric out-patient department of B.S. Medical College and Hospital, Bankura, West Bengal on childhood bronchial asthma. Fifty children suffering from asthma were selected from asthma clinic and age and sex matched control in 1:2 ratio with cases were selected form within the children attending Pediatric OPD with diseases other than asthma. **Results:** Family history, passive smoking and factory near residence were found to be associated significantly with increased risk of asthma. Triggering factors like preceding infections, exercise, certain food items, cold, dust and smoke were found to induce an episode of asthma. **Conclusion:** Avoidance of tobacco smoke, dust, exposure to cold,and certain offending food items will be of great help to reduce the prevalence and severity of bronchial asthma for Pediatric population.

Key words: Childhood asthma, triggering factors, matched case-control study

Introduction:

Bronchial asthma is the commonest chronic illness during childhood.[(1)] It is a multifactorial disease and is the result of interaction between a genetically

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determined predisposition to allergen and environmental factors that serve to enhance inflammation to the lower airway.[2] An accumulating body of evidence indicates that both life style factors and environmental exposures during early life may play particularly important roles in asthma occurrence[3]. In India, prevalence of asthma in school-going children has been reported between 4-20% in different geographic regions. The prevalence has increased by two folds in last 2 decades. It is responsible for significant social, economic & psychological impact on the family.[1] Although a large number of studies in asthma have been conducted, the etiology of childhood asthma remains to be firmly established[3]. Specific risk factors and triggering factors for childhood asthma relevant in the area of study need to be identified for better handling of childhood asthma cases to modify environmental factors and life-style issues. In this background, the present study was conducted with the objectives to find out risk & triggering factors associated with the development of bronchial asthma in pediatric patients and compare the findings with age and sex matched control group.

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Materials & Methods:

A matched case-control study was conducted at Pediatric out-patient department of Bankura Sammilani Medical College and Hospital, Bankura during 1st September 2008 to 31st October 2008.

All children attending the weekly asthma clinic of Pediatric OPD during initial six weeks of study period assigned for data collection and diagnosed by the physicians as having asthma excluding seriously ill children were selected as cases. Age and sex stratified group matched control were selected form within the children attending Pediatric OPD with diseases other than asthma in 1:2 ratios with cases. These children should have no present or past history of asthmatic attacks.

Before conducting study Institutional Ethical Committee Clearance was obtained. Permission from the HOD of Pediatric Medicine B.S Medical College was sought. Necessary information was taken from the mothers of children taking informed consent from them. Data were recorded in a pre-designed and pre-tested proforma.

Analysis was made with the help of MS-EXCEL and STAT CAL of EPI INFO software– version 3.4. Cases were compared with age & sex matched control

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group with respect to different risk & triggering factors. Chi square or Fisher's Exact Test was applied as a test the significance

Results:

Mean & standard deviation of age of asthmatic children were 3.67 & 2.44 years and that of the control group were 3.64 & 2.55 years respectively. Among cases, 70% were male & 30% were female; whereas among control 68% were male & 32 % were female. Diseases which control children had been suffering from were malaria & other febrile disorder(50%), diarrhea (15%), malnutrition (13%), abdominal discomfort (6%), Scabies(5%), impetigo(9%) & nephritis(2%).

Most of the children (90% cases & 85% control) came from rural area. 50% cases and 36% control came from farmer family having exposure to farm-related environmental pollution.

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Table 1: Association between childhood asthma and different factors in comparison with control

Factors	Case(n=50) No(%)	Control(n=100) No(%)	Odds ratio (95% C I)	X^2	P
Family History	26(52)	5 (5)	20.58 (6.58-68.89)	44.91	0.00000
Allergy to food	7 (14)	11 (11)	1.32 (0.42-4.01)	0.28	0.59
Factory near residence	4 (8)	1 (1)	8.61 (0.8-208.1)	(Fisher exact)	0.04
Biomass fuel	45 (90%)	95 (95%)	0.47 (0.1-2.0)	1.34	0.24
Passive smoking	30 (70%)	40 (40%)	2.25 (1.1-4.8	5.36	0.02
Dog / Cat / Cow	35 (70%)	63 (63%)	1.37 (0.6-3.0)	0.72	0.34
Thatch	45 (90%)	90 (90%)	1 (0.3-3.6)	0.00	1
Grain dust	25 (50%)	`46 (46%)	`1.17 (0.5-2.4)	`0.21	0.64
Cockroaches/ House flies / Mosquitoes	45 (90%)	97 (97%)	0.28 (0.05-1.4)	3.24	0.07

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Family members of both cases & control were using biomass fuels like cow dung cake, wood, dry leaves, straw, coals etc for cooking in large proportion (90% in cases & 95% in controls). 60% of cases and 40% of control has exposure to passive smoking. Difference of exposure to passive smoking between cases and control was significant (Odds ratio-2.25, P-0.02). 70% cases and 63% controls had domestic pets like dog, cat, cow etc. Same proportion (90%) of both cases & control had exposure to thatch. 50% cases & 46% controls were exposed to rice grain dust. 90% cases & 97% control had infestation in their houses with insects like cockroaches, house flies/, mosquitoes etc. But the differences between exposures among cases and controls with respect with these attributes were not significant.

Table 2: Factors triggering attack of current illness in study and control group

Triggering factors	Case(N=50) No (Exposure Rate	Control (N=100) No (Exposure Rate	Odds ratio (95% CI)	X^2	P
Preceding infection	44 (88%)	53 (53%)	6.50 (2.4-18.7)	17.87	0.00002

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Exercise	28 ((56%)	15 (15%)	7.21 (3.6-17.1)	27.40	0.000002
Food	9 (18%)	2 (2%)	110.76 (2.0-75.6)	12.56	0.00039
Cold	50 (100%)	44 (44%)	Undefined	42.32	0.00000
Dust	45 (90%)	15 (15%)	51 (15.9-175.8)	78.13	0.00000
Smoke	40 (80%)	10 (10%)	36 (12.7106.4)	73.50	0.0000

Few attributes had triggering effect in asthma episode of a child. In this study it was revealed that factors like preceding infection like cough & cold (88%), exercise like playing, running (56%), certain food item like egg, crab (18%), exposure to cold (100%), dust (90%) and smoke (80%) had a role to precipitate asthmatic attack in children.

More than one triggering agents were found to be associated with an attack of asthma. These triggering factors were found to precede the current illness less frequently among control group. Differences between exposure rates in study &

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control group with respect to the triggering factors were found to be statistically significant.

Discussion:

Male predominance (70%) among asthmatic children as found in this study corroborated with the findings of Salam et al[3] and Horaka et al[(4)]. Exposure to farm environment was found in different studies to be associated with increased risk for early-life asthma [(3)]. Like other study[(4)] our study showed that family history was associated with childhood asthma (OR=20.58, P=0.00000).

Salam et al[(3)] in their study found that children ever exposed to biomass fuel like wood ,oil, etc; cockroaches in their infancy and farm animal, crops or dust were at 1.6, 2 and 1.6 fold higher risk of asthma respectively, than those who were not exposed. In contrast with these findings, no such difference was found in our study between cases and control with respect to exposure to biomass fuels like wood, cow dung, cake, straws etc. (OR=0.47) and insects like cockroaches, houseflies etc(OR=0.28) and farm animals, thatch or dust (OR=1 to 1.37).

60% of cases and 40% of control in our study had exposure to passive smoking either at domestic or at public places. (OR=2.25, P=0.02). Study among Australian children revealed the same findings [(4)].

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A number of exacerbations of existing asthma in children are found to be associated with running in over 80% of children with asthma([5]); inter-current viral respiratory infection[(6)]and breathing cold air[(7)]. Present study was found to be consistent with these facts. 56% of cases and 15% control had exercise provoking the episode of current illness. Difference was found to be statistically significant (OR=7.21, P=0.000002). 88% cases had history of common cold or sinusitis or fever preceding the attack of asthma (OR=6.50, P=0.00002). 100% of cases had experience of exposure to cold provoking asthma attack. (OR=62.36, P=0.00000). Dust and smoke in the present study were found to trigger asthma. 9 out of 50 cases reported that some food had induced asthmatic attack (OR=10.76).

It is concluded that avoidance of tobacco smoke, dust, exposure to cold, and certain offending food items, will be of great help to avert or reduce an attack of asthma among pediatric population.

There are few limitations of the study. Sample size was based on neither documented exposure rate among cases or control, nor the level of confidence or power of the study.

This study has not offered any evidence of temporal relationship between pediatric asthma and different risk factors. External validity or generalizability can not be predicted.

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