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Study of Aerosol Therapy Compliance in Bronchial Asthmatics

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Abstract

Asthma is commonly controllable but often neglected disease asscociated with huge burden to family and society. It is important to obtain optimal control to improve quality of life in asthmatics. The suboptimal control of disease occurs due to very poor adherence to aerosol therapy. Objective is to study the aerosol therapy compliance in bronchial asthmatics .and the factors responsible for non compliance of aerosol therapy and effect of repeated health education on compliance. It is a prospective study where patient was followed up monthly for three months for collecting data and checking the compliance. This study included 113 bronchial asthmatics who were taking aerosol therapy for 1 or more years. After three months it was observed that only 45 patient (39.82%) were compliant and 68 (60.17%) were non compliant to aerosol therapy as advised by doctor, after employing various strategies, compliance improved in 22 (32.35%) of the previously compliant patients. Factors responsible for poor compliance were low level of education, patients from poor socioeconomic strata, poorly accessible pharmacy, adverse effect and fear of adverse effect (forgetfulness busy life style, ill altitude to chronic condition) felt better with medications, negligence dislike medication. Non compliance with treatment is an eminent challenge in asthma management and various compliance improving strategies can helpful to improve compliance in few patient.

Keywords: Bronchial Asthma, Compliance, Health Education

1. Introduction

Worldwide around 300 million people are estimated to be suffering from bronchial asthma[1]. The urbanization and change in the lifestyle are responsible for increase in number of asthmatics[1]. In 2001 it was found that, world wide asthma was the 25th leading cause for Disability-Adjusted Life Years (DALYs) lost[2]. Worldwide it was estimated that asthma was the cause of death for 1 in every 250 deaths[3]. In India, asthma symptoms prevalence is 2.5-5% in 20-44 years old adults. Asthma mortality varies from country to country, in England it is 3.2 per 100000 where as 36.7 per 100000 in china among 5 to 34 years old[1]. Compliance with medication is important for proper management of asthma. Poor compliance to prescribed therapy increases mortality and morbidity. Studies have reported that 50% of patient with chronic asthma fail to take medications as prescribed or reluctant to take medicines[4]. For non compliance the important factor is lack of knowledge about asthma. The economic burden of asthma is measured by direct factors (like hospital admissions and cost of medicines) and indirect factors (like time lost from work and premature death). Thus good compliance with medicines will decrease the economic burden of the patient. This study was done to find out the

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factors responsible for non compliance aerosol therapy in patients with bronchial asthma.

2. Aims and Objectives

1. To study aerosol therapy compliance in bronchial asthmatics. 2. To study the factors responsible for non compliance of aerosol therapy in bronchial asthmatics. 3. To study effect of repeated health education on compliance.

3. Material and Methods

This study was conducted in the pulmonary medicine department of a medical college and tertiary health care centre. In this study patients having age above 12 years, diagnosed cases of bronchial asthma for more than 1 year and on medications (with inhalers) for more than 1 year were included in the study. Patients having age below 12 years, taking medications less than 1 year and patients having acute asthma, sever uncontrolled asthma and Chronic obstructive pulmonary disease were excluded from study. The patient attending outpatient department and fullfiling inclusion criteria were selected. They were diagnosed as bronchial asthma by spirometry as per GINA guidelines. All patients were interrogated with a standard protocol and were asked to maintain a diary for daily dosages of inhalers. After enrolment in to the study patients were explained natural course of the disease, complications, importance of regular therapy. They were demonstrated different inhaler techniques and asked to choose suitable device for them. All patients were asked to use spacer with MDI. The patients relative, either, wife, mother, husband, son, father were told to monitor the patient and the patient was assessed at the end of every month for three consecutive months. The questionnaire about demographic profile, level of education, socioeconomic status, treatment compliance score was completed. PFT was done and patients were treated according to GINA guidelines. If the patient was taking inhalers as prescribed (that is no. of puff of MDI or DPI rotacaps), he was said to be compliant with the treatment. Patient was said to be noncompliant if he/she had not taken inhalers as advised. In present study various educational strategies were used to improve compliance like tailor the medications to patients routine, review the patients self-management plan and review of inhaler technique and correcting it. Patients were given special attention and encouragement, they were praised for their correct inhaler techniques, patient's family worries were answered. B G Prasad classification is based on income and it is used to determine the socioeconomic status. Data was analysed by chia-square test. P value of less than 0.05 was considered significant.

4. Results

This study included total 113 patients. 51/113 (46.01%) were in the age group of 12-40 years. 3 patient were age more than 70 years old. There were 66 male and 47 female. In the present study with male:female ratio of 1.4:1, 3 patient were more than 70 years old. 25/66 (37.87%) male patients and 20/47(42.55%) female patients were regularly compliant with therapy.

6 patients who were regular with the therapy, were found to be highly educated (post graduation). 21 out of 33 patients had completed graduation. They had not defaulted any time during treatment. A total of 58 patients (53.98%) had either primary or secondary education. The defaulter rate was 70% in patients with secondary education and it was 71.42% in patients with primary education (Table 6). The defaulter rate was highest 100% in illiterate patients. They defaulted more number of doseges of the inhalers. Only 12 patients (10.61%) were illiterate. More than half of the patients (68.14%) belonged to class II and class III (socio economic class). Only 11 (9.73%) patients belonged to class I. A total 45/113 (39.82%) were noted to be compliant of arosol therapy and 68 (60.17%) were defaulter. Majority of the patient who defaulted belong to age >40. among the 68 patients who had defaulted, 8 patients had missed less than 10 doses in three months (7.07%), 24 patients had missed 11-20 doses in three months (21.23%), another 25 patients had missed 21-30 doses in three months (22.12%) while 11 patients had missed more than 30 doses in three months (9.73%). In the present study out of 45 patients who were on regular compliance 9 patients belong to class I . 9 out of 11 class I socio economic patients were compliant (92%), and 2 patients were non-complaint. The default rate was 41.93% in class II, 71.73% in class III, 77.77% in class IV and it was 85.71 in class V category of the patients.

There was significant association between educational level, socioeconomic status and compliance with therapy (Table 7, 8). While association between male and female was not significant (Table 9). About 1/3 patient used DPI (74.33%) and 18.18% used MDI while 7% were prescribed MDI+ spacer. Following are factors associated

with poor compliance. 68 out of 113 patients (60.17%) were defaulted aerosol therapy; Female patients had higher default rate 70.7%, while male patients had 64.4% default rate. The most common factors for the higher default rates were adverse effects of medicines (16.90%), high cost of the inhalers (16.90%), felt better with therapy (14.08%) and negligence of the patients (14.08%). Other factors for non-compliance are drug related, like difficulty in using inhaler devices (8.45%), dislike for inhaler devices and long distance of medical shops (11.26%). The other factors not related to drugs were fears about adverse effects (4.22%), frustration about disease or its treatment (8.45%). In the present study the various education tools for patients were applied to improve compliance, which were useful in 22 patients (32.35%) among the defaulted patients. The remaining 46 patients were noncompliant even after various educational tools. After the use of various educational tools the compliance was improved in female patients (37.03%) than male patients (29.26%) (Table 10).

5. Discussion

Asthma is a chronic inflammatory airway disorder that affects people of all ages, races, and ethnic groups. It is a problem of concern throughout the world due to incerease in number of cases.

To Combat with the asthma it is important that patient should be educated about the disease and regular use of inhaler medications like DPI/MDI as advised by physician. A study conducted in Trinidad[5] about the understanding and use of inhaler medication by asthmatics, observed that asthma management can be improved by patients education especially children and elderly. Proper use of inhaler devices and reinforcing importance of regular asthma medications does help.

The present study was conducted to find out the percentage of compliance with aerosol therapy in bronchial asthmatics and factors responsible for non-compliance. The various educational programmes were used for patients to improve compliance with therapy.

The present study included 113 bronchial asthmatics taking aerosol therapy either DPI/MDI more than 1 year.

In this study out of 113 patients, only 45 patients (39.82%) were regularly taking aerosol therapy and never missed a single dose and 68 patients (60.17%) were non-compliant to aerosol therapy and this was statistically highly significant.

5.1 Sex Prevalence (Table 1.)

Difference in male and female compliance was statistically not significant. As compared to female patients higher number of male patients missed more than 20 doses in a period of 3 months.

In another study conducted by[6] regarding sex differences in asthma prevalence in eight state, it was observed that prevalence of asthma is higher in female patients as compared to males. Majority of females presented with adult onset of asthma and males presented with childhood onset asthma. The asthma-control also differed in males and females. The risk of asthma was higher in females as well as asthma profiles were poorer in females as compared to males.

The aerosol therapy Compliance in pre-school children was also studied.

The parents were ask to supervise the medication of pre-school children and they were held responsible for drug administration. In this study it was observed that parental supervision resulted in good compliance. It was concluded that compliance with aerosol therapy is poor in pre-school children than in children with asthma who were supervised by parents while taking medications[7].

Since last three decades the social behaviour has resulted in encouraging children to actively participate in their own health care. Research conducted over the past several years suggests that children are very much

Table 1. Compliance with regards to sex

Tables		Male	Female	Total	Percentage
Regular therapy		25	20	45	39.82
Default (doses missed in 3 month)	<10	5	3	8	7.07
	11-20	13	11	24	21.23
	21-30	15	10	25	22.12
	>30	8	3	11	9.73
Total		66	47	113	

competent to participate in programmes that teach decision-making skills regarding their health matters. There are many examples of child empowerment approaches specifically to asthma management, regarding the consequences of empowering children to their own health care[8].

In the present study 10 (76.92%) out of 13 (11.50%) adolescent were non-compliant.

5.2 Educational Status (Table 2.)

Majority of compliance was found in highly educated i.e., (69.23%) while majority of non compliance was in low educated i.e., (56.96%). The association between education status and compliance was statistically significant (<0.05). (Post graduate and graduate are considered highly educated).

Good and valid educational stratergies are helpful for asthmatics to improve the knowledge of the disease and better understanding of careful evaluation of their own symptoms and respiratory function. Patients who attended clinics with useful educational methods, increased knowledge of asthma as well as treatment compliance and could better understand self- management treatment plans[9].

5.3 Economic Status (Table 3.)

As asthmatics require regular medications life long, the economic status is very important while managing these patients.

In majority, compliance was found in class 1 and 2 i.e., (64.28) while majority of non compliance was found in Class III, IV, V socioeconomic status i.e., (74.64). The association between socioeconomic status and compliance was statistically significant (<0.05). There is no significant socioeconomic association between male and female. But there is significant association between education status, socioeconomic status and compliance.

B G Prasad classification based on per capita income devised in 1961. It is modified time to time by linking it to AICPI by using multiplication factor.

Multiplication factor = value of AICPI*CF/100.

Table 2. Compliance with regard to education status

Educational Status	Regular compliance	Default withDPI/MDI (no. of doses missed in 3 months)				Total defaulter	Percentage
		<10 doses missed	11-20 doses missed	21-30 doses missed	>30 doses missed		
Post graduate	6	0	0	0	0	0	0
Graduate	21	2	4	5	1	12	36.36
Secondary Schooling	12	3	7	14	5	29	70.73
Primary schooling	6	2	8	3	2	15	71.42
Illiterate	0	1	5	3	3	12	100
Total	45	8	24	25	11	68	

Table 3. Compliance with regard to socioeconomic status

Socioeconomic Status(class)	Regular compliance	Default withDPI/MDI (no. of doses missed in 3 months)				Total defaulter	Percentage Default
		<10 doses missed	11-20 doses missed	21-30 doses missed	>30 doses missed		
I	9	0	1	1	0	02	18.18
II	18	0	5	6	2	13	41.93
III	13	5	12	11	5	33	71.73
IV	4	3	2	7	2	14	77.77
V	1	0	4	0	2	06	85.71
Total	45	8	24	25	11	68	

5.4 Reasons for Non Compliance (Table 4-5.)

The patient and their family members should be educated with all the aspects of bronchial asthma so that they can cope up with the disease. The patient should be trained about the use, dosages and plan of medication so that they can adjust accordingly.

The present study suggests that the factors for non-compliance of therapy are multifactorial. The major factor for non compliance could be depression. As the depression is a sensitive issue, question about depression were avoided during interrogation with patients.

Recently, a study[10] in COPD patients observed that 63% patients had sub optimal adherence to aerosol therapy. Adherent patients had better knowledge of their disease and knew other options to cope up with illness. They were confident about their treatment which would keep their disease under control. The patients who were less adherent to treatment, were less Satisfied with treating physicians and had low faith in the treating physician. The study observed that patients having sub optimal adherence thought that their medications are more difficult to take and unpleasant as compared to other patients. And also thought that their doctors offer them limited treatment options. According to another study[11] patients who follow their treatment as prescribed by their doctors are likely to believe their doctor and leave control of disease to the doctor.

In both groups that is adherent and non adherent, there are differences in both intentional and unintentional health behaviours[10]. May be due to greater knowledge about disease and treatment, adherent patients are less likely to be confused about their inhaler treatment. Less adherent patients were more unlikely to follow their prescribed treatment. They are likely to change the medicines according to their convenience or feeling of well being. The major factor to improve adherence is "Routinization" that means the ability to fit to a medication regimen to one's daily routine[12]. The asthmatics having associated co morbid condition is important factor for the non adherence[12]. Depression is also important risk factor for the non adherence[13]. In patients of bronchial asthma, patient's acceptance about illness, prescribed treatment, knowledge about and faith in the treatment, good patient-clinician relationship, and routinization of drug

Table 4. Cause of default

Cause of default	Male	Female	total	Percentage
Felt better	10	1	11	15.49
Negligence	7	3	10	14.08
Cost factor	6	6	12	16.90
Distant pharmacies	3	5	8	11.26
Difficulties with device	2	4	6	8.45
Dislike medication	0	1	1	1.40
Side effects	8	5	13	16.90
Fear about side effect	1	2	3	4.22
Anger about condition	3	3	6	8.45
Misunderstood instruction	1	0	1	1.40

Table 5. Side effects

Side effects	Male	Female	Total
Loss of taste	2	2	4
Oral thrush	2	0	2
Cough	3	2	5
tremors	1	1	2
Palpitation	0	2	2

Table 6. Distribution of Sociodemographic factors in two groups

	Non compliant	compliant	Total
Side effect	13(86.66%)	2(13.33%)	15
socioeconomic			
Class I and II	15(35.71%)	27(64.28%)	42
Class III IV V	53(74.64%)	18(25.35%)	71
Educational status			
Post graduate and graduate	12(30.76%)	27(69.23%)	39
Sec+primary	44(70.96%)	18(29.03%)	62
illiterate	12	0	12
sex			
M	41(62.12%)	25(37.87%)	66
F	27(57.44%)	20(42.55%)	47

therapy are important factors for adherence to the medications. Patients can get more information about asthma and its treatment by attending lectures of the health care professional, asthma educational course, patient support group to learn from other asthmatics, reading articles in newspapers, programs on television or radio about asthma. At the beginning of treatment, the patients should be told about diagnosis of asthma and treatment options available. Patient should be told about different inhaler devices with demonstration, and patients should be ask to choose most suitable device for them.

Present study advocates various strategies to improve compliance of asthmatics like tailoring the medication plan according to patients routine, review of self-management plan of patients and review of technique of inhaler devices. The patients who were using regular inhalers

Table 7. P value less than 0.05 is considered significant

socioeconomic	Non compliant	compliant	total	P value
Class I and II	15(35.71%)	27(64.28%)	42	0.001
Class III IV V	53(74.64%)	18(25.35%)	71	
	68	45	113	

Table 8. Association of Level of education with status of compliance

Educational status	Non compliant	compliant	total	P value
High educated	12(30.76%)	27(69.23%)	39	0.001
Low educated	56(70.96%)	18(29.03%)	74	
	68	45	113	

Table 9. Male female comparison

Sex	Non compliant	compliant	total	P value
M	41(62.12%)	25(37.87%)	66	0.61
F	27(57.44%)	20(42.55%)	47	
total	68	45	113	

Table 10. Effectiveness of patient's education in enhancing the compliance towards aerosol therapy

	Male	Female	total
Before education			
Non compliant	41	27	68
After repeated health education(at the end of 3 month)			
compliant	12	10	22(32.35%)
Non compliant	29	17	46

with proper technique were encouraged and praised. The worries and difficulties of patients and family members were answered.

Patients should be given all rights to express their expectations regarding asthma and its management. Most of the patients are entitled to expect freedom from day and night asthma symptoms, no limitation of activities including sports and best possible lung function (e.g., peak expiratory flow). In a study conducted in Sweden on compliance with medications in asthma patients the important factors that resulted in noncompliance were age gender duration of the disease and patients view on asthma[14]. Thus, it is prudent in current scenario where urbanisation of society brings various options of better understanding of our partients regarding their diseases and treatment options available to ensure compliance of arosol therapy in asthmatics for better control of disease.

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