

Impact of Patient Education on Quality of Life of Asthma Patients in an Indian Tertiary Care Hospital

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ABSTRACT

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Background: The overall burden of asthma in India is estimated at more than 15 million patients. It can place considerable limitations on the physical, emotional, social and professional lives of patients, with substantial negative impact on quality of life (QOL). Literature provides evidence that clinical pharmacists have contributed to patient care through education which enhances the feasibility of asthma self-management.

Objectives: To study the impact of patient education provided by the clinical pharmacist regarding asthma, self-management and inhaler technique in improving the quality of life of asthma patients in a South Indian tertiary care hospital.

Methodology: The study was randomized, comparative and intervention based with 92 patients who were randomized into intervention (49 patients) and control groups (43 patients). After the enrolment period of 1 month (Baseline), three follow-ups were carried out at the intervals of 1st, 3rd and 5th month. The parameters measured in this study included peak expiratory flow rate (PEFR), inhalation technique, QOL and asthma self-management. During the follow-ups, intervention group received verbal and written education on asthma and inhaler techniques for self-management along with routine medical consultation whereas, the control group received only routine medical consultation during the follow-ups and education on asthma at the end of the study.

Results: At the baseline, mean PEFR value was 186.78 mL/sec in intervention group and 187.26 mL/sec in control group. A significant difference was noted at 2nd (P=0.006) and 3rd (P=0.000) follow-up. Intervention group showed a significant improvement in inhalation technique at 2nd (P=0.000) and 3rd (P=0.000) follow-up. At the end of the study, QOL of patients in the intervention group improved compared to control group. Significant improvement (P=0.000) was noted in Asthma Self-Management Questionnaire (ASMQ) score in the intervention group.

Conclusion: Results of this study shows that clinical pharmacist's educational interventions had a positive impact on the understanding and self-management of asthma patients which helps in improving their health and quality of life.

Key Words: Asthma, ASMQ, Patient education, Quality of Life, SF-36

INTRODUCTION

Asthma is a syndrome that is characterized by paroxysmal or persistent symptoms such as breathlessness, chest tightness, wheezing and cough. Inflammation and its resultant effects on airway structure are considered to be the main mechanisms leading to the development and persistence of asthma.¹

The prevalence of asthma increased steadily over the later part of the last century, first in the developed and then in the developing world. Current estimates suggest that asthma affects 300 million people worldwide and an additional 100

million persons will be diagnosed by 2025.² The overall burden of asthma in India is estimated at more than 15 million patients.³ About one half of the cases develop before age 10 and another third develop before 40. Allergic asthma which accounts for 25% of the cases tends to be seasonal and occurs more commonly in children & young adults.⁴ Much of the day-to-day responsibility for managing asthma falls on the patient and the patient's family.⁵ Patients with asthma similar to patients with other chronic diseases are poorly adherent to drug therapy. Asthma can place considerable limitations on the physical, emotional, social and professional lives of patients, with substantial negative impact on quality of life.⁶ These problems can be reduced through patient education by a pharmacist.^{7,8,9,10}

Asthma education is considered an essential component of asthma management. It is necessary to help patients gain the motivation, skills and confidence to control their asthma.

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Globally a poor level of practical knowledge and understanding of asthma has been reported among patients. In India, asthma patient education is not a routine practice¹¹ and hence, teaching the patient to recognize and intervene in exacerbations during their earliest stages can be helpful in avoiding more serious morbidity and in some cases, mortality. Patient Education has been defined as “a planned learning experience using a combination of methods such as teaching, counseling, and behavior modification techniques which influence patients' knowledge and health behaviour ... (and) involves an interactive process which assists patients to participate actively in their health care”.^{3,6}

This study focuses on the evaluation of the impact of patient education provided by a clinical pharmacist regarding the disease, improving quality of life, inhalation technique and self-management for asthma patients in a South Indian tertiary care hospital.

METHODOLOGY

The study was a randomized, comparative, controlled intervention study carried out for a period of 9 months in the medicine out-patient department of a tertiary care hospital, in South India. Ethical committee clearance was obtained from the Institutional Ethical Review Board of the hospital. Written informed consent was obtained from the patients before enrolling them in the study.

Study criteria

Data such as demographics, history of illness, family history, personal habits, PEFR values, patient knowledge about the illness was collected from patient's out-patient department (OPD) cards, laboratory reports and by interviewing the patients. All out-patients diagnosed with varying degrees of severity of asthma in the medicine out-patient department with oral or inhaled medication and those who were willing to participate till the end were included in the study. Patients were included in the study with reference to the senior practicing physician of the hospital. Participating patients with co morbid conditions such as hypertension, diabetes mellitus, ischemic heart disease, anxiety, hypothyroidism, epilepsy and dyslipidemia. Pediatric patients and pregnant asthmatic women were excluded from the study.

Method of collection of data:

The patients were randomized into two groups; control and intervention using a chit method. Each patient chose a folded paper (called a “chit” in India) that stated “Intervention” or “Control” and based on what was selected, the patient was assigned to the respective group. Intervention group received comprehensive medication counseling, asthma education at regular intervals. The control group received routine medical

consultation during the follow-ups and counseling at the end of the study. Medication counseling was divided into 3 phases:

(1) Pre-intervention phase

In this phase, the quality of life of patients was assessed by administering standardized asthma QOL questionnaire (SF-36). Asthma self management questionnaire (ASMQ) was used to assess their knowledge regarding self-management of disease. One-on-one interviews were conducted to document levels of self-reported adherence to therapy and life style pattern of patients such as level of exposure to allergens, pollution. Patients' existing knowledge regarding the use of inhaler was checked by using standardized nine steps of inhalation technique as shown in table 1. Patients were evaluated for PEFR at entry into the study (baseline).

(2) Intervention phase

In the intervention phase, patients were educated about asthma and its management, its complications, the importance of adhering to medications, life style modifications with the help of one to one interview and by providing them with an information leaflet for asthma. The SF-36 survey was administered by the clinical pharmacist using the language which the individual patient can follow. Patients were also shown correct inhalation technique by using a placebo inhaler.

Patients were also evaluated for PEFR during the follow-up visit; 1st follow-up was after 1 month of baseline (entry) and 2nd as well as 3rd follow-ups at the interval of 2 months.

(3) Post-intervention phase

Patients were re-assessed at 3rd month (2nd follow-up) and 5th month (3rd follow-up) to determine the improvement in their QOL, by using SF-36 questionnaire. Patients were re-evaluated at 5th month to assess their knowledge regarding self-management of disease. Improvement in correct technique of inhaler was checked by using the nine- step inhalation technique.⁵ At the end of the study, control group patients were also educated about the self-management of the disease. (Table 1)

Data analysis

At the end of the study, statistical analysis was performed using SPSS. Baseline characteristics (gender, age, education) were analyzed using chi-square test. *t*-tests for independent samples were performed to compare the participants PEFR, Inhalation technique score, SF-36 scores and ASMQ scores. *P*-values <0.05 were considered statistically significant.

RESULTS

In a span of 1 month of the baseline study, 122 patients were identified by senior practicing physicians. These patients

Table 1: Inhaler Technique Checklist used in the study

Steps	Description ^a
1	Shake the inhaler thoroughly
2	Hold the inhaler upright
3	Exhale normally
4	Place mouthpiece in mouth, lips closed around mouthpiece
5	Activate canister while beginning slow inhalation
6	Continue to inhale slowly and deeply (for a count of 4)
7	Hold breath at full inspiration for a count of 5 to 10
8	Shake inhaler thoroughly between inhalation
9	Wait at least 1 minute(count of 60) between inhalations

^aChecklists based on previously published literature⁵

were approached to participate in this study among whom 115 patients signed the consent form. However, only 108 patients participated in the 1st follow-up (end of 1st month of the study), followed by 97 patients in the second (3rd month of study) and 92 patients in the third follow-up (5th month of the study). 23 patients dropped out of the study due to factors like, distance, lack of continued interest. The remaining 92 patients completed the study and the data was included for final statistical analysis. Amongst study population, majority of the patients were found to be male in both intervention group 26 (53.1%) and control group 24 (55.8%), followed by female 23 (46.9%) in intervention and 19 (44.2%) in control groups. The minimum age group of the patients was between 20-25 years. The mean age in the intervention group was found to be 51.9±15 years ranged from 20 to >80 years and 52.7±15 years in the control group ranged from 20-79 years. Most of the patients 17(34.7%) were found to have education <4 years. Both groups were compared and no statistically significant difference with reference to gender, age and education level was found. The demographic characteristics of 92 patients is shown in Table 2.

PEFR as a parameter of asthma control

There was no statistically significant difference observed in PEFR of both the groups at baseline ($P=0.971$). Mean PEFR value at baseline was 186.78 mL/sec in intervention group and 187.26 mL/sec in control group. By the 1st follow-up, improvement was observed in both the groups though no significant difference ($P=0.447$) was evident. However, intervention group showed significant improvement in PEFR at 2nd ($P=0.006$) and 3rd follow-ups ($P=0.000$), whereas there was no improvement seen in the control group. The comparison of PEFR between the intervention and control groups at each follow-up is shown in Table 3.

Inhalation technique

At the baseline, both the groups did not show any significant difference in inhalation technique score with the mean inhalation technique score of 2 in intervention group and 1.81 in control group. By 1st follow-up, improvement was noted in

Table 2: Demographic characteristics of study participants

Characteristics	Intervention group (n, %)	Control group (n, %)	P
Gender			
Male	26(53.1%)	24(55.8%)	0.79
Female	23(46.9%)	19(44.2%)	
Age (mean± SD)	51.9±15	52.7±15	0.78
Education			
Uneducated	16(32.7%)	10(23.3%)	0.77
< 4 years	17(34.7%)	16(37.2%)	
4 – 10 years	12(24.5%)	11(25.5%)	
> 10 years	4(8.1%)	6(14.0%)	

*n = number of patients

Table 3: Comparison of PEFR between intervention and control group at each follow-up.

Groups	N	Mean	SD	T	P
PEFR value at baseline (mL/sec)					
Intervention	49	186.78	69.214	-0.036	0.971
Control	43	187.26	56.174		
PEFR value at 1st follow up (mL/sec)					
Intervention	49	195.20	50.72	0.764	0.447
Control	43	187.09	50.95		
PEFR value at 2nd follow up (mL/sec)					
Intervention	49	237.86	61.813	4.618	0.006
Control	43	180.70	56.152		
PEFR value at 3rd follow up (mL/sec)					
Intervention	49	238.47	48.92	5.817	0.000
Control	43	175.35	55.17		

*N=number of patients

the intervention group though it was not statistically significant ($P=0.447$). A significant difference was noted at 2nd ($P=0.000$) and 3rd ($P=0.000$) follow-ups in intervention group compared to control group. Comparison of inhalation technique scores between intervention and control group at each follow-up is shown in table 4.

Quality of life

The SF-36 is a generic instrument to assess patient's health related quality of life. It generates a score ranging from 0 (worst possible health) to 100 (best possible health) for eight multi-item domains. Aggregate scores are compiled as a percentage of the total points possible, using the RAND scoring table.¹² Scores from those questions that address each

Table 4: Mean of Inhalation technique score at different follow ups

Groups	N	Mean	SD	T	P
Inhalation Technique Score at baseline					
Intervention	49	2.00	1.000	0.930	0.355
Control	43	1.81	0.906		
Inhalation Technique Score at 1st follow-up					
Intervention	49	4.45	1.50	0.764	0.447
Control	43	1.86	0.97		
Inhalation Technique Score at 2nd follow-up					
Intervention	49	5.90	1.3731	5.976	0.000
Control	43	1.86	0.990		
Inhalation Technique Score at 3rd follow-up					
Intervention	49	7.76	1.13	26.460	0.000
Control	43	1.91	0.97		
*N=number of patients					

specific area of functional health status are then averaged together, for a final score within each of the 8 dimensions measured. (e.g. pain, physical functioning etc.). Table 5 shows the comparison of SF-36 score between intervention and control group at the baseline, 2nd follow-up and 3rd follow-up. The results indicated that there was significant improvement in the quality of life of patients belonging to intervention group compared to control group.

Asthma self-management

The 16-item, multiple-choice asthma self-management questionnaire (ASMQ) was used. It generates a score of 0 to 100, with higher scores indicating more correct responses.¹³

Table 4: Mean of Inhalation technique score at different follow ups

Domains	Groups	N	Mean	SD	t	P
Physical functioning						
Baseline	Intervention	49	36.12	29.462	-0.31	0.756
	Control	43	38.02	28.788		
2 nd follow-up	Intervention	49	57.96	25.164	4.89	0.000
	Control	43	33.14	23.223		
3 rd follow-up	Intervention	49	74.08	18.870	12.68	0.000
	Control	43	25.471	7.720		
Role, Physical						
Baseline	Intervention	49	28.06	41.026	0.08	0.933
	Control	43	27.44	27.611		
2 nd follow-up	Intervention	49	50.51	30.826	4.87	0.000
	Control	43	22.91	22.153		

3 rd follow-up	Intervention	49	64.59	26.410	9.10	0.000
	Control	43	18.95	20.920		
Role, Emotional						
Baseline	Intervention	49	34.69	45.623	-0.17	0.864
	Control	43	36.24	39.752		
2 nd follow-up	Intervention	49	42.86	44.618	0.83	0.408
	Control	43	35.46	40.134		
3 rd follow-up	Intervention	49	51.02	39.730	2.57	0.012
	Control	43	30.81	35.190		
Energy/Fatigue						
Baseline	Intervention	49	36.48	20.097	-0.77	0.443
	Control	43	39.42	15.923		
2 nd follow-up	Intervention	49	42.19	15.882	2.04	0.045
	Control	43	35.70	14.540		
3 rd follow-up	Intervention	49	46.68	17.470	4.65	0.000
	Control	43	30.93	14.610		
Emotional well being						
Baseline	Intervention	49	51.37	25.237	-1.48	0.142
	Control	43	58.86	22.953		
2 nd follow-up	Intervention	49	55.12	21.561	-0.12	0.902
	Control	43	55.67	21.109		
3 rd follow-up	Intervention	49	59.16	17.950	2.59	0.011
	Control	43	53.40	21.050		
Social functioning						
Baseline	Intervention	49	60.031	25.400	-1.09	0.281
	Control	43	65.593	23.500		
2 nd follow-up	Intervention	49	64.500	23.031	-0.03	0.977
	Control	43	64.640	24.055		
3 rd follow-up	Intervention	49	66.30	21.950	0.43	0.667
	Control	43	64.19	24.930		
Body pain						
Baseline	Intervention	49	53.367	24.878	0.49	0.627
	Control	43	50.655	28.519		
2 nd follow-up	Intervention	49	57.245	21.428	1.59	0.116
	Control	43	50.049	22.024		
3 rd follow-up	Intervention	49	59.08	19.970	1.26	0.112
	Control	43	45.47	23.220		
General health						
Baseline	Intervention	49	31.43	23.496	-0.98	0.331
	Control	43	36.28	24.025		
2 nd follow-up	Intervention	49	50.82	25.132	2.83	0.006
	Control	43	36.28	24.025		
3 rd follow-up	Intervention	49	64.08	19.490	7.92	0.000
	Control	43	30.58	21.070		

At baseline, mean ASMQ score was 4.49 in intervention group and 3.91 in control group. Intervention group showed statistical improvement at the 3rd follow-up ($P=0.000$) compared to control group.

DISCUSSION

In many countries, clinical pharmacy services are still in their infancy, with pharmacists spending a predominant amount of time on distributive and manufacturing activities.¹⁴ In India,

Follow ups	Asthma self-management scores (Mean±SD)		t	p
	Intervention	Control		
Baseline	28.6 ±18.7645	24.395 ± 15.5	1.146	0.255
3 rd follow-up	75.13±16.06	25.12±15.47	15.159	0.000

pharmacy practice is still in its infancy.¹⁵ The clinical pharmacist's contribution to patient care through education and counseling is an approach being advocated to optimize drug therapy and improve patients' quality of life. At the baseline of the present study, patients in both groups were found to have poor QOL. The observations showed significant improvement in PEFR of the intervention group. Previous studies involving patient education also demonstrate similar improvement in PEFR value of asthma patients.^{9,16,17,18,19}

There is evidence that poor inhaler technique is associated with poor asthma control. The efficacy of asthma treatment depends on patients' ability to perform the inhalation technique correctly.²⁰ Many studies have shown that education has a significant positive impact on the patients' knowledge of correct inhalation technique.^{21,22,23,24} This study also demonstrates that patient education facilitated by the clinical pharmacist resulted in the improvement of inhalation technique. However, one study showed no significant improvement, probably due to the short duration of the educational intervention and the lack of reinforcement in subsequent visits.²⁰ Patient education showed statistically significant improvement ($P=0.000$) in most of the domains of SF-36 questionnaire except social functioning which is not related to asthma and body pain which is also not specifically related to asthma. This shows the impact of asthma education on their quality of life. However, one study reported that the intervention carried out by specialized asthma nurses in 41 general practices in London, did not detect any improvement in quality of life or in the quality of asthma care, probably due to the large number of patients who required management in primary care and the high turnover of practice nurses.²⁵ Since inhalation medication is most important part of the treatment

in asthma, improper use of the same leads to worsening of the condition. Most of the patients in both the groups were found to be using improper method for inhalers. At baseline, mean inhalation technique score was 2 in intervention group and 1.81 in control group. A significant difference was observed at 2nd ($P=0.000$) and 3rd ($P=0.000$) follow-ups. Education showed significant improvement in intervention group. Similar result was found in the study conducted by M Schulz et.al, in which there was significant improvement with regard to inhalation technique and PEFR value.²⁶

Although, new medicines and evidence based guidelines have been developed in recent years, there has been no major change in asthma morbidity and mortality. Asthma continues to be incompletely managed with the drugs being prescribed with or without supervision. Appropriate management recommends appropriate medication, patient education, and a written action plan, ongoing monitoring, appropriate follow-up, and specialty referral where appropriate. Self-management skills should be developed through education of the patients about asthma and its appropriate treatment by health care professionals. Clinical pharmacists can educate patients by providing information about asthma medications and by demonstrating how to use inhaled medications and peak flow meters. They can help patients to understand their asthma management plan.

CONCLUSION

As the first study of this nature in this tertiary care hospital of South India, initiating educational intervention for asthma patients in this study achieved improvement in PEFR, knowledge regarding inhalation technique, self-management of asthma and QOL of the patients who were included in the intervention group. This study validates that clinical pharmacist's educational interventions impact health and quality of life of asthma patients, positively.

LIMITATIONS

1. Pulmonary function test of patients in both groups at each phase of the study could not be carried out due to financial constraints of patients. Because of insufficient data, PFT of patients could not be compared.
2. Specific questionnaires like Asthma Quality of Life Questionnaire (AQLQ [Juniper]) or (AQLQ [Marks]) could not be used in the study as required permissions could not be obtained within the limited study period.
3. In this study, QOL is based on self-reports of patients and has not been validated on any other objective assessments.
4. Patients were not available for follow-up and hence the exact reasons other than their lack of interest, could not be documented.

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