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Research Article

EVALUATION OF THE KNOWLEDGE OF PATIENTS, COMPLIANCE TO TREATMENT AND THE IMPACT OF PATIENT EDUCATION ON ASTHMA: A QUESTIONNAIRE BASED STUDY ON OUTPATIENT ASTHMATICS

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ABSTRACT
The purpose of this study was to evaluate the patient knowledge of asthma, their compliance to treatment, providing patient education and evaluating the impact of education on asthma management. With this view an interventional study was conducted from December 2008 to March 2009 among the asthma outpatients of Department of Respiratory Medicine, Govt. Medical College Hospital, Thiruvananthapuram, Kerala, South India. By using a semi-structured questionnaire, the study was carried out on 100 patients between the ages of 12 - 70 year. Information such as demographic data, triggering factors and frequency of asthma attacks, history of childhood and hereditary asthma, knowledge level of patient, usage of common medication, inhaler usage, side effects, compliance to treatment and reasons for non compliance was collected by direct interview method. Pulmonary function test was performed and patient education was provided to participants. After three months, all the participants were assessed again. The collected data was analyzed by using statistical package for the social sciences (SPSS) software. The study revealed that 75 % of patients were females and 25 % were males. Majority of the patients were under the age group of 30-39 years (32 %). The analysis of educational status revealed that the majority of study population was literate. Major precipitating factors for asthma were found to be dust, weather, smoke and cold. In the study population 26 % had a history of childhood asthma, 49 % had history of hereditary asthma, 74 % used dry powder inhaler and 26 % used metered dose inhaler. It was found that Budesonide/formoterol and Salmeterol/fluticasone are the commonly prescribed combination medication and the only side effect reported was dysphonia. Cost of medication was the major reason for non-compliance. In follow up, patient education was found to have a significant impact on smoking habits, inhaler usage, patient compliance and knowledge. From this study, it was clear that patient education plays an important role in the better management of asthma.
Keywords: Asthma, Patient knowledge, Patient education

INTRODUCTION

Asthma is a chronic inflammatory disorder of the airways in which many cells and cellular elements play a role. The chronic inflammation is associated with airway hyper responsiveness that leads to recurrent episodes of wheezing, breathlessness, chest tightness and coughing particularly at night or in the early morning[1]. Onset of asthma can occur at any age but children and young adults are the commonly affected age groups. Both sexes are affected almost equally though slight differences in prevalence between males and females have been reported. The exact cause of asthma is not known. It could be partly genetic and partly environmental in origin[2]. Asthma is classified as mild intermittent, mild persistent, moderate persistent and severe persistent[3]. Asthma affects an estimated 300 million people worldwide and the prevalence of asthma is continuing to rise throughout the world. The Poor asthma control is responsible for a large proportion of the total cost of the disease[4-6]. Increasing patients' knowledge about their asthma therapy is vital to asthma management as people with asthma are likely to be using multiple medications and delivery devices[7]. In asthma, inhaler medications are popularly used for their convenience, effectiveness and less side effects. The incorrect use of inhalers will lead to sub optimal treatment. Their improper use is found to be one of the major causes of non compliance among asthma patients[8]. People with asthma can lead a normal and healthy life and one major step in ensuring this is adherence to their management plan[7]. Poor adherence to the prescribed medication regimen has evolved as a major concern worldwide for health care providers. Educating patients about their disease state and medications will improve the patient knowledge regarding medications and can increase the compliance in therapy. Moreover it is well documented that safe and effective drug therapy most frequently occurs when patients are well informed about their medications[8]. Poorly controlled asthma can also be potentially fatal. Therefore, there is urgent need for an asthma education program for better asthma management[9]. Research shows that asthma education can be cost effective and can reduce morbidity for both adults and children especially among high risk patients[3]. Thus patient education has become a key component of asthma management for asthma patients at all age groups. Therefore, the preset study was designed to evaluate the patient knowledge of asthma, their compliance to treatment, providing patient education and evaluating the impact of education on asthma management.

MATERIALS AND METHODS

After getting necessary approval from institutional ethical committee, the study was conducted from December 2008 to March 2009 among the asthma outpatients of Department of Respiratory Medicine, Govt. Medical College Hospital, Thiruvananthapuram, Kerala, South India. The study was carried out on one hundred patients between the age of 12 - 70 years with clinically diagnosed asthma and using either metered dose inhalers or dry powder inhalers. Consecutive patients satisfying up to the sample size was selected for the study. None of the participants had under gone asthma counselling before and they had no history of heart disease, stroke, renal disease, chronic obstructive pulmonary disease and tuberculosis. A brief introduction regarding the study was given to the participants and their consent was obtained in the

prescribed format. The study was carried out by using a semi structured interview schedule. Information was collected by direct interview method. Information regarding age, sex, educational status, triggering factors of asthma, history of childhood asthma and hereditary asthma, smoking habits, knowledge level of patients, usage of common medication, inhaler usage, side effects, compliance to medication, and reasons for non – compliance were assessed and patient responses were recorded. Pulmonary function test was also performed at baseline. The patient education was instituted according to the subject's educational needs. Details regarding basic knowledge on disease process, prevention of allergy and medication were provided to the subjects during education session. In case of illiterate patients, who are unable to read, more emphasis was placed on direct patient education. Inhaler technique was demonstrated to the subjects wherever necessary. During the 3rd month follow up subjects were again assessed for knowledge of asthma, compliance, and inhaler technique. Pulmonary function test was also performed during follow up. The data obtained was analysed by using statistical package for the social sciences (SPSS) software. The statistical techniques such as Chi - square tests, paired t test, z test for proportion, fisher's exact test were used.

Ethical Approval: The Institute human ethical committee has given approval for the study. (IEC No. 08/10/2008/MCT, Dated 18/12/2008)

RESULTS

An interventional study was conducted from December 2008 to March 2009 among the asthma outpatients of Department of Respiratory Medicine, Govt. Medical College Hospital, Thiruvananthapuram, Kerala, South India. One hundred patients in the age group of 12 - 70 years were covered during the study period. Semi structured interview schedule was the tool used to collect the data. Information was collected by direct interview method and the data obtained was analyzed by using SPSS software. Results showed that majority of study population, 75 % was females (75 patients) and the rest 25 % (25 patients) was males. According to age, total population was divided into five groups. 32 participants (32 %) were aged between 40 to 49 years. 21 participants (21 %) were aged between 50 to 59 years. 19 participants (19 %) were aged between 30 to 39 years. 10 participants (10 %) were aged between 60 to 70 years. 12 to 19 years and 20 to 29 years age group having 9 participants in each group. The analysis of educational status revealed that the majority of study population was literate. Among them 47 participants (47 %) had education in the level of below matriculation and 38 participants (38 %) come under above matriculation level. 8 participants (8 %) were graduates and 7 participants (7 %) were uneducated. The results showed that, dust was the major triggering factor (79 %) that aggravates asthma followed by weather (73 %). Smoke (62 %), cold (46 %) and perfumes (34 %) are the other triggering factors for asthma. Among the one hundred participants, only 26 patients (26 %) had a history of childhood asthma. The results showed that only 49 participants (49 %) had the history of hereditary asthma, among them 34 participants (34 %) had maternal history of asthma. 74 of 100 participants (74 %) were used dry powder inhaler and the remaining 26 participants (26 %) were used metered dose inhaler. Among one hundred patients who agreed to enter the study, eighteen patients were excluded because of difficulties in follow up. The results showed that the patient education has a significant effect on the smoking habits. At base line 70.7 % were non smokers, 4.9 % were smokers, 18.3 % were passive smokers, and 6.1 % were ex-smokers. Post-education resulted in 84.1 % to be non-smokers, 1.2 % remained as a smoker, 3.7 % to be passive smokers and ex-smokers were 11 % (Table 1). During pre and post education, dysphonia was the only reported side effect. At base line 17.1 % reported that they have dysphonia as side effect. During post-education, proportion of patients with dysphonia as side effect has reduced to 7.3 %. 82.9 % reported no side effects at base line and at follow up 92.7 % reported no side effects. Thus during post education the percentage of patients with no side effects increased, although the result was not statistically significant (Table 2). Table 3 showed that the common medicines used by the patients. It was seen that Budesonide/Formoterol and Salmeterol/Fluticasone are the commonly prescribed combination medication. During the study period proportion of patients treated with Budesonide/Formoterol combination was found to increase. Education was found to have a significant effect on the usage of metered dose inhaler. At base line, mean score was 6.6 and at follow up, mean score was found to be 7.3. Similarly the education has a significant effect on the usage of dry powder inhaler. At base line, mean score was 6.2 and at follow up mean score was found to be 6.9. During the observation of dry powder inhalers at baseline, it was found that 80.3 % of patients followed proper care of the device and 19.7 % had improper care of device and the device was found to be wet. During post education, proportion of patients who followed proper care of device was found to increase to 95.1 %, although the result was not statistically significant. Regarding with the patient knowledge, the results showed that at baseline, only 30.5 % of patients were aware that asthma is an illness that lasts many years. At follow up, significantly higher percentage of patients (47.5 %) was found to be aware of the above fact of the illness. During pre-education, 93.9 % had the knowledge that many different factors trigger an asthma episode. During post-education, significantly more patients (100 %) were aware of the triggering factors. At baseline, the proportion of patients who knew that asthma is a disease which cannot be cured but could only be controlled was 62.2 %. At follow up this percentage was found to increase significantly to 78 %. During pre-education, only 3.7 % had the knowledge that asthmatics can use a device called peak flow meter to measure how well air moves out of the lungs. At follow up, this percentage was found to increase to 9.7 %, although not statistically significant. At baseline only 25.6 % of patients were aware that symptoms of asthma are caused by swelling and narrowing of airways. During follow up, significantly higher percentage of patients (41.4 %) was found to be aware of the above fact of the illness. During pre-education 39 % had the knowledge that inhaler should be carried everywhere and during post-education this percentage was found to increase to 53.6 %, although not statistically significant. 30.5 % of patients had the knowledge that steroid inhaler is to be used every day to prevent asthma attacks from occurring at baseline. During follow up, significantly higher percentage of patients (47.5 %) was found to be aware of the above fact. At base line 73.2 % of patients knew about the usage of reliever medication where as this percentage was found to increase significantly to 87.8 % during follow up (Table 4). Regarding with the patient compliance, the results showed that at baseline 29.3 % of patients used their medication regularly. During follow up this percentage was found to increase to

42.7 %, although not statistically significant. During pre-education 29.3 % of patients used the required number of puffs per day. At follow up 43.9 % of patients reported that they used the required number of puffs per day which is not statistically significant. At baseline 29.3 % of patients used the required number of administrations per day. During follow up a higher percentage of patients (40.2 %) reported that, they took the required number of administrations per day which is statistically insignificant (Table 5). Regarding with the patient non compliance, the results showed that at pre-education level 24 patients (29.3 %) never missed their dose, 10 patients (12.2 %) missed their dose less than or equal to two times, 13 patients (15.9 %) missed their dose 3-5 times, 21 patients (25.6 %) missed their dose 6-10 times and 14 patients (17.1 %) missed their dose more than 10 times per month. At post-education level 35 patients (42.7 %) never missed their dose, 9 patients (11 %) missed their dose less than or equal to two times, 10 patients (12.2 %) missed their dose 3-5 times, 18 patients (22 %) missed their dose 6-10 times and 10 patients (12.2 %) missed their dose more than 10 times per month. Although during post education, the proportion of patients who were non compliant was found to decrease, the result was not statistically significant (Table 6). Analysis of reasons for the non compliance revealed that at pre-education level at pre-education level 9.8 % of patients were found to be non-compliant as they tend to forget to take the medication. During post education the proportion of patients with the above problem was found to decrease to 7.3 %, but the result was not statistically significant. 32.9 % of patients at pre-education level and 18.3 % of patients at post-education level were found to be non-compliant as they had no more symptoms of asthma. Thus during post education, the proportion of patients who were found to be non compliant, was found to decrease significantly. 4.9 % at pre-education level and 2.4 % of patients at post-education level were non-compliant because of non availability of medication. During post education, the proportion of patients with the above problem was found to decrease, but the result was not statistically significant. At pre-education level 36.6 % and at follow up 31.7 % of patients were non-compliant because of high cost of medication. Although proportion of patients with the above problem was found to decrease during post education, the result was not statistically significant. 18.3 % at pre-education level and 7.3 % at post-education level were non-compliant because of concern of side effects of asthma medications. Thus during post education, the proportion of patients who were found to be non compliant, was found to decrease significantly (p value is less than 0.05). 11 % were non-compliant as they were using other remedies at both pre and post education level. The result was not statistically significant (p value was greater than 0.05). At pre-education level 8.5 % and at follow up 6.1 % were non-compliant due to family problems. Statistically significant results were not obtained (p value was greater than 0.05). 9.8 % at pre-education level and 4.9 % at post-education level were non-compliant because of delay in next consultation. During post education the proportion of patients with the above problem was found to decrease and the result was statistically significant (p value less than 0.05). At pre-education level 12.2 % and at follow up 2.4 % were non-compliant due to delay in purchasing of asthma medication. The result was found to be statistically significant as p value was less than 0.05 (Table 7). Regarding with the frequency of asthma attacks, the result showed that at base line 8.5 % had infrequent attack, 17.1 % had less than 2 attacks per month, 41.5 % had 3-4 attacks per month, 29.3 % had more than 5 attacks per month and 3.7 % had daily attacks. During follow up it was observed that 11 % had infrequent attack, 25.6 % had less than 2 attacks per month, 40.2 % had 3-4 attacks per month, 20.7 % had more than 5 attacks per month and 2.4 % had daily attacks. P value was found to be greater than 0.05 and was not statistically significant (Table 8). The results showed that at pre-education level, mean FEV_1 (Forced expiratory volume in 1 second) value was found to be 1.67 and at post education level mean FEV_1 value has increased to 1.82. On statistical analysis p value is found to be greater than 0.05 which is insignificant. Mean FEV_1 % was found to be 61.1 at pre-education level and 65.5 at post-education level. On statistical analysis p value is found to be greater than 0.05 which is insignificant.

Table 1: Categorization of patients based on smoking habits

Habit	Pre patient education		Post patient education		z	p
	Count	Percent	Count	Percent		
Nil	58	70.7	69	84.1	2.055	p<0.05
Smoking	4	4.9	1	1.2		
Passive Smoking	15	18.3	3	3.7		
Ex-smoker	5	6.1	9	11.0		

Table 2: Categorization of patients based on side effects

Side effects	Pre patient education		Post patient education		z	p
	Count	Percent	Count	Percent		
Nil	68	82.9	76	92.7	1.909	p>0.05
Dysphonia	14	17.1	6	7.3		

Table 3: Categorization of patients based on medicines usage

Medication	Pre patient education		Post patient education	
	Count	Percent	Count	Percent
Budesonide + Formoterol	41	50.0	43	52.4
Salmeterol + Fluticasone	31	37.8	28	34.1
Budesonide	2	2.4	3	3.7
Tiotropium + Formoterol	1	1.2	1	1.2
Tiotropium	1	1.2	1	1.2
Beclomethasone + Salbutamol	1	1.2	1	1.2
Beclomethasone + Formoterol	4	4.9	4	4.9
Ipratropium+ Salbutamol	1	1.2	1	1.2

Table 4: Patient knowledge on asthma during pre and post education period

Knowledge about asthma	Pre patient education		Post patient education		z	p
	Count	Percent	Count	Percent		
Last Many Years	25	30.5	39	47.5	2.23	p<0.05
Triggering factor	77	93.9	82	100.0	2.271	p<0.05
No cure, but controlled	51	62.2	64	78.0	2.21	p<0.05
Peak Flow meter	3	3.7	8	9.7	1.53	p>0.05
Symptoms by airway narrowing	21	25.6	34	41.4	2.14	p<0.05
Inhaler carrying	32	39.0	44	53.6	1.87	p>0.05
Usage of steroid inhaler	25	30.5	39	47.5	2.29	p<0.05
Usage of Reliever Medication	60	73.2	72	87.8	2.35	p<0.05

Table 5: Patient compliance during pre and post education period

Compliance with	Pre patient education		Post patient education		Fisher's Exact Test
	Count	Percent	Count	Percent	
Regular medication	24	29.3	35	42.7	p>0.05
Reqd no. of puffs per day	24	29.3	36	43.9	p>0.05
Reqd no. of administration per day	24	29.3	33	40.2	p>0.05

Table 6: Patient non-compliance during pre and post education period

Non-compliance	Pre patient education		Post patient education		χ^2 Test	p
	Count	Percent	Count	Percent		
Nil	24	29.3	35	42.7	4.95	p>0.05
< = 2 Times	10	12.2	9	11.0		
3-5 Times	13	15.9	10	12.2		
6-10 times	21	25.6	18	22.0		
> 10Times	14	17.1	10	12.2		

Table 7: Reasons for non-compliance

Reasons	Pre patient education		Post patient education		z	p
	Count	Percent	Count	Percent		
Tend to forget	8	9.8	6	7.3	0.559	p>0.05
No more symptoms	27	32.9	15	18.3	2.147	p<0.05
Non Availability	4	4.9	2	2.4	0.832	p>0.05
Concern of cost	30	36.6	26	31.7	0.659	p>0.05
Concern of side effects	15	18.3	6	7.3	2.103	p<0.05
Using other remedies	9	11.0	9	11.0	0.000	p>0.05
Family problems	7	8.5	5	6.1	0.600	p>0.05
Delay in next consultation	8	9.8	4	4.9	1.199	p>0.05
Delay in purchasing	10	12.2	2	2.4	2.399	p<0.05

Table 8: Frequency of asthma attacks during pre and post education period

Asthma attacks	Pre patient education		Post patient education		χ^2 Test	p
	Count	Percent	Count	Percent		
Infrequent	7	8.5	9	11.0	3.06	p>0.05
< 2 per month	14	17.1	21	25.6		
3-4 per month	34	41.5	33	40.2		
> 5 per month	24	29.3	17	20.7		
Daily	3	3.7	2	2.4		

DISCUSSION

Asthma is a chronic inflammatory disorder and the management of asthma has undergone revolutionary changes in the last few decades. To streamline its management, several guidelines have been developed in different countries. Despite all this, morbidity and mortality due to asthma is increasing worldwide. Patient education, pulmonary function monitoring, environmental control and pharmacotherapy are four main pillars of asthma management. Patient education is an essential component of asthma management. The present study was aimed to assess the knowledge level of patients, their compliance to treatment and the impact of patient education on asthma. The study revealed that 75 % of patients were females and 25 % were males. Majority of the patients were under the age group of 30-39 years (32 %) and 50-59 years (21 %). In the selected subjects, 47 % had education in the level of below matriculation, 38 % were above matriculation, 8 % were graduates and 7 % were uneducated. There were no professionals in the study group. Major precipitating factors for asthma were found to be dust, weather, smoke and cold. In the study population 26 % had a history of childhood asthma, 49 % had history of hereditary asthma, of which 34 % had maternal history of asthma, 74 % used dry powder inhaler and 26 % used metered dose inhaler. It was found that Budesonide/formoterol and Salmeterol/fluticasone are the commonly prescribed combination medication and the only side effect reported was dysphonia. Patient Education was found to have a significant impact on smoking habits. In the post intervention, it was found that there was a significant improvement in the smoking habits. The patient education has a significant improvement in the usage of metered dose inhaler and dry powder inhaler. Concern of cost was found to be the major reason for non-compliance. Patient compliance and knowledge were improved and the frequency of attack was decreased during follow up. Regarding with FEV_1, its value

and percentage was improved in post education period comparing with pre education period. Of course better results would have been obtained if the study was conducted for a longer duration and importantly, this study was carried out in a tertiary care government hospital where most of the patients belong to low socioeconomic status and definitely certain classes of people are missing and true reflection of society is not possible here. However this study clearly implicates the necessity of education for better management of asthma.

CONCLUSION

Asthma education is an important but often most neglected aspect of asthma management in our country. Despite various guidelines and better understanding of the disease, the goals of asthma management are not met in the medical community all over the world at large but more so in developing countries, including ours. We have our own peculiar impediments in planning and implementing an asthma education program fulfilling our requirements. Lack of time and manpower, communication barriers, misconceptions about disease and its treatment and compliance to treatment, are some of the major obstacles. The present study emphasize the need for asthma education program, as significant improvement was observed in inhaler technique and knowledge level of patients and improvement occurred in compliance and lung function. Thus, there is an urgent need for close cooperation between health care providers, voluntary organizations, government, pharmaceutical companies, media and patients for planning a national level strategy for asthma education. Steps should be taken to provide asthma medications and devices free of cost to patients of poor socio-economic status, so that their compliance to medication can be improved significantly. Sincere and sustained efforts in a step-wise manner appear to be the only answer to make a start and gradually achieve this goal.

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