ABSTRACT

The combination of inhaled corticosteroid (ICS) and a long acting β -agonist (LABA) is preferred in mild to moderate persistent asthma patients and it is recommended by the Global Initiative for Asthma (GINA) guideline as the first-line preferred treatment. The other alternative treatment options recommended in the GINA guideline are an addition of either leukotriene antagonist (LTA) or sustained-release theophylline (SR-T) with a low dose ICS. Though clinical studies have supported the use of long acting muscarinic antagonist (LAMA) in asthma, we could not find many clinical studies in this area.

The objective of this study was to compare the efficacy and safety of second-line treatment regimens (montelukast, doxofylline and tiotropium with inhaled budesonide) with first-line treatment regimen (formoterol with inhaled budesonide) as a control in mild to moderate persistent asthma patients in a randomized controlled trial. Current treatment guidelines for asthma emphasize the importance of patient education. However, in many hospitals in India, patient education by a trained clinical pharmacist is almost nil. The study also aimed to develop and validate a knowledge, attitude, practice (KAP) questionnaire for asthma in the local language Tamil and to assess the impact of patient education on the KAP of the study patients.
Patients were recruited as per the study criteria. Patients, all of whom were concurrently using inhaled budesonide (400μg) were treated for six months with either formoterol (12μg), montelukast (10mg), doxofylline (400mg) or tiotropium (18μg). Outcomes included forced expiratory volume in one second (FEV$_1$), health related quality of life using Saint George’s Respiratory Questionnaire (SGRQ) scores, asthma symptom scores (day-time and night-time) and assessment of safety and rescue medication usage. All the patients were educated using GINA recommended pocket guide. Impact of patient education was assessed by comparing the baseline and end visit KAP scores.

Out of 559 patients screened, 362 patients met the inclusion criteria and 297 patients completed the study. In all the four groups, significant improvements were observed in all the outcome measures, among which budesonide/formoterol treatment had greater and earlier improvements than other three second-line controller medications. Among the second-line treatments, montelukast improved the % FEV$_1$ from day 45 ($p<0.01$), SGRQ scores from day 30 ($p<0.0001$), day-time scores from day 30 ($p<0.05$), night-time scores from day 30 ($p<0.0001$) and rescue medication usage from day 15 ($p<0.0001$) at a faster rate than either doxofylline or tiotropium with budesonide. No patient discontinued the treatment due to adverse reactions.

The standardized cronbach’s alpha value for the developed KAP questionnaire was 0.81. The test-retest reliability was 0.89. A significant
(p<0.05) improvement of KAP score was observed with respect to baseline characteristics. Patient’s adherence to the medication ranged from 92.8 to 100%.

Based on our findings, among the tested second-line treatment regimens, combination of budesonide/montelukast was found to be superior to either budesonide/doxofylline or budesonide/tiotropium in the improvement of lung function, SGRQ scores, rescue medication usage, day-time and night-time asthma symptom scores and without adversely affecting the tolerability of the patients. The developed KAP questionnaire was acceptable and culture fair in the tested population. Patient education significantly improved patient KAP and medication adherence. Further clinical studies with blinding techniques are likely to be useful.