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ANALYSIS OF THE IMPACT OF PATIENT INHALER PREFERENCE ON BRONCHIAL ASTHMA TREATMENT

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ABSTRACT:

Background and objectives: About 358 million people have asthma. The main way to treat asthma is with inhalers. Non-adherence to asthma treatment has been linked to more hospital and emergency room visits, more illness, and more money spent on things that aren't necessary. For asthma to be managed well, people need to take their medicine as prescribed. The main goal is to find out which inhaler is best for treating bronchial asthma.

Methods: A descriptive study of 200 Bronchial Asthma patients on Inhalers. Randomization will separate patients into Groups 1 and 2. Each patient will be given an inhaler adherence questionnaire, asthma symptoms will be controlled, and FEV1 will be measured. The identical treatment will be done in 3 months. In both groups, we used health education to improve second-visit non-adherence.

Results: Most individuals were aged 31–45, male, and degree holders. Many used DPI. 27(54%) non-adherents in group1 decreased to 22(44%) at visit 2. 30 (60%) non-adherent patients in group 2 decreased to 4 (8%) by visit 2 (p 0.05). Two groups and two visits differed significantly in FEV1%. Degree holders had better asthma adherence and control.

Conclusion: Patients should be urged to use long-term aerosol therapy for disease maintenance. The doctor must prescribe the correct inhaler to the right patient to improve adherence. Individualized asthma therapy compliance. Multiple compliance-improving strategies are more effective in a good doctor-patient relationship.

Keywords: Asthma; medicationadherence;drypowder inhaler; meterdoseinhaler

INTRODUCTION:

A chronic inflammatory disease of the airways, asthma affects 358 million people worldwide.

It is a significant issue for global health, and its prevalence is rising. Low- and middle-income nations are home to the majority of persons affected, and it is thought that these nations will see the quickest rise in frequency. This chronic airway illness affects people of all ages and has a higher burden of disability [1, 2]. Asthma claimed more than 397,100 lives in 2020, the majority of them in underdeveloped nations. It is believed that a mix of hereditary and environmental factors contribute to asthma [3].

By avoiding triggers like allergies and irritants, symptoms can be avoided. Although there is no known cure for asthma, symptoms can be reduced with a medicine cocktail and avoiding triggers. Acute asthma symptoms are first treated with short-acting beta 2 agonists, and anticholinergic drugs have added advantages when used with short-acting beta 2 agonists [4]. Right now, corticosteroids are the best therapy option for long-term asthma management. Inhaled corticosteroids are often used in long-term therapy unless there is a severe chronic illness. The key to long-term asthma management is a high level of adherence. Non-adherence or improper inhaler handling in individuals with chronic asthma raises mortality, morbidity, and hospital admission rates [5, 6].

In numerous academic works, the link between non-adherence and subpar disease control is made quite evident. The factors that were taught to contribute to non-adherence to inhaled medication were patient age, degree of education/knowledge about the problems, medication, and lack of technical ability of delivery systems. Other variables that contribute to poor adherence to inhalational treatments include the complexity of the inhalation regimen, the idiosyncrasies of inhaler devices, the type of inhaled agent, a range of patient beliefs, and socio-cultural and psychological factors. The effective management of persistent asthma is improved by the prudent use of inhaled medications [7, 8]. Only 50% of patients undergoing long-term pharmacotherapy for chronic illnesses adhere to their regimens, although adherence rates in asthma have been observed to range substantially from 22% to 78%. Several studies examining the non-adherence rate to inhaled medication using standardized patient self-completed questionnaires have been published. Using a tested tool called the Test of Adherence to Inhalers (TAI), the primary goals of the current study were to evaluate the preference for inhalers and their adherence, asthma symptom control in two groups, and to identify potential factors related to non-adherence [9, 10].

METHODOLOGY

Designofthestudy: Thisis adescriptivestudy

Setting: DepartmentofPulmonaryMedicineatGovt CD &TB Hospital, hanamkonda.

Periodofstudy: November2020 to June2022

Inclusioncriteria:

1. Patientsaged18yearsandabove.
2. Patientsare alreadydiagnosed tohaveasthma.
3. Patientswho areusinginhalers for morethan sixmonths.
4. Patientswere willingtoparticipateinthisstudy.

Exclusioncriteria:

1. PatientswithCOPD,IschemicHeartDiseases
2. SputumPositivePulmonaryTuberculosis

Samplesizeestimation:

For this study's sample size calculation, the formula below was used. 200 participants were studied to determine inhaler type and adherence. Patients identified with asthma based on wheezing, shortness of breath, chest tightness, and nocturnal coughing, using inhalers, and meeting inclusion criteria had their hospital records reviewed. The sample size was derived by dividing the total number of asthma patients over 18 by 3 years. 200 patients were studied. Two groups of 100 patients were randomly assigned [11, 12].

Samplesize: 200 (Group1: 100, Group2: 100).

Procedureanddatacollection:

A total of 200 patients with a diagnosis of bronchial asthma who gave given written consent and were willing to participate in the study and were already using inhalers as part of their treatment were included in this descriptive study. Simple randomization will be used to separate the patients into two groups. There will be 50 patients in each group [13].

GROUP1: The patients who were using in halers prescribed earlier by physicians else where based on patient's preference.

GROUP2: We prescribe inhalers based on age, education, occupation, and amount of inspiratory exertion, regardless of previous use. Both groups' demographic information (age, gender, education level, and socioeconomic status) will be obtained. They'll also complete the Test of Adherence to Inhalers (TAI), which consists of 10 questions on how well they use their inhalers (1 being the worst and 5 being the best) and 4 questions about how effectively they control their asthma symptoms. Yes/No answers will earn 1 and 0, respectively. Record these results. FEV1 (%) post-bronchodilator (400 mcg salbutamol) will be measured in each patient [14, 15].

After three months, these patients will receive follow-up care and be given the same questions on adherence (TIA) and asthma symptom management (ASC). We'll record responses and results [16, 17].

Visit 2 spirometry will record post-BDR FEV1 (%) for each subject. If the TIA Score was 50, 46-49, or 45, the adherence scale was divided into adherent, intermediate adherent, and non-adherent groups. Asthma Symptom Control was classed as Well Controlled, Partially Controlled, or Uncontrolled if the overall ASC score was 0, 1-2, or 3–4. Using these statistics, the study's goals will be evaluated. Patients who weren't consistent with inhaler use were provided additional advice following the research [18, 19].

Statisticalanalysis:SPSS version 20.0 was used to analyze data obtained in a Microsoft Excel worksheet. In descriptive statistics, all qualitative characteristics are expressed in frequency and percentages. Mean and standard deviation was calculated for continuous variables. When a cell's expected value was less than 5, Fisher's exact test was employed. P values below 0.05 were considered significant. A Chi-square test was performed to examine socio-demographic profile and inhaler adherence, and asthma control symptoms. Microsoft Word and Excel were used to construct graphs and tables [20, 21].

RESULTS

Table1:Age-wisedistributionofstudysubjectsin Groups 1and2

Age(years)	Group1	Group2
	Frequency(Percentage)	
18-30	24(24.0)	22(22)
31-45	40(40.0)	50(50)
46-64	34(34.0)	28(28)
≥65	02 (2.0)	--
Total	100(100)	100(100)

A total of 100subjects in each group were included in the study. Among the subjects,the majority i.e.40(40%) in group1and 50(50%) in group2 belonged to the age group of 31-45years. The mean age in group 1is 40.92 ± 11.92 years and in group 2 is 40.22 ± 12.02years. Table 1 shows Age wise distribution of study subjects in Groups 1 and 2 (N=100).

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Table2:Distributionofstudysubjectsaccordingtogender(N=50)

Gender	Group1	Group2
	Frequency(Percentage)	
Male	70(70)	72(72)
Female	30(30)	28(28)
Total	100(100)	100(100)

Amongthe studysubjects in group1 majorityi.e.70 (70%) aremalesand in group2 majorityi.e. 72 (72%).Table2 showsthe Distributionofstudysubjectsaccordingtogender(N=100). Table 2 represents the Distribution of study subjects according to gender (N=100)

Table 3: Distribution of study subjects according to the level of education in Groups 1 and2 (N=100)

Levelofeducation	Group1	Group2
	Frequency(Percentage)	
Uneducated	20(20)	14(14)
Highschool	26(26)	18(18)
PUC	18(18)	20(20)
Degree	36(36)	18(48)
Total	100(100)	100(100)

Table 3 shows the distribution of study subjects according to the level of education and 36 (36%) ingroup1and48 (48%) in group2had a degreeas the level of education Table 3 shows the Distribution of study subjects according to the level of education in Group 1and 2 (N=100).

Table 4: Distribution of study subjects according to the socio-economic status in Groups 1 and 2 (N=100)

socio-economicstatus	Group1	Group2
	Frequency(Percentage)	
Lowerclass	46(46)	30(30)
Middleclass	48(48)	58(58)
Upperclass	6(6)	12(12)
Total	100(100)	100(100)

In this study, most of the study participants i.e 48(48%) and 58 (59%) were belonging tothe middleclass in Group 1 and Group 2 respectively.Table 4 shows the Distribution of study subjects according to their socio-economic status in Groups 1 and 2 (N=100).

Table5: Distributionofstudyparticipantsaccordingtothetypeofinhalerused

Typeof Inhaler	**Group1N(%)**	**Group2N(%)**
DPI	46 (46%)	54 (54%)
MDI	44 (44%)	12 (12%)
MDI withspacer	10 (10%)	34 (34%)
Total	100(100%)	100 (100%)

Among the group 1 study subjects, 46(46%) of them choose a DPIinhaler and 10(10%)choose MDI with a spacer. In the group, 2 DPI inhaler was prescribed for54(54%) of the studysubjectsand 34 (34%) used MDIwith a spacer. Table 5 shows the Distribution of study participants according to the type of inhaler used.

Table6:Distributionofstudyparticipantsaccordingtoadherencescale

Adherence scale	**Group1**		**Group2**	
	Visit 1N(%)	**Visit 2N(%)**	**Visit 1N(%)**	**Visit 2N(%)**
Non-adherent	54 (54)	44 (44)	60 (60)	08 (8)
Intermediatea dherent	54 (44)	36 (36)	36 (36)	42 (42)
Adherent	02 (2)	20 (20)	04 (4)	50 (50)
Total	100 (100)	100(100)	100 (100)	100 (100)

According to the above table, 1(2%) of the study subjects in group 1 were adherent during visit 1 and the adherence was4(4%) in group 2 during visit 1. During visit 2 among the study subjects, 4 (4%) remainedad herent ingroup 1 and visit 2, whereas adherencein group 2 increased to 50(50%) during visit 2.The difference in the adherence scale between the two groups between two visits was statistically significant ($p<0.05$). Table 6 shows the Distribution of study participants according to the adherence scale. Table 6 Distribution of study participants according to adherence scale.

Table 7: Distribution of study participants according to asthma control symptomscore

Asthma control	Group1		Group2	
	Visit 1N(%)	Visit 2N(%)	Visit 1N(%)	Visit 2N(%)
Uncontrolled	54 (54)	38 (38)	60 (60)	08 (8)
Partiallycontrolled	42 (42)	42 (42)	32 (32)	44 (44)
Well-controlled	04 (4)	20(20)	08 (8)	48 (48)
Total	100(100)	100(100)	100(100)	100(100)

Amongthe study subjects, 4(4%) had well-controlled asthma in group 1 which increasedto 20(20%) during visit 2. Whereas in group 2, 8(8%) had well-controlled asthma duringvisit 1 which increased to 48 (48%) during visit 2. The difference in the number ofstudy subjects in asthma control symptom scores between the two groupsis statisticallysignificant ($p<0.05$).Table 7 shows the Distribution of study participants according to asthma control symptomscore.

Table8:Distributionofstudysubjectsingroup1accordingtoageandadherencetoinhaler

Adherence score	**Non-adherentN(%)**		**IntermediateadherentN(%)**		**AdherentN(%)**	
Age(years)	**Visit1**	**Visit2**	**Visit1**	**Visit2**	**Visit1**	**Visit2**
18-30	4(14.8)	0	7(31.8)	6(33.3)	1(100)	6(60)
31-45	8(29.6)	8(36.4)	12(54.5)	9(50)	0	3(30)
46-64	15(55.6)	13(59.1)	2(9.1)	3(16.7)	0	1(10)
≥65	0	1(4.5)	1(4.5)	0	0	0
Total	27	22	22	18	1	10

Among the subjects with Non-adherence to inhalers 8(29.6) during visit 1 and 8(36.4)during visit 2 belong to the 31-45 yrs age group. Intermediate adherence to inhalers among the 18-30yrs age group was recorded in 7(31.8%) of the subjects during visits 1 and6 (33.3%)during visit 2. The association between age and adherence to inhalers in group 1 wasfoundto be

statisticallysignificant (p<0.001).Table 8 shows the Distribution of study subjects in group 1 according to age and adherence to the inhaler.

Table9 shows the Distributionof studysubjectsingroup2accordingtoageandadherenceto inhaler

Adherence score	**Non-adherent N(%)**		**Intermediateadherent N(%)**		**Adherent N(%)**	
Age(years)	**Visit1**	**Visit2**	**Visit1**	**Visit2**	**Visit1**	**Visit2**
18-30	8(26.7)	0	3(16.7)	1(4.8)	0	10(40)
31-45	13(43.3)	1(25)	10(55.6)	12(57.1)	2(100)	12(48)
46-64	9(30)	3(75)	5(27.8)	8(38.1)	0	3(12)
≥65						
Total	30(100)	4(100)	18(1000	21(100)	2(100)	25(100)

8(26.7%) of the subjects during visit 1 and 0 during visit 2 belonged to the 18-30yr age group and wereNon-adherenttoinhalers.Intermediateadherencetoinhalers wasobservedin10(55.6%) of the subjects during visits 1 and 12 (57.1%) during visit 2 among the 31-45 yrs agegroup. Among 46-64 yrs 0 during visits 1 and 3(12%) during visit 2 were adherent tothe inhaler. The association between age and adherence to inhalers in group 2 was not foundtobe statisticallysignificant (p=0.311). Table 9 shows the Distribution of study subjects in group 2 according to age and adherence to the inhaler.

Table 10: Distribution of study subjects in group 1 according to age and asthmasymptomcontrol

Age(years)	**UncontrolledN(%)**		**PartiallycontrolledN(%)**		**Well-controlledN(%)**	
	Visit1	**Visit2**	**Visit1**	**Visit2**	**Visit1**	**Visit2**
18-30	4(14.80	0	6(28.6)	6(28.6)	2(100)	6(60)
31-45	7(25.9)	6(31.6)	13(61.9)	10(47.6)	0	4(40)
46-64	16(59.3)	12(63.2)	1(4.80	5(23.8)	0	0
≥65	0(0)	1(5.3)	1(4.8)	0	0	0
Total	27(100)	19(100)	21(100)	21(100)	2	10(100)

In the study, 16 subjects who were belonging to the age group of 46 – 64 yrs had uncontrolledasthma during visit 1 reduced to 12 during visit 2, whereas 7 subjects who were

belongingto the age group of 31-45 yrs had uncontrolled asthma during visit 1 which reduced to 4subjects in visit 2. The association between age and asthma control in group 1 wasfoundto be statisticallysignificant (p<0.01). Table 10 shows the Distribution of study subjects in group 1 according to age and asthma symptom control.

Table 11: Distribution of study subjects in group 2 according to age and as thmasymptom control

Age(years)	controlled(%)		Partiallycontrolled N(%)		Well-controlled N(%)	
	Visit1	Visit2	Visit1	Visit2	Visit1	Visit2
18-30	8(26.7)	0	2(12.5)	1(4.5)	1(25)	10(41.7)
31-45	13(43.30	1(25)	10(62.5)	13(59.1)	2(50)	25(45.8)
46-64	9(30)	3(75)	4(25)	8(36.4)	1(25)	3(12.5)
≥65	--	--	--	--	--	--
Total	30(100)	4(100)	16(100)	22(100)	4(100)	24(100)

8(26.7%) of the study subjects during visit 1 and 0 during visit 2 belong to the 18-30 yrsage groupwho had uncontrolled asthma. Partially controlled asthma was observed in10(62.5%)ofthe subjectsduringvisit 1 and13(59.1%) duringvisit2 amongthe 31-45yrs age group. Among 46-64 yrs 1(25%) during visit 1 and 3(12.5) during visit 2 had well-controlled asthma. The association between age and asthma controlin group 2 was foundtobe statisticallysignificant (p=0.03). Table 11 shows the Distribution of study subjects in group 2 according to age and asthma symptom control

Table12:Distributionof study subject sin group 1 according to Genderandad herence to in haler

Adherence To inhaler	Non-adherent N(%)		IntermediateadherentN(%)		AdherentN(%)	
Gender	**Visit1**	**Visit2**	**Visit1**	**Visit2**	**Visit1**	**Visit2**
Male	20(74.1)	17(77.3)	15(68.2)	12(66.7)	0	6(60)
Female	7(25.9)	5(22.7)	7(31.8)	6(33.3)	1(100)	4(40)

Total	27	22	22	18	1	10

During the first visit, 20(74.1%) of the males and 7(25.9%) of the females and 17(77.3%)males, and 5(22.7%) females during visit 2 were Non-adherent to the inhaler. 1(100%) off emales during visits 1 and 4(40%) during visit 2 adherent to inhalers. The difference between gender and adherenceto inhalers ingroup1wasnotstatisticallysignificant (p=0.627) Table 12 shows the Distribution of study subjects in group 1 according to Gender and adherence to inhalers

Table13:Distributionof study subjects in group 2according to Genderandad herence to inhaler

Adherence toinhaler	**Non-adherent N(%)**		**Intermediate adherentN(%)**		**Adherent N(%)**	
Gender	**Visit1**	**Visit2**	**Visit1**	**Visit2**	**Visit1**	**Visit2**
Male	23(76.7)	1(25)	12(66.7)	17(81)	1(50)	18(72)
Female	7(23.3)	3(75)	6(33.3)	4(28)	1(50)	7(28)
Total	30(100)	4(100)	18(1000	21(100)	2(100)	25(100)

Among group 2 subjects 23(76.7%) of the males were Non-adherent to inhalers duringvisit 1 and 1 (25%) during visit 2. Intermediate adherence to inhalers was observed in6 (33.3%)of females duringvisits 1 and4(28%) during visit 2. Amongthe study subjects,1 (50%) of males were adherent to inhalers during visit1 and 17 (70.8%) during visit 2. The association between genderandad heren cetoinhalers was not significant (p=0.267). Table 13 shows the Distribution of study subjects in group 2 according to Gender and adherence to inhaler

Table14: Distribution of study subjectsin group 1 according to genderanda sthmasymptom control

Asthma control	**UncontrolledN(%)**		**PartiallycontrolledN(%)**		**Well-controlled (N%)**	
Gender	**Visit1**	**Visit2**	**Visit1**	**Visit2**	**Visit1**	**Visit2**
Male	21(77.8)	15(78.9)	13(61.9)	15(71.4)	1(50)	5(50)
Female	6(22.2)	4(21.1)	8(38.1)	6(28.6)	1(50)	5(50)
Total	27(100)	19(100)	21(100)	21(100)	2(100)	10(100)

During the first visit, 21(77.8%) of the males and 6(22.2%) of the femalesand

15(78.9%)malesand15 (78.9%)femalesduringvisit2haduncontrolledasthmasymptoms.1 (50%) of females during visit 1 and 5(50%) during visit 2 had well-controlled asthma. Thedifference between gender and asthma control in group 1 was not statisticallysignificant (p=0.41) Table 14 shows the Distribution of study subjects in group 1 according to gender and asthma symptom control

DISCUSSION

People of all ages, races, and ethnicities are susceptible to the chronic inflammatory airway illness known as asthma. Due to a growth in the number of instances, it is a problem that causes concern on a global scale. Patients must be informed about the condition and regularly utilize inhaler drugs like DPI/MDI as prescribed by a doctor to combat asthma [22, 23]. An investigation of how well asthmatics comprehend and use their inhalers found that patient education, particularly for the elderly and young, can enhance asthma management. It does assist to use inhalers correctly and emphasizes the value of taking regular asthma treatments. In our study, the patient group whose inhalers were prescribed by someone else had an increase in adherence to asthma controller medication from 2% to 4%, whereas the patient group whose inhalers were prescribed by us saw an increase in adherence from 4% to 50% after three months [24, 25]. In a similar study, Demoly et al. found that 60% of patients adhered to follow-up studies after being prescribed and explained the necessity of asthma controller treatment. The study comprised five European countries. According to a study by Desalu et al. in Nigeria, patients who did not receive adequate inhaler therapy counseling had a 20% worse rate of adherence to the treatment [26, 27].

In our study group, group 1, where adherent subjects increased from 0 to 3 (30%) in between 2 visits, the majority of participants were aged 31 to 45 years. However, between two visits, the number of adherent participants in Group 2 who were between the ages of 31 and 45 increased from 2 to 12 (48%) There was little difference in the adherence scores between the two visits in the 46 to 64 year age group in either group, indicating that adherence to asthma controller medication declines with age. Similar research by Bozek A. et al. revealed that as age grows, adherence to asthma controller medication declines. On the other hand, in a comparable study conducted in the United States by Apter et al. [28, 29], they found no correlation between age and adherence to asthma controller medication. These contradictory findings are possibly the result of the various adherence assessment techniques used in these investigations. To get a conclusion regarding any association between age and adherence to

asthma controller therapy, another study using a more accurate technique of medication adherence measurement, such as electronic monitor devices, is required. In our study, 70% (Group 1) and 72% of the participants were men (Group2). During the first visit, 74% of these subjects in group 1 and 76% of those in group 2 were not adhering. Gender and adherence did not correlate in a statistically significant way (p 0.627). Male patients (65.8%) and female patients (46.3%) both showed non-adherence in a related trial, albeit there was no statistically significant difference between the two groups. Another study by Williams et al. found that female asthma patients were considerably less likely to adhere to ICS than male asthma patients, likely as a result of the majority of study participants being female [30–32].

CONCLUSION

Asthma is a pandemic worldwide. Patient adherence to treatment suggestions is a challenge in chronic respiratory disease management. Prescribe the proper inhaler depending on age, occupation, education, disease duration, and socioeconomic status to improve asthma inhaler adherence and control. Inhaler technique and its importance in asthma therapy must be thoroughly taught. Social factors impair adherence, the research found. They include poverty, social disputes, job loss, and homelessness; ignored anxieties and concerns; misunderstanding, language obstacles, and literacy. Age, gender, education, ethnicity, and ethnic culture might alter a person's ability to learn, communicate, and interact, which can affect a treatment strategy. Non-adherence is also caused by a lack of confidence in the treatment plan, inability to adjust medications, inability to use inhalers and other devices, ignorance of declining lung function, inability to accurately self-evaluate, forgetfulness, misunderstanding, health beliefs, and attitudes toward disease and treatment. ICS side effects seem to scare individuals with asthma the most, and many believe asthma is a relapsing condition. Before beliefs change behavior, educational programs to enhance adherence must change patients' views about asthma and medication. Behavioral therapies can improve asthma medication attitudes and self-management.

Asthma management emphasizes patient education. Include simple details about treatment alternatives, justification for inhaled drugs, and inhaler equipment and processes. Patients should avoid allergies and air pollution. Let patients express their expectations. To earn their trust and increase adherence, patient and family queries should be answered frequently. Asthma can be treated with regular inhaler technique explanations and physical verification.

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