**International Journal of Current Advanced Research**
ISSN: O: 2319-6475, ISSN: P: 2319-6505, Impact Factor: 6.614
Available Online at www.journalijcar.org
Volume 8; Issue 05 (A); May 2019; Page No.18539-18542
DOI: http://dx.doi.org/10.24327/ijcar.2019.18542.3546

**Research Article**

# MASER THE DRUG ADHERENCE, FACTOR AFFECTING ADHERENCE AND MANAGEMENT OF ACUTE ASTHMA CHILDREN'S IN TAMILNADU

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**A R T I C L E I N F O**

***Article History:***
Received 13th February, 2019
Received in revised form 11th March, 2019
Accepted 8th April, 2019
Published online 28th May, 2019

***Key words:***
Bronchial asthma, adherence, health education, non-adherence, self-action plan

**A B S T R A C T**

**Background:** Considering the prevalence and associated burden of disease due to bronchial asthma, it is mandatory to obtain an optimal control of the disease and to improve outcomes for these patients. But it has been observed that there is very poor adherence to the inhalational therapy which leads to the suboptimal control of the disease.
Objectives: To study the adherence for aerosol therapy in bronchial asthma patients and to assess the impact of health education and self action plan in improving the adherence to the therapy.
**Method:** A prospective study was done in a total of 986 bronchial asthma patients over a period of 2 years. Once included in the study, the patients were followed up for a total of 12 weeks for calculation of non-adherence to the aerosol therapy. In non-adherent patients, we employed various health education strategies to improve the adherence in these cases.
**Results:** A total of 986 patients of bronchial asthma who were started on therapy over duration of 6 months were included in the study. At the end of 12 weeks, it was observed that, only 108 patients (10.95) had regular adherence and 878 patients (89.05%) were non adherence to the therapy as prescribed for bronchial asthma. Factors that were associated with poor adherence were: Lower educational level status, poor socioeconomic status, cumber some regimens, dislike of medication, Fears about side effects, beliefs, changing in regimen, and patient's ill attitudes toward health. After employing the various strategies for improving the adherence in these patients, the adherence increased in patients (61.32%) among the earlier defaulted patients, while the remaining 188 patients (38.68%) were found to be non-adherence even after various educational techniques.
**Conclusion:** No adherence in asthma management is a fact of life and no single adherence improving strategy probably will be as effective as a good physician and patient relationship. Optimal self-management allowing for optimization of asthma control by adjustment of medications may be conducted by either self-adjustment with the aid of a written action plan or by regular medical review. Individualized written action plans based on peak expiratory flow are equivalent to action plans based on symptoms.



## INTRODUCTION

Bronchial asthma is a major public health problem affecting a large number of individuals of all ages. Globally, 100-150 million people suffer from asthma. India has 20-28 million asthmatics and the prevalence amongst children (5-11 years) is 10-15%.Being a chronic medical condition, management of bronchial asthma requires continuous medical care. Modern management of bronchial asthma requires prolonged medications. A key issue in proper management of bronchial asthma is adherence to treatment. Poor adherence to prescribed therapy increases morbidity and mortality and it is increasingly being documented that long-termadherence or adherence to prescribed therapy is difficult to attain (Chochrane, 1996).

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Studies have reported that 50% of patients with a chronic disease do not use their medication at all or do not use it as prescribed (Antonello, 2009). Important reason for poor adherence is that patients with a chronic disease do not have a satisfactory understanding of their condition. The economic burden of bronchial asthma to the society is well documented in industrialized countries (Barnes *et al*., 1996), and is a great burden to the health services. Poor asthma control is responsible for a large proportion of the total cost of the disease, for the patient as well as to the society, and thus responsible for the both direct and indirect cost of therapy. The present study was undertaken to study the factors that influence patient's adherence with prescribed medications, and to assess the impact of health education and self-action plan in improving the adherence in bronchial asthma patients.

## METHODS

The present study was a prospective study done at a tertiary care hospital over a period of 2 years from June 2015 to September 2018.Children below 15 years of age with the diagnosis of bronchial asthma as per Global Initiative for Asthma (GINA)guidelines(GINA2012) were included in the study. Patients with acute severe asthma, chronic obstructive pulmonary disease (COPD), and cardiac asthma were excluded. All patients were interviewed using a standard interview schedule and requested to maintain a diary regarding the therapy. Apart from a detailed history, physical examination, pulmonary function test, and peak expiratory flow rate were measured during the first visit. All the patients were treated according to GINA guidelines under the supervision of physicians. Regarding the use of medications, the choice was left to the treating physician. All patients were followed-up every 15 days for 12 weeks. At the end of 12 weeks, adherence to treatment was calculated after studying the patient diary noting and frequency of the hospital visits.

Second step in this study was to impart health education in the non-adherent patients. We tried to improve the adherence by imparting the patient education program with the help of health educator. Various strategies which were employed for the patient education included verbal praise, interactive communication skills, tailoring the medications to the patient's routine, conducting asthma awareness camps for the defaulted patients, distribution of literature regarding asthma, and its consequences in the local languages and answering to the family's worries regarding bronchial asthma. At this stage, all the non-adherent patients were given detail health education regarding bronchial asthma, its allergy status, chronicity of the disease, and duration of treatment, nature of quick relief and long term medications, and preventive aspects of the disease with the help of health educator.

All the patients were asked to keep a diary of any symptoms occurring during this period. Also an action plan was provided by the treating physician for all the non adherence cases, explaining what to do in case of increase in the symptoms, orduring any exacerbations, when to take oral steroids, and when to call the doctor. This will help the patient to be more interactive and be more communicable with the doctor. In the second step, all the patients were followed-up for another 12 weeks. Final assessment was done at the end of this period only. The study was approved by the Institutional Ethical Board. The economic status was classified as per modified Prasad classification (Prasad 1970).

### *Statistical Analysis*

Data are expressed as the mean (standard deviation (SD).Comparison of parameters between two groups was done by Student's*t*-test. Comparisons among three groups were done by one-way analysis of variance (ANOVA) with Bonferroni'smultiple comparison tests. Differences in frequency between adherence and no adherence patients were assessed by the Chi-square test. A *P* value of less than 0.05 was considered significant.

## RESULTS

A total of 986 patients were studied during the period. The majority of the patients (42.18%) were in the age group of 5-15 years. The male: female ratio was 3:2. Majority of 361(36.61%) had secondary education and 212(21.50%) were illiterate. The majority of the patients belonged to middle socioeconomic status [Table 1].Among male patients; regular adherence was observed in 69(63.88) patients. A higher number of male patients missed more doses 518(58.99) as compared to female patients 360 (41.00). There was significant correlation between the educational status and the adherence to the therapy. Socioeconomic status of the patient was a significant risk factor associated with the nonadherenceto the therapy.

**Table 1** Baseline characteristics of the patients with adherence

| Characteristic | Adherence *n* (%) | Non-adherence *n* (%) | *P* value |
|---|---|---|---|
| In the total 986respondent | 108(10.95) | 878(89.05) | 0.001 |
| Male | 69(63.88) | 518(58.99) | 0.001 |
| Female | 39(36.12) | 360(41.00) | 0.001 |
| Age | | | |
| >5 | 67(28.69) | 223(71.61) | 0.001 |
| 5-10 | 48(13.67) | 303(86.33) | 0.001 |
| 10-15 | 47(11.78) | 352(88.22) | 0.001 |
| *Education of parents* | | | |
| Illiterate | 23(10.85) | 189(89.15) | 0.001 |
| Primary | 25(10.46) | 210(89.36) | 0.001 |
| Secondary | 94(26.04) | 267(73.96) | 0.001 |
| Degree | 72(40.45) | 106(59.55) | 0.001 |
| Economic status of guardians | | | |
| Lower | 38(10.92) | 310(89.08) | 0.001 |
| Middle | 44(10.89) | 360(89.11) | 0.001 |
| Upper | 56(23.94) | 208(76.06) | 0.001 |

Factors were the key reasons for non-adherent to the therapy [Table 2]. The major factors associated with poor adherence were: cost of the medication724 (73.42), beliefs 670 (67.95), duration of therapy 693(70.28), lack of immediate benefit of therapy 654 (66.33).

**Table 2** Causes for Non-adherence for asthma therapy

| Factors | No (%) |
|---|---|
| Complexity of medication | 304(30.63) |
| Frequent changes in regimen | 627(63.59) |
| Treatment requiring certain techniques | 453(45.78) |
| Unpleasant side effects | 453(45.78) |
| Duration of therapy | 693(70.28) |
| Lack of immediate benefit of therapy | 654(66.33) |
| Medications with social stigma | 461(46.75) |
| Medication cost | 724(73.42) |
| Lack of family or social support | 351(35.60) |
| beliefs and behavior | 670(67.95) |
| Feeling of well being | 548(55.58) |

Various strategies were employed with the help of a health educator after 12 weeks of therapy to improve the patient's adherence to the therapy, and these patients were followed-up for a further duration of 12 weeks to evaluate the response to the intervention. We have tried to educate these bronchial asthma patients in different ways, so that it will help in improving the adherence to the therapy.

**Table 3** Parental Report of Management of Acute Asthma

| What do you do when the child is having asthma signs or symptoms or is having an asthma attack? (*n*=986) | n(%) |
|---|---|
| Give asthma medicine | 805(81.7) |
| Go to clinic | 633(64.2) |
| Have child lie down or rest | 473(48.0) |
| Give fluids by mouth | 151(15.4) |
| Call physician or Call hospital | 224(22.7) |
| Use home remedies, herbs, or teas | 118(12.0) |
| Ask family or friends for help or advice | 118(12.0) |
| Use medicines or call physician as first or second action | 723(73.4) |

Parents were asked what they do when the child has asthma signs or symptoms or actually has an asthma attack in Table 3. Eighty-two percent of the respondents reported using an asthma medicine, and 64.2% went to a clinic or emergency room. The child was told to lie down or rest by 48.0% of parents. In addition, 15.4% of the parents gave fluids by mouth and 13.4% reported calling a physician as a part of their emergency plan of action. Other responses, such as calling a hospital, performing breathing or relaxing exercises, attempting postural drainage, and using home remedies, were reported,10% of the time. Seventy-two percent of the respondents used a medication or took the child to a physician as the first or second action in their response to an acute asthma event.

## DISCUSSION

Bronchial asthma, a chronic lung disease that affects people of all ages, races, and ethnic groups, is a growing concern throughout the world. There is a need for educating the patient about asthma disease and medications used like DPI/MDI to be taken on regular basis as prescribed. In the study(Pinto Pereira *et al*., 2002) conducted in Trinidad regarding the understanding and use of inhaler medication by asthmatics, it was observed that educating patients with a focus on children and the elderly, inhaler techniques, and reinforcing understanding of asthma medications could improve asthma management to a great extent. No adherence to treatment programs is common in patients with bronchial asthma. No adherence is more common than usually suspected and rates vary from 20%to 80% (Rand *et al*., 1994).True rates of nonadherence are hard to come by because patients do not accurately report and physicians often do not inquire critically. The ruleofthumb in chronic nonlethal disease (i.e., asthma, hypertension, etc.) is that one-third of patients are compliant, one-third are somewhat compliant, and one third are non adherence. This is important because compliant patients are significantly less likely to experience exacerbations than less compliant patients (Stern *et al* 2006).

The present study was conducted to know adherence with therapy in bronchial asthma patients and reasons for nonadherence. An effort was also made to improve the patient adherence via the patient education program. In the present study a total of 878 patients (89.05%) were observed to benon adherence to the asthma therapy. Gibson *et al*.,[11]conducted a study to study the adherence with asthma medications in preschool children. In preschool children, the parents supervise and are responsible for drug administration. In this study it was observed that parental supervision would result in good adherence. It was concluded that adherence with prophylactic therapy is poor in preschool children with asthma whose medication is administrated under parental supervision. Nonadherence depends on many factors and they are difficult to sort out Beliefs, perceptions, and experience constitute some of the variables associated with compliant medication taking behavior. It had been suggested that race, crime, age, and other environmental factors are associated with adherence and nonadherence; but these are speculative (Arulprakasam *et al*., 2017). Lindberg *et al*.,studied various factors affecting the adherence in asthma patients and have identified five important factors regarding self-reportedadherence with prescribed medications in patients with asthma: Age, gender, length of time with airway problems, whether the staff listen and take into account the patient's views concerning his/her asthma, and whether the patient has received information and education concerning asthma.

There were 88 patients with higher education (graduation) and all these patients had regular adherence with the therapy. Patient'shaving secondary education had a default rate of 62.28%, patients having primary education had a high default rate of76.14%, while illiterate patients had a higher default rate 80%. Education status wasthus a significant factor for the nonadherence to the therapy for asthma medications. Valid educational program for asthmatics can improve theknowledge of the disease and to understand how they look after themselves by careful evaluation of their own symptoms and respiratory function. Patients attending two lessons with helpful training tools can increase significantly asthma knowledge, treatment adherence, and patient self-management (Cegala *et al*., 2000).In thepresent study economic status was significant and there was moderate correlation to adherence and low socioeconomic status. It was observed that there were higher default rates among lower socioeconomic class patients. Patient education in bronchial asthma is to provide the patient and the patient's family with suitable information and training so that the patient can keep well and adjust according to a planned medication. The factors involved in nonadherence in the present study are multifactorial. The most common reasons for the higher nonadherence rates were cost of the medication (83.33%), beliefs (74.07%), duration of therapy (75.01%), lack of immediate benefit of therapy (71.6%), feeling of well-being on therapy (61.31), Fear about side effects to the medications (44.23%), and negligence on the part of the patients (7%). Various strategies were employed with the help of a health educator after 12 weeks of therapy to improve the patient's adherence to the therapy, and these patients were followed-up for a further duration of 12 weeks to evaluate the response to the intervention. We have tried to educate these bronchial asthma patients in different ways, so that it will help in improving the adherence to the therapy. These different ways included: Verbal praise (15.80%), interactive communication skills (14.70%), tailoring the medications to the patient's routine (7.72%), conducting asthma awareness camps for the defaulted patients (15.80%), distribution of literature regarding asthma and its consequences in local languages (25%), answering to the family's worry (11.02%), and written self-action plan (26.47%). They also had greater confidence that current management would keep their illness under control. Dowell and Hudson[19] concluded that accepting the recommended treatment, especially long=term treatment perceived as powerful, requires an acceptance of the illness.

The major methods that have been proposed and tried to improve adherence include improved dosing schedules, patient education, and improved communication between physician and the patient. It has been well-established that less frequent dosing and simple schedules works best (Riekert *et al*., 2003).It is less certain that patient education and/or provider involvement by themselves make a significant difference in the long run. The following are thought to improve adherence: Specific patient written instructions, patient diaries, physician/provider interest, less frequent dosing, long acting drugs, a simplified dose schedule, pro re nata (p.r.n.) dosing, self=management, and shorter course of therapy. Patient education plays an important role in improving the adherence

in such a chronic disease like bronchial asthma. Hence, every effort should be made to motivate these patients at every visit. Motivational interviewing (MI) is one approach to building patient motivation for adherence (Arulprakasam *et al*., 2017). MI is a patient-centered style of communication specifically geared toward resolving ambivalence and building motivation for change. It focuses on creating a comfortable atmosphere without pressure or coercion to change. MI was originally described by Arulprakasam *et al*., and the theory and practice of MI has been expanded upon in several seminal texts and in several hundred peer reviewed papers. MIviews ambivalence as part of the natural process of change—a phase that people must go through before fully committing toa decision (Arulprakasam *et al*., 2017).Although extensive research has been done in efforts to understand and improve adherence in asthma, little progress has-been made in cutting the rate of nonadherence. It is frustrating and goes against our intuition and training that spending time and effort, interacting with patients, and building rapport does not seem to be very effective in improving adherence. It is better to design programs that are more convenient and comfortable. Patients take drugs only if they agree that these agents are more beneficial than disruptive (Arulprakasam *et al*., 2017).

## CONCLUSION

The percentage of regular adherence on therapy in asthma is 8.65%, and nonadherence is 89.05% which is significantly high. Regular adherence is an important aspect inthe management and control of bronchial asthma, so patients should be advised to take regular and long term aerosol therapy for reducing the acute attacks of asthma and maintaining the disease state. Patients who have faith in the physician and the prescribed method of treatment are more likely to adhere to the treatment than patients who have a negative attitude toward treatment. The same is true of the parents of children with asthma. People with asthma should be offered education and written asthma action plans that focus on their individual needs this is a reinforcement of earlier advice.

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**How to cite this article:**

Arulprakasam K C and Senthilkumar N (2019) 'Maser the Drug Adherence, Factor Affecting Adherence and Management of Acute Asthma Children's in Tamilnadu', *International Journal of Current Advanced Research,* 08(05), pp. 18539-18542. DOI: http://dx.doi.org/10.24327/ijcar.2019.18542.3546


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