



## **CLINICAL PHARMACIST ROLE IN THE MANAGEMENT OF ASTHMA IN A TERTIARY CARE HOSPITAL**

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### **ABSTRACT**

Asthma is a chronic inflammatory disorder of the airways, in which many cells play a role, in particular mast cells, eosinophils and t-lymphocytes. This inflammation causes recurrent episodes of wheezing, breathing, chest tightness and cough particularly at night or in morning. Asthma has been growing in prevalence and has imposed an increasingly large burden on health services. This study was targeted on educating the patient about the disease and medications in order to improve the health status and quality of life. The study aims at educating the patients in overcoming the common misconception prevalent among patients suffering from the diseases, to help maintain the social relationship with family and friends and in turn provide better psychological support treatment.

**Key words:** Chronic obstructive pulmonary disorder, Patient compliance, Patient counseling, Prospective interventional study.

### **INTRODUCTION**

#### **Aim**

To study the role of pharmacist in the management of Asthma.

#### **Objectives**

To assess the quality of life with help of St. George Respiratory questionnaire. medication knowledge of patients with help of questionnaire with patient counseling on medication knowledge and to assess the compliance by pill count method and self-assessment method.

#### **The goals of asthma management**

- Control symptoms so as to maintain normal activity levels, including exercise.

- Maintain pulmonary function as close to normal levels as possible.
- Establish plans for the prevention and management of exacerbations.
- Avoid adverse effects from asthma medications.
- Educate patients to develop a partnership in asthma management.
- Establish plans for chronic management and regular follow-up care.
- Prevent development of irreversible airway obstruction and reduce asthma mortality by strict adherence to the above goals.

### **Reasons for failure to achieve asthma control**

- Problems with patient adherence to treatment plan.
- Problems with patient technique in using medications.
- Coexisting conditions (e.g., sinusitis, allergens or irritant exposure, gastroesophageal reflux).
- Psychosocial or family barriers
- Needs for temporary increase in anti-inflammatory medication (e.g., short course of a corticosteroid)

### **Patient counseling**

Counseling is both an art and science because of its underlying principles and art because of the blend of the counselor's personality, technique and skill. Counseling is about helping people and as people and treatment different, there can be no universal or predetermined methods of counseling. It helps the patient to take the medication in a manner that is most likely to achieve the desired therapeutic response.

Appropriate advice, and counseling by the pharmacist will make the patient understand better about their medication, which have become potent and toxic with the advancement of science this will in turn increase patient compliance, which can otherwise result in inappropriate or inadequate use of drugs,

The objective of the counseling is to provide directions, instructions, advices about the drug as per prescription and imply a positive behavior in which the patient is motivated to adheres to the prescribed treatment. Moreover, as per the new code of ethics it become the responsibility of the pharmacist to counsel the patient before dispensing of drugs in many countries.

### **Patient compliance**

Patient compliance or adherence may be defined as the extent to which a patient takes or uses medication in accordance with the medical or health advice given.

Patients on short term medication tend to show greater compliance than those at long term therapy. In a Swedish study in late 1970's showed that patients with hypertension showed 100% compliance at the beginning, where as 94% at the end of 1<sup>st</sup> year & 34% at the end of 3<sup>rd</sup> year.

### **Factors effecting patient compliance**

- Nature of the treatment.
- Nature of the medication.
- Characteristics of the patient.

- The type of the illness.
- The behavior of the doctor.

Pharmacist's or the counselor, lack of knowledge or information regarding medicines and health related matter constitute the leading problem in patient compliance. This is the reason why patient education is taken as a major challenge by the pharmacist engaged in patient counseling. Through patient education, the pharmacist aims at "right drug to the right patient at the right time, in the right dose through the right route, and in a right manner".

### **Compliance assessment (Pill Count)**

Compliance assessment contains a formula to calculate compliance by pill count method.

$$\text{Compliance} = \frac{\text{Total No. of tablets taken}}{\text{Total No. of tablets to be taken}} \times 100$$

Self-assessment form contains a grading scale of compliance with this form patients will grade their compliance according to their perception,

- Almost followed prescribed regimen.
- Sometimes follow prescribed regimen.
- Compliant half of the time.
- Compliant most of the time.
- Compliant all the time.
- It also contains factors which effect patient compliance.
- Forgetfulness, confusion, Apathy, health beliefs, Dissatisfaction, cost of medication.

In a randomized study medical records were examined for 253 randomly selected asthma patients from 18 general practices in England. Quality of care was assessed against seven predetermined QIs. The preliminary findings were that quality of asthma care varied with deprivation support the idea that primary care may be targeting care to those in most needs. However, variations were small and only significant for two QIs.<sup>1</sup>

A patient compliance survey in a general medical clinic was carried out in Hong Kong. Of the 61 patients interviewed, 12 (19.7%) were non-compliant and 21 (34.4%) were partially compliant. Reasons for poor treatment compliance include appearance or worsening of symptoms, disappearance of symptoms, forgetfulness. In this pilot study, 50% of patients on long term medical therapy were found to be non-compliant. It was recommended that pharmacist should take an active role to educate patients about the appropriate use of drugs reinforce compliance<sup>2</sup>.

A study was carried out by senior pharmacist of Tasmania's department of Health and Community Services, designed the pharmacy follow up project where totally 500 patients were interviewed. This study came out with a conclusion that they a good deal to gain by taking their medications properly, particularly if they have already experienced an admission to hospital, where there was a proper pharmacist intervention is present<sup>3</sup>.

A study conducted by pharmaceutical care services recognized in New Zealand, where 100 patients were recruited. On average, 4.3% medication-related compliance related. The most common interventions were revision of patient's asthma action plans, referral and medication counseling. Clinical outcomes included reduced bronchodilator use and improved symptom control in around two-thirds of patients. Asthma-specific QOL changes were more positive and correlated well with clinical indicators<sup>4</sup>.

The pharmacist counseling of patients hospitalized with acute exacerbations of asthma significantly enhanced medication adherence after discharge and reduced (Emergency Department) ED visits and hospital.<sup>5</sup>

The main role of pharmacist in improving asthma care guidelines was designed to help pharmacist which was released by national Asthma Education and Prevention program coordinating committee. The article describes about the pivotal position occupied by the pharmacist and the role of pharmacist in identifying the problems related to uncontrolled asthma, education of patients about their medications, monitoring the patients. Finally it concludes that by their education and supportive role pharmacist who can contribute to improve the control of asthma and enable the patients to live full active and productive life<sup>6</sup>.

A randomized controlled study on asthma and COPD disease. They included 78 asthmatics and 62 COPD patients and the effect of patient education on health related quality of life was analyzed using St. George's respiratory questionnaire (SGRQ). This study concluded that the patient education increased the health related quality of life and FEV1, among asthmatics, but not among patients with COPD<sup>7</sup>.

Evaluated the impact of medication consultations with a medication event monitoring system. A study, which was conducted in cardiology clinic and outpatient pharmacy at Bronx veteran Hospital, Bronx in New York district U.S. patients where medication knowledge and medication adherence (pill count method and medication event monitoring system) were determined at one-month follow-up. The adherence with pill count was 90.8% whereas with MEMS was 80.7%. The average medication adherence rate in patients who received therapeutic consultation at the clinic was 83.2% Vs 78% for outpatient pharmacy<sup>8</sup>.

Conducted an uncontrolled multicentre study to assess the relationship between indicators of ventilatory function and quality of life. 746 patients with asthma received 8 weeks of treatment with Formoterol 12 to 24 µg BID. They concluded that an 8-week treatment with Formoterol improved PEF and decreased daytime and nighttime symptoms of asthma. Patient's quality of life is also improved<sup>9</sup>.

In a meta-analysis study, the role of pharmacist in improving as work in community pharmacies, hospitals or clinics they are in pivotal position to contribute to overall management of asthma was carried out, this study came out with the conclusion that pharmacist can educate patients by providing information on the types and purpose of asthma medications and how to use inhaled medications and peak flow meters. Pharmacist can be a valuable source of important information provider for other members of health care team<sup>10</sup>.

In a Canadian asthma education and management program, a three year search for asthma education identified 74 patient education programs for an asthma population estimated to exceed 1.2 million. The study survey shows that there has been progress in establishing asthma education programs in Canada, although there are significant regional difference in the availability of such programs<sup>11</sup>.

## Methodology

**Study site:** The study was carried out at Krishna Institute of Medical Sciences, which is a 500 bedded tertiary care hospital, located in Secunderabad.

**Study period:** Nov. 2010 to July 2011.

**Study design:** Prospective Interventional Study.

The first step in the study is to design a documentation form, patient medication knowledge assessment form and compliance assessment form. Documentation form was used to collect patient details to known about their past and previous medication histories, lab results and other details of the patient.

### Inclusion criteria

Patients aged above 18 years and below 60 years of age, Patients who are diagnosed with Asthma, Patients who are having an established prescription and were diagnosed at least 6 months for asthma, Patients who agree to perform study related tests.

### Exclusion criteria

Patients aged below 18 years and above 60 years of age, pregnant patients, patients with major disorder of hepatic, GIT or Hemopoietic systems, patients who are not willing to participate, patients with fluctuating or rapidly deteriorating renal function, chronic smokers.

Patient who shall satisfy the inclusion criteria were enrolled in the study for collection of base line data and details about their prescription. Patients were then assessed for their quality of life using St. George Respiratory Questionnaire, patient compliance and medication knowledge.

## RESULTS AND DISCUSSION

During the study period a total of 77 patients were enrolled, In which 80.51% of patients reported with Asthma (n = 62) and 19.48% (n = 15) were Chronic Obstructive Pulmonary Disease. Only 36 patients were fulfilling the inclusion criteria and those patients were included in our study (mean age, 39.29).

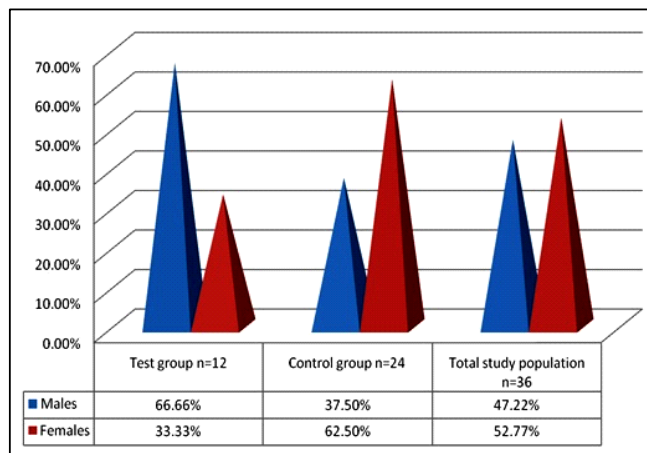
The patients are randomly classified into (a) test group or intervention group (n = 12, 33.33%) and (b) control group (n = 24, 66.66%) with a mean age of 36 years and 42.58 years respectively.

### Demographic data based on age and sex

In our study, the overall study population considered of 36 patients of whom 52.77% (n=19) were female. The female population was found to be slightly more than male 47.22% (n=17). This shown that inadequate knowledge or inappropriate therapy is known to cause more asthma in female. Gender categorization was done to know which population affected more with asthma (Table 1 and Fig. 1).

**Table 1: Demographic data of asthmatic patients based on sex**

Sex	Test group (n = 12)	Control group (n = 24)	Total study population (n = 36)
Male	8 (66.66%)	9 (37.5%)	17 (47.22%)
Female	4 (33.33%)	15 (62.5%)	19 (52.77%)

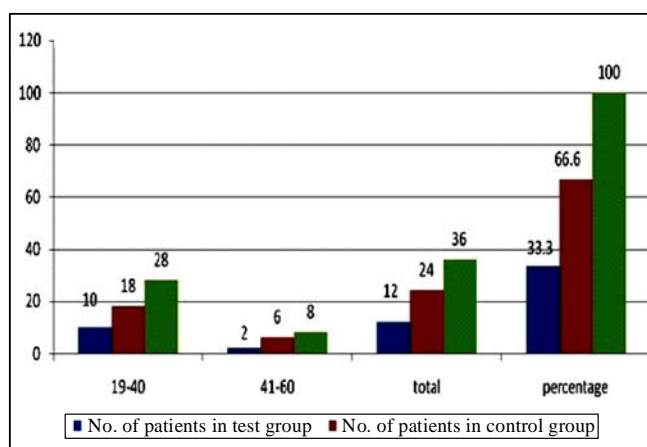


**Fig. 1: Demographic data of asthmatic patients based on sex**

While categorization of patients based on age in our study, the results shown that 77.77% (n = 28) of people are exposed to asthma in the age group of 19-60, and only 8.33%, and 13.88% of people from other two groups (Table 2 and Fig. 2).

**Table 2: Demographic data of asthmatic patients based on age in years**

Age in years	Test group (n = 12)	Control group (n = 24)	Total study population (n = 36)
19-40	10 (83.33%)	18 (75%)	28 (77.77%)
41-60	2 (16.66%)	6 (25%)	8 (22.23%)



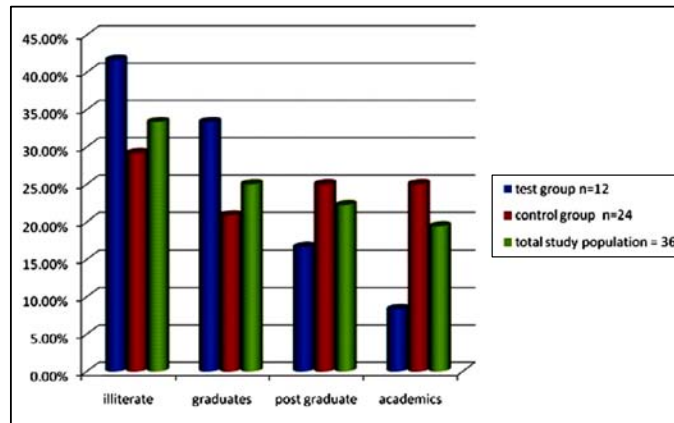
**Fig. 2: Demographic data of asthmatic patients based on age in years**

The study population was categorized according to education (Table 3 and Fig. 3). It was clearly shown that 66.66% (n = 24) of people affected are more with asthma coming under graduate level to academic staff, and illiterates found to be 33.32% (n = 12).

Whereas the occupational characteristics are concerned (Table 4 and Fig. 4), housewives, are effected more 36.11% (n = 13) and least with labor, 5.55% (n = 2). All other group carried 58.32% (n = 21).

**Table 3: Demographic data of asthmatic patients based on academics**

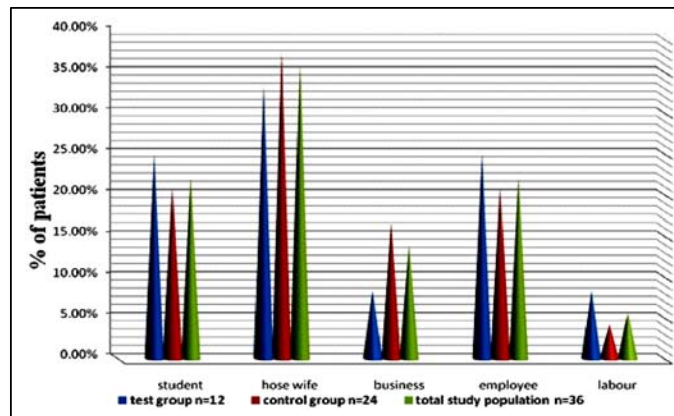
Education	Test group (n = 12)	Control group (n = 24)	Total study population (n = 36)
Illiterate	5 (41.66%)	7 (28.71%)	12 (33.32%)
Graduates	4 (33.33%)	5 (20.83%)	9 (25%)
Post graduates	2 (16.66%)	6 (25%)	8 (22.22%)
Academic staff	1 (8.33%)	6 (25%)	7 (19.44%)



**Fig. 3: Demographic data of asthmatic patients based on education**

**Table 4: Demographic data of asthmatic patients based on occupation**

Occupation	Test group (n = 12)	Control group (n = 24)	total study population (n = 36)
Student	3 (25%)	5 (20.83%)	8 (22.22%)
House wife	4 (33.33%)	9 (37.5%)	13 (36.11%)
Business	1 (8.33%)	4 (16.66%)	5 (13.88%)
Employee	3 (25%)	5 (20.83%)	8 (22.22%)
Labor	1 (8.33%)	1 (4.16%)	2 (5.55%)



**Fig. 4: Demographic data of asthmatic patients based on occupation**

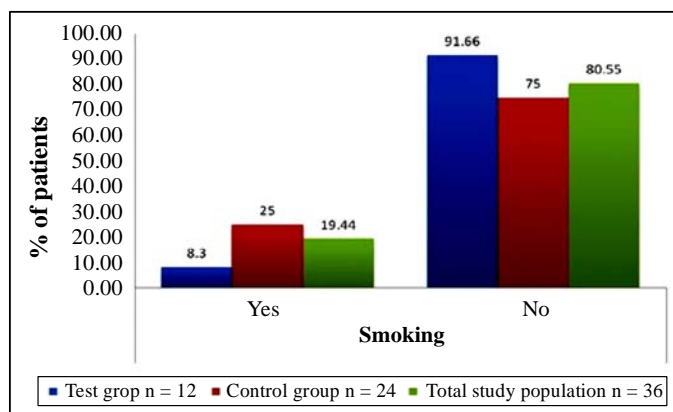
Results from the Table 1 and Table 4 show that females report significantly lower quality of life. It may be due to exposure to asthma triggers that include house hold dust mite, smoke, psychological stress, menstruation, pungent odor etc. The other professionals like bakers (flour dust), farmers (hay hold), spice and enzyme workers, printers (Arabic gum), chemical workers (Azo dyes, polyvinyl chloride) plastics, rubbers and workers also exposed more to the asthma.

**Demographic data based on social habits**

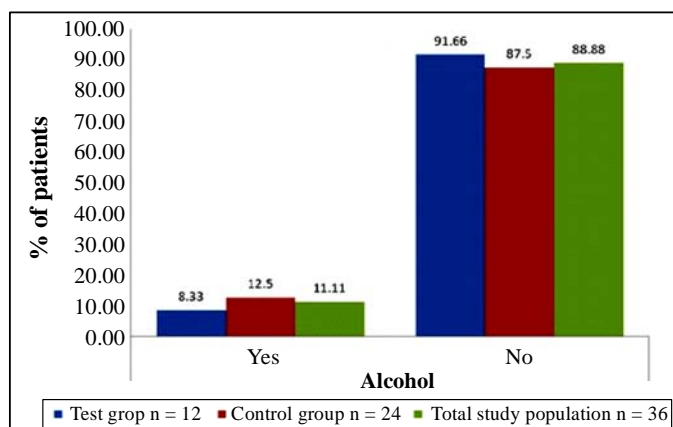
Data were also studied based upon smoking (Table 5 and Fig. 5) and alcohol (Table 5 and Fig. 6) habits were defined by assessing the status by yes/ no answer. Studies revealed that smoking and alcohol are precipitating the asthma. It is also examined that relation between childhood Environmental Tobacco Exposure (ETS) will give asthma in adulthood.

**Table 5: Demographic data of asthmatic patients based on social habits**

Social habit	Assessment	Test group (n = 12)	Control group (n = 24)	Total study population (n = 36)
Smoking	Yes	1 (8.33%)	6 (25%)	7 (19.44%)
	No	11 (91.66%)	18 (75%)	29 (80.55%)
Alcohol	Yes	1 (8.33%)	3 (12.5%)	4 (11.11%)
	No	11 (91.66%)	2 (87.5%)	32 (88.88%)



**Fig. 5: Demographic data of asthmatic patients based on smoking**



**Fig. 6: Demographic data of patients based on alcohol**



In our study, reports stated that even non-smokers (80.55%) and non-alcoholics (88.88%) were also exposed more to asthma.

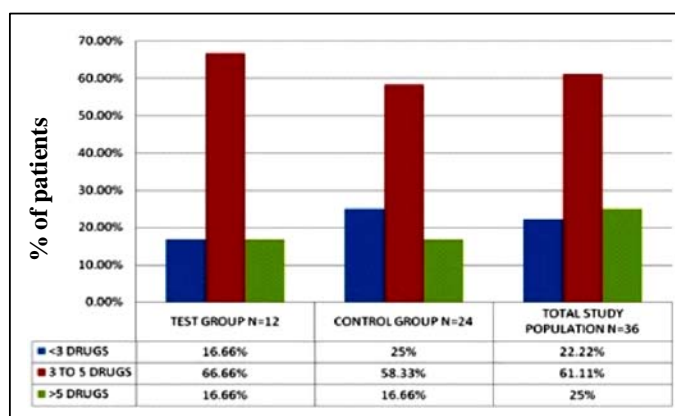
### Demographic data based on treatment profile

Combinations of drugs are used to control asthma or improve compliance in asthmatic patients. A stepwise approach was recommended by the NAEPP for managing asthma in adults and children over 5 years of age consisting of none to 5 types of drugs are used to maintain asthma severity.

In our study, nearly 61.11% of asthmatic patients were using 3 to 5 numbers of drugs (Table 6 and Fig. 7), whereas 22.22% (n = 8) of asthmatic population is using less than 3 drugs, and 25% (n = 9) are using more than 5 drugs treatment regimen.

**Table 6: Demographic data of asthmatic patients based on number of drugs used**

No. of drugs used	Test group (n = 12)	Control group (n = 24)	Total study population (n = 36)
< 3	2 (16.66%)	6 (25%)	8 (22.22%)
3-5	8 (66.66%)	14 (58.33%)	22 (61.11%)
> 5	2 (16.66%)	4 (16.66%)	9 (25%)



**Fig. 7: Demographic data of asthmatic patients based on number of drugs used**

### Patient compliance: Pill count method

A study was done to examine the patient compliance with regard to the asthmatic drug administration. It was found that 19.7% were noncompliance and 34.45% were partially compliant due to different reasons. It was recommended that pharmacist should take an active role to educate patients about the appropriate use of drugs and reinforce compliance.

The effect of pharmacist counseling on improving drug use, methods and strategies were developed for improving compliance through indirect method like self-report, interview, therapeutic outcome, pill count, computerized compliance and direct methods like biological makers, tracers compounds etc, it was concluded that the need for healthcare provider to understand the noncompliance factors and use of effective methods to counter that to increase compliance behavior.

In our study, compliance or adherence to the medication was assessed by pill count method (Appendix 2). It was excellent as verified by the pill count method, assessed at the end of all visits by counting remaining tablets.

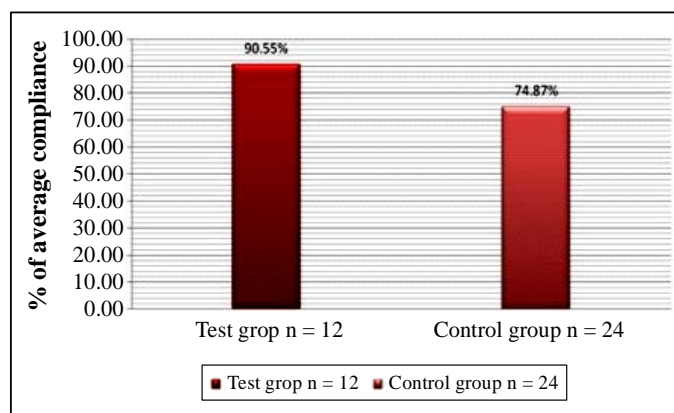
The average percentage of compliance was more in test group 90.55% ( $F = 0.1436$ ,  $^{ns}p = < 0.9813$ ) than the other group 74.87% ( $F = 0.6062$ ,  $^{ns}p = < 0.6953$ ). But it was noted that in both groups were statistically not significant, but comparatively there was more compliance in the test group.

**Table 7: Demographic data of asthmatic patients based on their compliance**

Average percentage of compliance	Test group (n = 12)	control group (n = 24)
	90.55%	74.87%

**Table 8: Mean medication knowledge assessment score**

Characteristic population	Base line	End of study time	% Change	P value
Test group	24.41 ± 9.64	54.33 ± 4.79	122.57	*p = < 0.0001
Control group	14.30 ± 8.18	20.87 ± 16.00	45.94	P = < 0.0868



**Fig. 8: Demographic data of asthmatic patients based on their compliance**

### Patient knowledge, attitude and practice assessment

It was done using questioner (Appendix 5) and found to be very significant changes in test group (122.57%) and in control group it was found that (45.94%), which is statistically in test group than the control group.

### Data: Mean ± SD

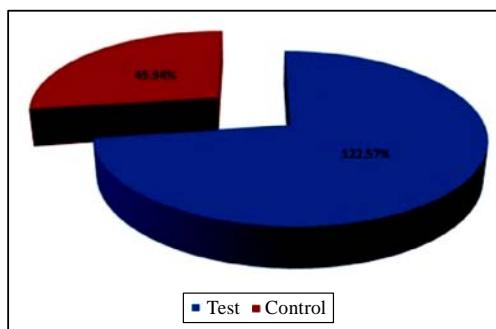
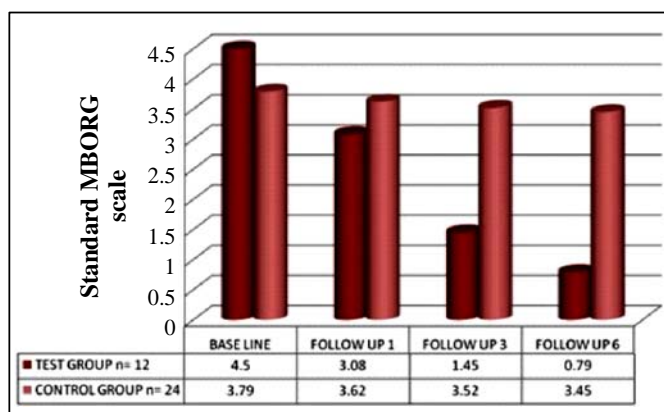
### Asthma severity: Comparison with standard modified borg scale dysnoea scale

The severity of the asthma were read by using the MBORG scale (Annexure 6), and compared between the test and control groups with characteristic symptoms percentage predicted.

In our study, there was a significant change from base line to 6<sup>th</sup> follow up in test group. This is shown in Table 9 and Fig. 9.

**Table 9: Comparative statement of MBORG Scale between test and control group**

Characteristic group	Base line	Follow up 1	Follow up 3	Follow up 6
Test group	4.5	3.08	1.45	0.79
Control group	3.79	3.62	3.52	3.45

**Fig. 9: Percentage change in mean medication knowledge score****Fig. 10: Comparative statement of MBORG scale between test group and control group****Data: Mean****Health related quality of life: St. George Hospital Respiratory Questioner**

Health related quality of life was assessed (Appendix 4) in terms of symptoms, activity, impact and total score using St. George Hospital Questioner at an interval of 30 days for 6 months. The score was assessed using excel-based scoring calculator.

A study developed a 76 item questionnaire, the St. George's respiratory questionnaire (SGRQ) and performed three studies to assess the repeatability, sensitivity and validity of it. This standardized measure was designed to quantify the impact of diseases of chronic airflow limitation on health and wellbeing and to be sufficiently sensitive to respond to changes in disease activity. The study concluded that SGRQ is a valid measure of impaired health in diseases of chronic airflow limitation that is repeatable and sensitive.

A literature study conducted observational study to identify determinants of pulmonary function and health related quality of life (HRQOL) to better understand diseases severity in patients with asthma and

COPD. They concluded that pulmonary function and HRQOL appear to high different aspects of disease severity in asthma and COPD. Therefore both measures should be taken in to account.

In our study, results shown (Table 10) that component score was highly impaired in both groups at base line. The comparisons of scores for days 0-90 and 91-180 were made by using differences in the mean score of the component (scores for days 0-90 minus scores for 91-180).

**Table 10: Comparison of SGRQ symptom scores between pharmaceutical care and usual care group**

Characteristic population	SGRQ Component	Score difference 0-90 <sup>th</sup> day	Score difference 91-180 <sup>th</sup> day	% *change	P value
Test group	Symptoms	45.40 ± 22.96	9.644 ± 7.90	-78.76	*p = < 0.0001
	Activity	46.74 ± 28.69	4.14 ± 8.51	-91.14	*p = < 0.0001
	Impact	37.02 ± 16.08	4.33 ± 8.03	-88.30	*p = < 0.0001
	Total score	41.31 ± 18.50	5.19 ± 7.30	-87.43	*p = < 0.0001
Control group	Symptoms	8.82 ± 20.79	13.44 ± 2.71	52.38	P = 0.3792
	Activity	21.79 ± 23.60	12.63 ± 17.02	-0.42	P = 0.1472
	Impact	18.68 ± 18.72	15.76 ± 13.85	-15.63	P = 0.5598
	Total score	17.89 ± 18.71	14.42 ± 12.15	-19.39	P = 0.4689

#### Data: Mean ± SD

The significance was calculated using a paired t test. The characteristic improvement was achieved in all the components in the test group. Where as in control group, though there was an improvement in the score, but there was a statistical insignificance.

### CONCLUSION

An attempt was carried out to study the impact of patient counseling on medication knowledge about asthma, and its complication. The study was carried out between November- 2010 to July-2011. The result of the present study was compared well with of the other studies published elsewhere.

The counseling produced a significant improvement in quality of life, medication knowledge and in compliance behavior. Assessment of outcome of this study will be better if follow up of patients carried out for longer period.

The categories of patients who are aged, who are having longer duration of disease, who are consuming more number of drugs tend to gain more benefits with counseling and these groups are given more attention and special strategies in counseling them. The results of this study will be utilized to focus the pharmacist attention on these categories of patients to carry out further studies in this area. This will establish pharmacist as an important member of health care team.

Since, therapeutic interventions such as medications enhance as well as decrease quality of life, medical providers must strive for to achieve enhanced quality of life as outcome of therapy. Quality of life has always played an implicit role in the provision of health care.

In conclusion, patient counseling aided better patient understanding of their illness and the role of medications in it' s treatment, improved medication adherence, knowledge and attitude regarding the disease

and improved quality of life for the patients. Moreover, a good professional rapport has been build between Pharmacist and patients.

The counseling service provided by clinical pharmacist was found to be useful and beneficial to the patients of the hospital where the study was carried out finally. It is believed that pharmacist and other health care professionals would appreciate the role of pharmacist in counseling and educating the patients and an attempt to extent their services to include patient counseling as one of their service.

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