

Study of Factors Associated with Poor Asthma Control in Children Aged 1 to 14 Years Attending Department of Paediatrics of a Teaching Hospital

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Abstract: *Despite the availability of new pharmacological options and novel combinations of existing drug therapies, the rate of suboptimal asthma control is still high. A prospective observational study was conducted to determine the factors affecting the control of asthma among children of 1-14 years suffering from bronchial asthma. 100 paediatric cases of bronchial asthma attending the paediatric department (outpatient and wards) of teaching hospital from December 2014 to May 2016 were included in the study. All the enrolled children with bronchial asthma were followed at 1 month, 3 months and 6 months and level of control and factors affecting poor control in different age groups were noted. Of the 100 children studied, 26 cases were newly diagnosed and remaining cases were previously diagnosed cases. Among the factors affecting the poor control of asthma difficulty with devices was the main factor affecting the control in 1-4 years group. Irregular follow up visits and passive smoking were the main factors affecting control in 5-11 years age group and allergic rhinitis was the main factor affecting the control in the age group of 12-14 years.*

Keywords: Bronchial asthma, poor control, allergic rhinitis

1. Introduction

Bronchial Asthma is one of the common chronic diseases that substantially burdens both patients' lives and health economics. Despite the availability of new pharmacological options and novel combinations of existing drug therapies, the rate of suboptimal asthma control is still high.

In order to tackle this, early identification of the clinical and behavioural factors responsible for poor asthma control and interventions during routine outpatient visits for improving asthma trigger management have been recommended. In addition, follow-up consultations including checking the patient's adherence to their medication plan, and measures to reduce the exposure to risk factors have also been strongly recommended. Clinicians and general practitioners must be aware of determinants of asthma control in order to review and improve the implementation of the asthma guidelines.

2. Materials and Methods

This is a prospective observational study in a teaching hospital conducted from December 2014 to May 2016 in which a total of 100 children aged 1 to 14 years attending paediatric ward and outpatient department were included. Ethics committee approval was taken. Written consent was taken from the parents of asthmatic children. Based on severity of asthma, each child was classified as intermittent or persistent type and initiated on appropriate treatment as per Expert Panel Report 3. Routine investigations like hemogram, ESR, CRP, chest X ray, AEC were done for all patients. All the enrolled children with bronchial asthma and their parents / attendants were educated about the chronicity of disease, proper usage of various drugs, correct method of using devices, need for long term treatment and

follow up visits at regular intervals. They were followed up at 1 month, 3 months and 6 months and level of control was noted.

Risk factors responsible for not well controlled and poorly controlled asthma like fear of side effects of drugs, passive smoking, pets, cost of therapy, irregular follow up visits, difficulty with devices, and co morbidities like allergic rhinitis etc were evaluated and necessary alterations in the treatment were done. Parents and children were supervised and counselled regarding the proper usage of devices. Diagnostic criteria from GINA 2016 and standard charts from NHLBI EPR3 for asthma severity classification and asthma control were used in the study. Data was analysed using the SPSS software version 20.

3. Results

Out of 100 children enrolled in the study, 74 cases were previously diagnosed and being treated for bronchial asthma and 26 children were newly diagnosed cases. 36% cases were in 1- 4 years age group, 56% cases were in 5- 11 years age group and 8% cases were in 12- 14 years age group. All cases were followed up for six months at 1 month, 3 months and 6 months after enrolment for level of control of symptoms of bronchial asthma. Majority of children in 1-4 years age group belonged to moderate persistent type. In the 5-11 years age group and 12-14 years age group, majority of children belonged to intermittent type and moderate persistent type respectively. There is steady increase in number of patients in well controlled group as the number of follow up visits increased. There is steady decrease in number of cases in poorly controlled group during 6 months follow up. This was statistically significant as the p value is 0.033 (Table 1).

Table 1: Assessment of asthma control on followup

Follow up visit	Well controlled	Not well controlled	Poorly controlled
1 month (first visit)	37	45	18
3 months (second visit)	47	37	16
6 months (third visit)	52	36	12

In newly diagnosed cases, 65.3% of cases were in well controlled group where as in previously diagnosed cases, 47.2 % of cases were in well controlled group. This was statistically significant with a p value of 0.01 (table 2) at the end of 6 months.

Table 2: Level of control in newly diagnosed vs previously diagnosed cases of bronchial asthma

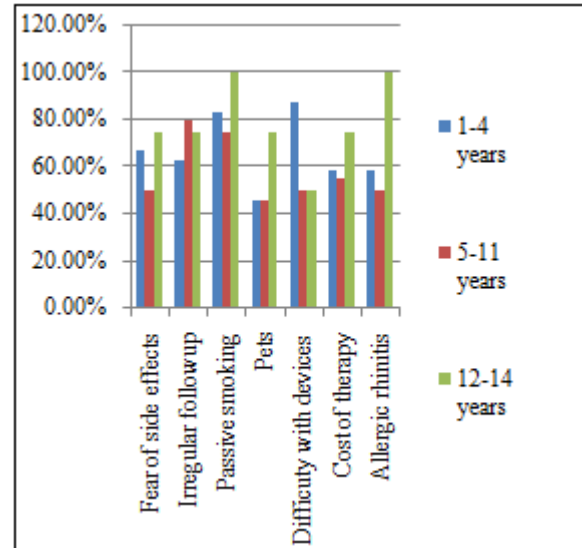
Cases	Well controlled	Not well controlled	Poorly controlled	Total
Newly diagnosed	17/26 (65.3%)	6/26 (23.07%)	3/26 (11.5%)	26
Previously diagnosed	35/74 (47.2%)	30/74 (40.05%)	9/74 (12.1%)	74
P value = 0.01				

In the present study, presence of various risk factors in both well controlled and poorly controlled group were evaluated and compared for statistical significance. Risk factors which were found to have statistically significant effect on control of asthma were passive smoking, irregular follow ups, difficulty with devices, cost of therapy and allergic rhinitis with p value of 0.005, 0.0001, 0.015, 0.009 and 0.046 respectively (table 3).

The factors associated for poor control of asthma vary in different age groups were depicted in graph 1. Among the factors associated the poor control of asthma, difficulty with devices was the main factor affecting the control in 1-4 years group Irregular follow up visits and passive smoking were the main factors affecting control in 5-11 years age group and allergic rhinitis was the main factor affecting the control in the age group of 12-14 years.

Table 3: Factors affecting control of bronchial asthma

Risk Factor	Well controlled (N=52)	Poorly controlled N=48	P Value
Fear of side effects of drugs	17(33.33%)	21(42.8%)	0.327
Irregular follow ups	16(31.3%)	29(59.18%)	0.005
Passive smoking	21(41.17%)	39(79.59%)	0.0001
Pets	13(25.49%)	20(40.8%)	0.103
Difficulty with devices	22(43.13%)	33(67.34%)	0.015
Cost of therapy	15(29.41%)	27(55.10%)	0.009
Allergic rhinitis	19(37.25%)	28(57.14%)	0.046



Graph 1: Factors associated with poor asthma control

4. Discussion

Bronchial asthma is under diagnosed and under treated with poor compliance. Although recommendations for optimal management of effective control of asthma have been defined, previous studies suggest that shortcomings exist in effective control of bronchial asthma in children. The rate of uncontrolled asthma reported in several studies ranges from 49 to 69% [1].

In the present study, the percentage of children in well controlled group increased from 37% to 52% at the end of 6 months and the percentage of children in poorly controlled group decreased from 18% to 12% at 6 months follow up. This shows better control compared to other studies. This is due to motivation given to patient and attendants on continuation of treatment and training them in proper utilization of devices. In the study done by Corrado A et al [1] in Italy, only 9.1 % children with bronchial asthma had good control. Meghan SL et al [2] from Alberta reported that majority of children with asthma had poor control (75%). Canadian study reported poor control in 76% . In Europe, 49% of Swiss German children with asthma had unsatisfactory control [3].

In the present study, 64.85% of children in the age group of 5-11 years showed good control where as 33.35% and 50% of children in the age groups of 1-4 years and 12-14 years respectively showed good control. This is probably because of the fact that most of the children in the age groups of 1-4 years and 12-14 years had moderate to severe persistent asthma at presentation, whereas most of the children of 5-11 years age had intermittent or mild persistent asthma at presentation.

In the present study, 65.35% of newly diagnosed children with asthma showed good control with treatment whereas only 47.2% of children with previously diagnosed asthma had good control. This difference was statistically significant with p value of 0.01. This is probably due to timely diagnosis with proper classification of severity and protocol based management of asthma with regular follow ups in these newly diagnosed cases.

In the present study, the factors that influence the asthma control like fear of side effects, irregular follow up visits, passive smoking, inadequate knowledge, pets, difficulty with devices, cost of therapy and co-morbid conditions were assessed. Non adherence to treatment due to fear of side effects was responsible for poor control of asthma in 42.8% of cases in the present study. In the studies conducted by Gaude GS et al [4] and Hinchageri SS et al [5], fear of side effects was seen in 18% and 13.04% of poorly controlled asthma patients. As bronchial asthma is a chronic disease for which prolonged medication is required, many patients may be afraid of the side effects of the drugs. This problem can be solved by counselling the parents of children with asthma regarding the side effects of each drug. The irregularity in follow up visits was more in poorly controlled group compared to well controlled group (59.8% Vs 31.3%) which is statistically significant (p value <0.005). This suggests that regular follow up is essential for effective control of asthma.

In the present study, passive smoking was present in 79.18% of cases of poorly controlled asthma whereas only 41.17% of children in well controlled group had exposure to passive smoking. This is statistically significant with a p value of 0.0001. In the studies conducted by McGhan SL et al [2] and Kinchoku VM et al [6] 44% and 43.85% of children respectively with poorly controlled asthma had exposure to passive smoking. All parents of children with asthma should be counselled to smoke outside the home only, if cessation is not immediately achievable. The major sources of allergens from cats and dogs are hair, dander, and saliva, whereas the major source of allergens from rodents is urine. In the present study, exposure to pets was a risk factor in 40.8% of poorly controlled cases which is comparable to the study done by Murray CS et al (42.8%) [7] in the present study difficulty with devices was present in 67.34% cases with poor control of asthma. This was high when compared to other studies like Hinchageri et al [5] and Gaude GS et al [4] who have reported difficulty with devices in 43.5% and 12% respectively.

The best predictor of compliance is parent's attitude towards treatment. Parents who have an unfavourable attitude towards the use of inhaled therapy are less likely to administer treatment according to physician's guidelines. Significant improvement can be found by educating the parents and children about the correct methods of using the devices and metered dose inhalers. Observing the techniques followed by the parents and children and correcting the techniques during the regular follow up visits help to improve the control in these children. In the present study, cost of therapy was an important risk factor in 55% of children with poor control of asthma. This is high when compared to other studies like Sodhi R et al [8] (33%), Hinchageri et al [5] (11.6%), Gaude GS et al [4] (55%). As asthma is a chronic disease requiring long term therapy and the devices like inhalers and rotahalers, spacers and drugs are expensive, most of the parents use medication only during the severe illness and discontinue usage in the symptom free period resulting in poor control.

Approximately 20–60% of patients with rhinitis have clinical asthma, while >80% of patients with allergic asthma

suffer from concomitant rhinitis symptoms. In the present study allergic rhinitis was present in 57.16% of cases with poor control of asthma. Desalu OO et al [9] study reported 31.3% of prevalence of allergic rhinitis in patients with poorly controlled asthma whereas Kinchoku VM et al [6] reported very high prevalence (95.6%) of allergic rhinitis in children with poorly controlled asthma. The factors responsible for poor control differ in various age groups.

5. Conclusions

Protocol based management from the time of diagnosis and ensuring proper follow up are required to maintain good control of asthma. Factors for poor asthma control can be overcome by following strategies like correct usage of devices and avoiding smoking in the house hold. Treating co morbidities like allergic rhinitis is essential to maintain good control of asthma.

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