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Research Article

RANDOMIZED, OPEN LABEL, ACTIVE CONTROLLED STUDY TO ASSESS AND COMPARE HEALTH RELATED QUALITY OF LIFE WITH MOMETASONE & FORMOTEROL VERSUS FLUTICASONE & FORMOTEROL DRY POWDER INHALER IN MILD TO MODERATE PERSISTENT ASTHMA

PARASURAMALU BG[1], SATHISH CHANDRA MR[2]*, HULIRAJ N[3], GIRIYANNA GOWDA[1], GANGABORAIAH[1]

[1]Department of Community Medicine, Kempegowda Institute of Medical Sciences Hospital & Research centre, Bengaluru, Karnataka, India. [2]Department of Community Medicine, BGS Global Institute of Medical Sciences, Bengaluru, Karnataka, India. [3]Department of Chest and TB diseases, Kempegowda Institute of Medical Sciences Hospital & Research centre, Bengaluru, Karnataka, India.
Email: sathi.medico@yahoo.co.in

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ABSTRACT

Objectives: The present study was under taken to assess and compare the improvement in HRQoL among mild to moderate persistent asthma between Mometasone & Formoterol versus Fluticasone & Formoterol using dry powder inhaler using Asthma HRQoL questionnaire which is disease-specific 32-item instrument including 4 domains: symptoms, emotions, exposure to environmental stimuli and activity limitations where impairments experienced during the previous 14 days and respond on 7-point scale.

Methods: The present study was conducted in Preventive Medicine Unit and Chest & TB diseases OPD, KIMS & RC, Bangalore during March 2011 to February 2012. 60 patients were recruited in each group based on inclusion and exclusion criteria. PFT was done pre and post bronchodilator with Salbutamol nebulization with Spirometry. Study medications were randomized and were given for 12weeks. HRQoL questionnaire was administered before and after the medications and outcome was compared between them. Statistical test used were descriptive statistics, t- test.

Results: There was a significant improvement in HRQoL from baseline to the end of 12 weeks in all domains (symptoms, emotional, exposure to environmental stimuli and activity limitations) in both the groups. The overall improvement in the HRQoL was better in Mometasone & Formoterol group compared to Fluticasone & Formoterol group but this difference was not statistically significant, which revealed both combinations were equally effective in improving HRQoL in mild to moderate persistent asthma.

Conclusion: Both Mometasone & Formoterol and Fluticasone & Formoterol combinations are equally effective in improving HRQoL in mild to moderate persistent asthma patients.

Keywords: Health-related quality of life, Mild to moderate persistent asthma, Dry powder inhaler.

INTRODUCTION

Asthma is a disease characterized by airway inflammation and recurrent episodes of symptoms of wheezing and chest tightness that are associated with variable airway obstruction and bronchial hyperresponsiveness [1]. The main strategy in the management of asthma includes patient's education, environment control, pharmacotherapy, and immunotherapy.

The addition of an inhaled long-acting β2-agonist (LABA) to an inhaled corticosteroid (ICS) gives optimal control of asthma in most patients and two fixed combination inhalers are increasingly used as a convenient controller in patients with persistent asthma. There is a strong scientific rationale for the combination of these two drug classes. ICS suppress the chronic inflammation of asthma and reduce airway hyperresponsiveness and this is achieved at low doses in most patients. LABA in addition to their bronchodilator action also inhibit mast cell mediator release plasma exudation and may reduce sensory nerve activation. Thus, these two classes of drug address complementary aspects of the pathophysiology of asthma that neither drug class is able to achieve alone [2].

Mometasone has low systemic bioavailability and high glucocoticoid receptor affinity compared with most other inhaled corticosteroids and modifies inflammatory mediators involved in the pathogenesis of asthma. Formoterol and salmeterol have a similar duration of bronchodilation of at least 12 hrs and is less lipophilic than salmeterol. Mometasone significantly improves lung function and control symptom in asthma patients when used in combination with formoterol [3].

Health-related quality of life (HRQoL) has been considered an important variable to be managed in airway diseases. Asthma can reduce HRQoL as a result of profound physical and psychosocial complications. Besides physical symptoms, asthma patients may exhibit fatigue, psychomotor sluggishness, irritability, mood, and cognitive disturbances. This combination of physical, emotional, and functional problems may diminish HRQoL [4].

Asthma HRQoL questionnaire is a disease-specific 32-item instrument including 4 domains: Symptoms, emotions, exposure to environmental stimuli, and activity limitations. Patients rate the impairments they have experienced during the previous 14 days and respond to each item on the 7-point scale. The instrument, in which higher numbers represent a better function, has proved responsive and valid and seen wide use [5].

In India, no studies have been conducted to compare the improvement in HRQoL with formoterol and mometasone. Hence, the present study was conducted to compare the improvement in HRQoL between mometasone and formoterol versus fluticasone and formoterol using a dry powder inhaler in patients with mild to moderate persistent asthma.

Objectives

1. To describe the sociodemographic characteristics of mild to moderate persistent asthma patients.

2. To assess and compare the improvement in HRQoL among mild to moderate persistent asthma between mometasone and formoterol versus fluticasone and formoterol using dry powder inhaler.

METHODS

It was a randomized, open-label, active - controlled, comparative study in patients with mild to moderate persistent asthma attending Allergy clinic, Preventive Medicine Unit and Chest and TB diseases, Kempegowda Institute of Medical Sciences Hospital and Research Centre, Bangalore.

Methodology

A total of 120 patients (60 in each group) with mild to moderate persistent bronchial asthma (GINA guidelines) were recruited based on inclusion and exclusion criteria. Baseline investigations such as blood routine (Hemoglobin, Total Count, Differential Count, Absolute Eosinophil Count), Chest X-ray spirometry (ERS'93/Polgar) was done with pre- and post-bronchodilator (Salbutamol nebulization). Spirometry was incorporated with a correction factor 0.88 of European respiratory society for South Indians [6]. HRQoL questionnaire was administered to all the patients at the time of recruitment following medications (mometasone and formoterol and fluticasone and formoterol) and were instructed to rate their impairments experienced during the previous 14 days on 7-point scale. At the end of 12 weeks, HRQoL was administered, and their improvement in HRQoL was compared following medications. The statistical test used were descriptive statistics, t-test.

RESULTS

Socio demographic profile of Asthma patients

Of 60 patients, in fluticasone and formoterol group, majority i.e., 20 (33.33%) were in the age group of 31-40 years, next highest i.e., 16 (26.67%) were in the age group of 21-30 years, and least i.e., 4 (6.67%) were in the age group of 18-20 years. 40 (66.67%) patients were males, and the remaining 20 (33.33%) were females. The age of the youngest and the oldest patient was 18 years and 65 years, respectively. The mean age of patients was 37.1±13.10 years. The mean age of male and female patients was 36.4±13.73 years and 38.7±11.94 years, respectively. In mometasone and formoterol group, out of 60 patients who were included majority, i.e. 22 (36.67%) were in the age group of 31-40 years, next highest i.e., 17 (28.33%) in the age group of 21-30 years and least, i.e., 2 (3.33%) were in the age group of 51-60 years. 20 (33.33%) were males and the remaining 40 (66.67%) patients were females. The age of the youngest and the oldest patient was 18 years and 63 years, respectively. The mean age of patients was 35.3±11.00 years. The mean age of male and female patients were 37.4±14.62 years and 34.3±8.63 years, respectively (Table 1).

Of 60 patients in fluticasone and formoterol group, 22 (36.67%) were degree holders or graduates next highest, i.e., 17 (28.33%) had studied up to PUC and least i.e., 4 (6.67%) each had studied up to primary school and postgraduates, respectively. In mometasone and formoterol group 22 (36.67%) had studied up to PUC next highest i.e., 16 (26.67%) had studied up to high school and least i.e., 3 (5.00%) were postgraduates (Table 1).

The majority in fluticasone and formoterol group, i.e., 21 (35.00%) patients were self-employed, next highest, i.e., 16 (26.67%) were housewives, and least i.e., 4 (10.00%) were laborers. In mometasone and formoterol group majority, i.e., 23 (38.33%) patients were housewives next highest, i.e., 13 (21.67%) were self-employed and least i.e., 4 (6.67%) were doing business (Table 1).

Modified Kuppuswamy classification was adopted for socio-economic classification of patients [7]. Of 60 patients in fluticasone and formoterol group, majority, i.e., 18 (30.00%) were belonging to upper class next highest, i.e., 16 (26.67%) were belonging to lower middle class and least, i.e., 6 (10.00%) were belonging to upper lower class. In mometasone and formoterol group, majority i.e., 17 (28.33%) were belonging to lower middle class, next highest i.e., 14 (23.33%) each were belonging to upper middle and upper lower class, respectively, and least i.e., 2 (3.33%) were belonging to lower class (Table 1).

Smoking history

Of 60 patients in each fluticasone and formoterol and mometasone and formoterol group, 5 (8.66%) were smokers in fluticasone and formoterol group, and 6 (10.00%) were smokers in mometasone and formoterol group.

HRQoL among patients suffering from asthma

HRQoL questionnaire was administered to all the patients at the time of recruitment and at the end of 12 weeks following medications. There was a significant improvement in HRQoL from baseline (before treatment) to the end of 12 weeks (after treatment) in all domains (symptoms, emotional, exposure to environmental stimuli, and activity limitations) in both mometasone and formoterol and fluticasone and formoterol groups, whereas improvement in HRQoL was better in mometasone and formoterol group compared to fluticasone and formoterol group. However, this difference was not statistically significant when compared between the groups, which revealed that both mometasone and formoterol and fluticasone and formoterol combinations were equally effective in improving HRQoL in mild to moderate persistent asthma (Table 2, Figure 1).

Table 1: Sociodemographic profile of asthma patients

Serial no.	Character	Fluticasone and formoterol group (%)	Mometasone and formoterol group (%)
1.	Age		
	18-20	04 (6.67)	06 (10.00)
	21-30	16 (26.67)	17 (28.33)
	31-40	20 (33.33)	22 (36.67)
	41-50	10 (16.67)	10 (16.67)
	51-60	05 (8.33)	02 (03.33)
	>61	05 (8.33)	03 (05.00)
	Total	60 (100)	60 (100)
2	Sex		
	Male	40 (66.67)	20 (33.33)
	Female	20 (33.33)	40 (66.67)
	Total	60 (100)	60 (100)
3	Education		
	Primary	04 (6.67)	06 (10.00)
	High school	13 (21.67)	16 (26.67)
	PUC	17 (28.33)	22 (36.67)
	Graduate	22 (36.67)	13 (21.67)
	Post graduate	04 (06.67)	03 (05.00)
	Total	60 (100)	60 (100)
4	Occupation		
	Housewife	16 (26.67)	23 (38.33)
	Professional	05 (08.33)	07 (11.67)
	Business	06 (10.00)	04 (06.67)
	Self-employed	21 (35.00)	13 (21.67)
	Laborer	04 (06.67)	07 (11.67)
	Unemployed/ retired/student	08 (13.33)	06 (10.00)
	Total	60 (100)	60 (100)
5	Socio-economic status (Class)		
	Upper	18 (30.00)	13 (21.67)
	Upper middle	12 (20.00)	14 (23.33)
	Lower middle	16 (26.67)	17 (28.33)
	Upper lower	06 (10.00)	14 (23.33)
	Lower	08 (13.33)	02 (03.33)
	Total	60 (100)	60 (100)

Figures in parenthesis indicate percentages

Table 2: HRQoL among patients suffering from asthma before and after treatment

HRQoL domains	Mean±SD		t value	p value
	Fluticasone and formoterol group	Mometasone and formoterol group		
Symptom domain				
Before treatment	4.14±1.08	3.90±1.09	1.20	0.23
After treatment	4.83±1.06	4.83±1.11	0.01	1.00
% change	16.7	23.8	-	-
Activity limitation				
Before treatment	4.09±0.90	4.09±0.94	0.04	0.97
After treatment	4.91±0.88	5.02±1.29	0.54	0.59
% change	20.0	22.7	-	-
Emotional function				
Before treatment	4.38±1.15	4.21±1.38	0.75	0.46
After treatment	4.97±1.00	5.00±1.17	0.19	0.85
% change	13.5	18.8	-	-
Environmental stimuli				
Before treatment	3.94±1.37	4.03±1.25	0.34	0.72
After treatment	4.67±1.24	4.79±1.28	0.53	0.60
% change	18.5	18.9	-	-
Overall domains				
Before treatment	4.14±0.92	4.03±0.98	0.58	0.60
After treatment	4.86±0.93	4.92±1.07	0.32	0.76
% change	17.4	22.1	-	-

HRQoL: Health-related quality of life, SD: Standard error

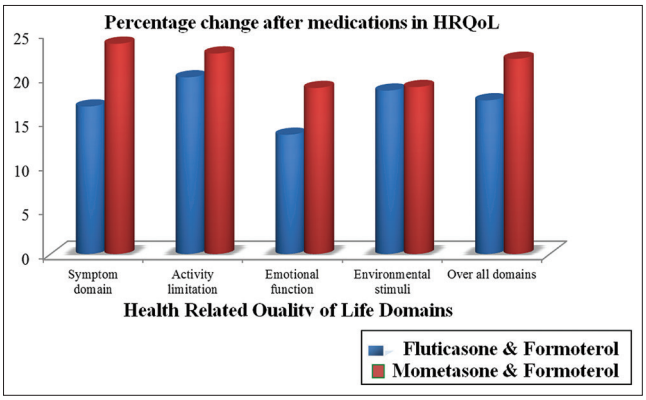

Fig. 1: Percentage change in health-related quality of life after medications

DISCUSSION

Only a few studies are available to compare the improvement in HRQoL using mometasone and formoterol combinations compared to other combinations in mild to moderate persistent asthma.

In the present randomized, open label comparative study 120 mild and moderate persistent bronchial asthma patients aged between 18 and 65 years were recruited, which differs from the study conducted by Bernstein *et al.* [8], which was a multicenter, 12 week, open label, evaluator-blinded, active-controlled trial to find the efficacy and onset of action of mometasone and formoterol versus fluticasone and salmeterol combination treatment in 722 subjects between 12 and 80 years with persistent asthma.

In the present study among 60 patients, who were included in Mometasone and Formoterol group, majority i.e., 22 (36.67%) were in the age group of 31-40 years, next highest i.e., 17 (28.33%) were in the age group of 21-30 years, and least i.e., 2 (3.33%) were in the age group of 51-60 years. 20 (33.33%) were males and the remaining, 40 (66.67%) patients were females. The age of the youngest and the oldest patient was 18 years and 63 years, respectively. The mean age of patients was 35.3±11years. The mean age of male and female patients were 37.4±14.6 years and 34.3±8.6 years, respectively, which differs from the study conducted by Bernstein *et al.* [8] where the mean age of the patients was 44.8 years (range 12-82 years) in mometasone and formoterol group (n=371). Of these, 239 (64.4%) were females.

HRQoL(Figure 1)

In the present study, there was a significant improvement in HRQoL from baseline (before treatment) to the end of 12 weeks (after treatment) in all domains (symptoms, emotional, exposure to environmental stimuli, and activity limitations) in both mometasone and formoterol and fluticasone and formoterol groups. Whereas improvement in HRQoL was better in mometasone and formoterol group compared to fluticasone and formoterol group. However, this difference was not statistically significant when compared between the groups, which revealed both mometasone and formoterol and fluticasone and formoterol combinations were equally effective in improving HRQoL in mild to moderate persistent asthma. These findings were similar to observations made by Bernstein *et al.* [8], where mometasone and formoterol were found to be non-inferior to fluticasone and salmeterol DPI from baseline to the end of 12 weeks.

CONCLUSION

Both mometasone and formoterol and fluticasone and formoterol combinations were equally efficacious in improving HRQoL among patients with mild to moderate persistent asthma.

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