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### RESEARCH ARTICLE

#### STUDY OF DRUG PRESCRIBING AND USE PATTERN IN PAEDIATRIC BRONCHIAL ASTHMA PATIENTS.

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$\beta$ -agonists, Bronchial asthma, Medication adherence, Quality of life.

#### Abstract

**Background:** Asthma is a condition in which a persons airways become inflamed,narrow and swell and produce extra mucus, which makes it difficult to breathe.

**Aim and Objective:** This study aims on describing the drug prescribing pattern,medication adherence,quality of life,handling of inhalers,lung function test and cost of illness in 110 paediatric bronchial asthma patients in a tertiary care hospital for duration of six months.

**Results:** Overall 110 patients were enrolled in the study and its found that male patients (60.90%) are more prone to asthmatic attacks than female patients (39.10%).  $\beta$ -agonists (Salbutamol,) was the most commonly used bronchodialator followed by corticosteroids(82.72%), antibiotics(56.36%),anti-histamines(30%)anti inflammatory(29.9%),anti-tussives(23.63%) and methylxanthines(11.81%). Drugs used in RMMCH were compared to various EDL (Essential drug list) which complied with national EDL.The FVC and FEV were assessed among the patients during their admission and discharge time.The statistical analysis of the data of the two groups (baseline and discharge) for FVC( $P<0.001$ ) and FEV( $p<0.008$ ) shows its significance.20.9%.61.81%.80.9% of the patients has shown correct usage of inhalers during baseline,after first and second counseling.A significant improvement in quality of life was assessed during pre and post counseling using Mann-Whitney rank sum test.The score of low(55.45%) medium(32.72%) and high(11.81%)medication adherence patients was found on pre-counseling and on post-counseling low(17.27%),medium(55.45%) and high(28.18%) medication adherence was observed.Hospitalization charges are accounting for 39.3% and medical charges are accounting for 24.21% on an average of 6 days of admission in the hospital.

**Conclusion:** Patient counseling aided and had a positive impact on patients understanding of their illness and the role of medications in its treatment,improved medication adherence and improved quality of life for the patients.

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**Introduction:-**

Asthma is a chronic inflammatory disorder of airways. It is a disease of increasing prevalence that is a result of genetic predisposition and environmental interactions and one of the most common chronic diseases of childhood. It is characterized by recurrent attacks of breathlessness and wheezing, that may vary in severity and frequency from person to person.<sup>1</sup> In an attack the lining of the passage swell causing the airways to narrow and reducing the flow of the air in and out of the lungs. Evidence suggests that prevalence of asthma worldwide is around 200 million with a mortality of around 0.2 million per year and is estimated to account for one in every 250 deaths worldwide.<sup>2</sup>

Three to five percent of paediatric population in India is affected by asthma where as in adults it ranges from 3-11%.<sup>4</sup> In this study, an attempt has been made to study general prescribing pattern, cost analysis, counseling patient on disease condition, medication use, and medication Adherence and improving the quality of life.<sup>5</sup> Patient counseling had a positive impact on patients understanding of their illness and the role of medications in its treatment, improved medication adherence, and improved quality of life for the patient. Moreover a good professional rapport has been built between the pharmacist and the patient. Bronchial asthma is a chronic disease which requires ongoing therapeutic monitoring. The acute exacerbations of asthma leading to morbidity, increased cost and death often preventable.<sup>6,7</sup>

Adherence is a primary determiner of the effectiveness of treatment because poor adherence attenuates optimum clinical benefit. Good adherence improves the effectiveness of interventions aimed at promoting healthy lifestyles, such as diet modification, increased physical activity, and of the pharmacological-based risk-reduction interventions. It also affects secondary prevention and disease treatment interventions.<sup>8</sup> This study aims at current prescribing pattern of asthmatic medications in patients below 14 years and the role of pharmacists in improving patient's health.

**Methodology:-**

The study was a non-invasive cross sectional prospective observational study carried out over 6 month period incorporating both descriptive and inferential analyses. The study was approved by the Institutional Human Ethics Committee & Informed Consent Form was obtained from the eligible patients. Patients were selected on the basis of inclusion criteria and exclusion criteria.

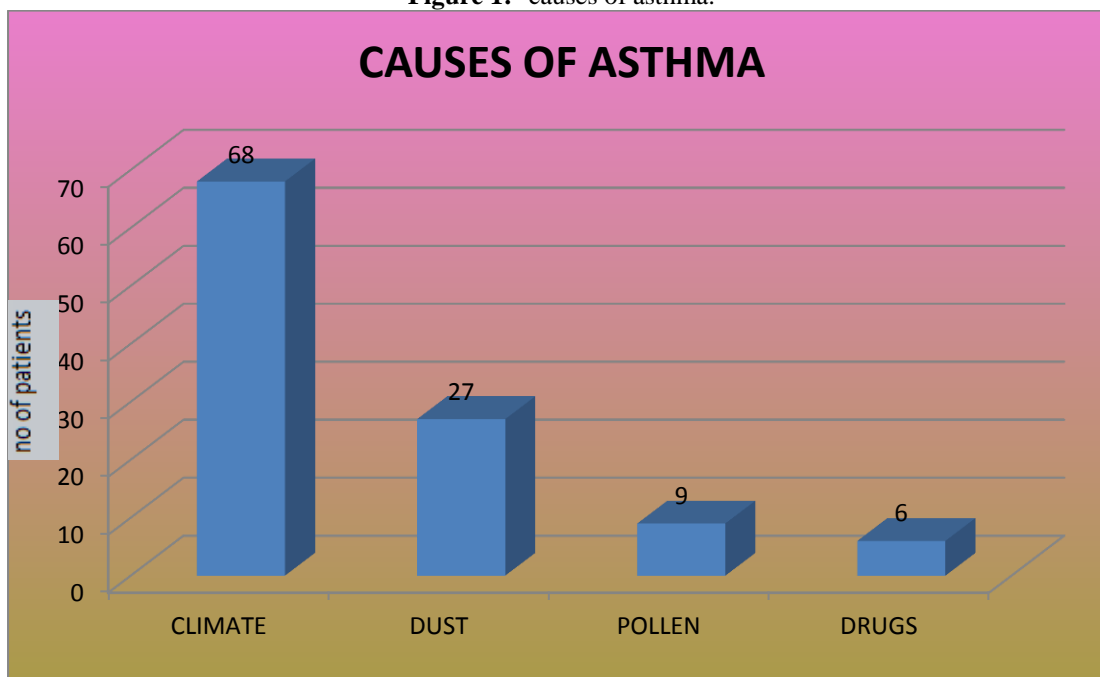
Patients of age group below 14 years who were prescribed with at least one anti-asthmatic drug, Patients who were diagnosed with bronchial asthma and under prescription are included in this study. Patients who were not willing to cooperate, Patients who were having other respiratory problems, cardiac problems are excluded from this study.

The patients were further classified into 3 age groups 0-4, 5-9, and 10-14 years. Convenient sampling was used to recruit all eligible patients and a validated data collection form was used to collect data from the patients. The data collection form provides the information regarding the demographic details of the patient which includes age, sex, past history, family history, medication history and treatment given to the patient. Participants were inquired about their understanding while completing the form. Their feedbacks were then used to improvise data collection for their easy understanding. In the present study the prescribing pattern was studied to evaluate the drug-prescribing trend of anti-asthmatic drugs by physicians in RMMCH (Rajah Muthiah Medical College and Hospital). In this study the categories of drugs, antibiotic prescribing pattern, drug therapy regimens, list of drugs complying with WHO (World Health Organisation), NATIONAL, T.N (Tamil Nadu) essential drug list was analysed by including the number of prescriptions. Finally 110 prescriptions were screened and results were tabulated according to their percentages and number of prescriptions.

The quality of life was measured by using the paediatric asthma care givers Quality of life (QoL) questionnaire. Medication adherence was adopted by using Morisky adherence scale and the results are interpreted based on the level of adherence as low, medium and high.<sup>9</sup> In this present study analysis was carried out by comparing the pre and post counseling results of the parameters under concern. All the 110 patients are divided into two groups and intake was performed in equal proportion with similar age groups and disease condition. The patients knowledge and attitude towards their disease and their quality of life improvement was compared at the admission period and the discharge period and thus the effectiveness of counseling was assessed. A statistical test was performed using student's t test using the statistical package for social sciences version 16 (SPSS Inc, Chicago, IL, USA) for the analysis of data at a significance level of  $P < 0.001$ . This level of significance is obtained at 60 degrees of freedom, 95% confidence interval.

**Patient Characteristics:-**

A total of 110 patients were enrolled in the study. Out of which 67 (60.90%) are males and 43(39.10%) are females. Majority of the patients were in the age group of 5-9 years (47.27%) followed by 0-4 years (40%) and 10-14(12.73%). Climate is the primary cause of bronchial asthma accounts for 61.81% followed by dust, pollen and drugs. Represented in (Figure 1).

**Figure 1:-** causes of asthma:**Prescribing pattern:-**

$\beta$ -agonists (Salbutamol, Ipratropium bromide) accounts for highest number of prescriptions i.e, 98 prescriptions followed by Corticosteroids (Hydrocortisone, Prednisolone, beclomethasone) and antibiotics(Crystalline penicillin, Amikacin, Amoxicillin),Antihistamines(Epinephrine, montelukast),anti-inflammatory(budesonide),andAntitussives(Mucolytics, Cough suppressants) 91, 62, 33, 32 and 26 prescriptions respectively (shown in Table 1). Whereas Methylxanthines(Theophylline) are the least prescribed category drugs. Crystalline penicillin was present in highest number of prescriptions (53.22%) followed by Amikacin (45.16%), Gentamycin (29.03%), Cefotaxime (27.41%), Amoxicillin(25.80%), Ampicillin(17.74%) and Doxycycline(6.45%). Multiple drug therapy was the most common type of drug therapy regimen prescribed in most of the prescriptions. In this study drugs used in RMMCH were compared to various EDL (Essential drug list) and it was found that 100% of drugs are complied with national EDL (shown in Table 2). List of all anti-asthmatic drugs mentioned in WHO EDL, National EDL, TN EDL and drugs used in RMMCH are tabulated in (Table 3).

**Table 1:-** Prescribing Pattern in RMMCH

CATEGORY	NAME OF DRUGS	No. OF PRESCRIPTION	PERCENTAGE
CORTICOSTEROIDS	Hydrocortisone, Prednisolone, Beclomethasone	91	82.72%
$\beta$ -AGONIST	Salbutamol, Ipratropium bromide	98	89.09%
METHYLXANTHINE	Theophylline	13	11.81%
ANTIHISTAMINES	Epinephrine, montelukast	33	30%
ANTIBIOTICS	Crystalline penicillin,	62	56.36%

	Amikacin, Amoxicillin.		
ANTITUSSIVES	Mucolytics, Cough suppressants	26	23.63%
ANTI-INFLAMMATORY	Budesonide	32	29.09%

**Table 2:-** Percentage Of Anti- Asthmatic Belonging To Essential Drug Lists (Who, National, Tn)

Below tabular column shows the number and percentage of anti-asthmatics prescribed from the WHO, NATIONAL and TAMILNADU essential drug lists, total number of drugs in WHO, NATIONAL and T.N EDL

SL No.	TOTAL No. OF ANTI-ASTHMATIC DRUGS				ACCORDING TO PRESCRIPTION No. OF DRUG BELONGING TO			% OF DRUG BELONGING TO		
	IN WHO EDL	IN NATIONAL EDL	IN TN EDL	IN RMMCH	WHO EDL	N EDL	TN EDL	WHO EDL	N EDL	TN EDL
1	5	4	5	5	5	4	3	100%	100%	60%

**Table 3:-**List of anti-asthmatic drugs in rmmch, who edl, national edl & tn edl.

S.no	DRUGS LIST IN WHO-EDL	DRUGS LIST IN NATIONAL EDL	DRUGS LIST IN TN-EDL	DRUGS LIST IN RMMCH
1.	BECLOMETASONE Inhalation (aerosol):100mcg per dose.	IPRATROPIUM BROMIDE Inhalation 20mcg/metered dose	THEOPHYLLINE & ETOFHYLLINE Anhydrous theophylline 50.6mg Etofyline 169.4mg	THEOPHYLLINE
2.	BUDESONIDE Inhalation (aerosol):100mcg; 200mcg per dose.	SALBUTAMOL Tab 2mg, 4mg Syrup 2mg/5ml Inhalation 100mcg/dose	THEOPHYLLINE IP 23mg	SALBUTAMOL
3.	EPINEPHRINE Inj. 1mg in 1-ml ampoule	BECLOMETHASONE DIPROPIONATE Inhalation: 50mcg, 250mcg/dose.	ETOPHYLLINE IP 77 mg	IPRATROPIUM BROMIDE
4.	IPRATROPIUM BROMIDE Inhalation (aerosol): 20mcg	HYDROCORTISONE SODIUM SUCCINATE Injection : 100mcg, 200mcg, 400mcg	SALBUTAMOL Nebulizer- 5mg/ml	BUDESONIDE
5.	SALBUTAMOL Neb: 5mg; Inj: 50mg. Inhalation (aerosol):100mg		SALBUTAMOL SULPHATE Tab I.P 4mg	

**Table 4:-** Antibiotics prescribed:

Antibiotics are the most common irrationally prescribed and used drugs. The following are the common antibiotics used in the treatment of bronchial asthma. Below tabular column represents the number and percentage of prescriptions with antibiotics.

NAME OF DRUG	NO. OF PRESCRIPTIONS	% OF PRESCRIPTIONS
CRYSTALLINE PENCILLIN	33	53.22%
AMIKACIN	28	45.16%
AMOXICILLIN	16	25.80%

AMPICILLIN	11	17.74%
GENTAMYCIN	18	29.03%
DOXYCYCLINE	4	6.45%
CEFOTAXIME	17	27.41%

**Lung function test:-**

FEV (Forced Expiratory Volume) and FVC (Forced Vital Capacity) tests were assessed among the patients during their baseline and discharge time (as shown in Table 5) and their statistical significance differences were measured.

**Table 5:-** Assessment of Lung Function Tests

Pre- and Post- Intervention values of forced vital capacity (FVC) and forced expiratory volume (FEV).

	BASELINE	DURING DISCHARGE	DIFFERENCE (P VALUE)
<b>FVC (FORCED VITAL CAPACITY)*</b>	3.08±0.27	3.39±0.32	<0.001
<b>FEV(FORCED EXPIRATORY VOLUME)*</b>	2.41±0.76	2.97±0.82	<0.008

\*values are mean ± SD for n=110

FVC:

\* The difference in the mean values of the two groups (baseline and discharge) is greater than would be expected by Chance; there is a statistically significant difference between the baseline and discharge groups ( $P = < 0.001$ ).  $t = 2.803$ .

FEV<sub>1</sub>:

\* The difference in the mean values of the two groups {baseline and discharge } is greater than would be expected by Chance; there is a statistically significant difference between the baseline and discharge groups ( $P = < 0.008$ ).  $t = 2.743$ .

**Inhaler handling assessment:-**

Inhaler handling assessment was done during baseline, after first counseling and after second counseling and thus the improvement was assessed as shown in (Table 6).

**Table 6:-** Inhaler handling assessment:

USERS	Baseline	After first counseling	After second counseling
<b>Number of incorrect users</b>	87 (79.09%)	42 (38.18%)	21(19.09%)
<b>Number of correct users</b>	23 (20.9%)	68 (61.81%)	89(80.9%)

**Quality of life assessment:-**

By using the paediatric asthma care givers quality of life questionnaire mean values are noted during pre counseling and post counseling. These mean values are noted in (Table 7)

**Table 7:** Assessment of quality of life:

The results of quality of life assessment done by using the paediatric asthma caregiver's quality of life questionnaire are furnished in table 13. The results indicates significant improvement in quality of life after intervention by student clinical pharmacist.

	PRE COUNSELING	POST COUNSELING	SIGNIFICANCE
<b>Physical activity domain</b>	43.21±5.83	56.21±7.86	YES
<b>Emotional domain</b>	44.73±5.84	48.59±6.36	YES

STATISTICAL ANALYSIS OF DATA USING Mann-Whitney Rank Sum Test

Physical activity domain:

The difference in the mean values of physical activity domain for pre-counseling and post-counseling group is greater than would be expected by Chance; there is a statistically significant difference between the input groups ( $P = < 0.001$ ).  $t = 7.396$

**Emotional activity domain**

The difference in the mean values of emotional activity domain for pre-counseling and post-counseling group is greater than would be expected by Chance; there is a statistically significant difference between the input groups  $t = 1.844$  ( $P = 0.070$ )

**Medication adherence**

Medication adherence results are noted during pre-counseling and post counseling.

The following tabular column represents the differences in mean values of forced vital capacity and forced expiratory volume1 in test and control groups before and after the intervention.

**Table 8:- Medication adherence analysis::**

Medication adherence results were tabulated below by using morisky's medication adherence scale. Results were tabulated as low, medium, and high.

**Medication Adherence In Enrolled Patients (N=110)**

Number of patients	Pre-counseling			Post-counseling		
	Low (greater than 2)	Medium (1 or 2)	High(=0)	Low(greater than2)	Medium(1 or2)	High(=0)
	61	36	13	19	61	30
Percentage(%)	55.45%	32.72%	11.81%	17.27%	55.45%	28.18%

**Table 9:- Cost of illness:**

On an average of 6 days of hospitalization, the cost burden per patient / per day is Rs.339. On overall direct medical charges are high when compared to direct non-medical charges. It accounts of RS 2032 on 6 days hospitalization.

TYPE OF CHARGES	PER PATIENT/ PERDAY	TOTAL COST	PERCENTAGE
<b>DIRECT MEDICAL CHARGES</b>			
BED CHARGES	100	600	29.5 %
ADMISSION CHARGES	33.3	200	9.8 %
MEDICAL CHARGES	82	492	24.21 %
<b>DIRECT- NON MEDICAL CHARGES</b>			
LAB DATA	33.3	200	9.8 %
TRAVEL EXPENSES	50	300	14.76%
MISCELLANEOUS	40	240	11.81%
<b>INDIRECT COST- NOT MEASURED</b>			
TOTAL	339	2032	100%

**Conclusion:-**

Our study showed that male is more affected with asthma than female. Patients of age group 5-09 more affected than any other age groups. B-agonists and corticosteroids are the most commonly prescribed drugs for asthma followed by antibiotics and antihistamines. Most of the treatment strategies are adopted from WHO guidelines and WHO EDL. Patient education increased the knowledge about Asthma and importance of self-care, and lifestyle modifications that can lead to better control of the disease among the patients. By the end of our study there was a significant increase in the medication adherence score. It is evident that Patient education produced a significant improvement in quality of life, medication knowledge and the effect in adherence behaviour. By the end of our study there was a significant increase in the mean score of QoL for the patients. At base line all patients had poor knowledge and attitude towards their disease and thus poor QoL. Medications and hospitalization charges account for the most part of direct cost can be overcome due to patient's education. Medication adherence results suggest that more involvement of pharmacist in patient care yields better therapeutic outcomes. Pharmacist holds an important role in educating the patient about disease there by avoiding the trigger factors and reducing the hospitalizations. In conclusion, patient counseling aided and had a positive impact on patient's understanding of their illness and the role of medications in its treatment, improved medication adherence, and

improved Quality of life for the patients. Moreover, a good professional rapport has been built between the Pharmacist and the Patient.

#### **Conflict Of Interest:-**

*The author has no conflict of interest*

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#### **Highlights of Paper**

*Made a clear attempt to show the general prescribing pattern of physicians in bronchial asthmatic paediatric patients.*

*Impact of patient counseling was evaluated and shown how significant the impact was.*

*Pharmaceutical care is provided and emphasized its importance in pediatric patients.*

#### **Authors Profile**

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