

Satisfaction level and asthma control among Malaysian asthma patients on Symbicort Maintenance and Reliever Therapy (SMART) in the primary care setting (SMARTEST study)

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Summary

Objective: To evaluate Malaysian patients' satisfaction levels and asthma control with Symbicort SMART® in the primary care setting.

Method: This is a cross-sectional, multicentre study involving adult patients with persistent asthma who were prescribed only Symbicort SMART in the preceding one month prior to recruitment. Patients' satisfaction with Symbicort SMART and asthma control were evaluated using the self-administered Satisfaction with Asthma Treatment Questionnaire (SATQ) and the Asthma Control Test (ACT).

Results: Asthma was controlled (ACT score ≥ 20) in 189 (83%) of 228 patients. The mean overall SATQ score for patients with controlled asthma was 5.65 indicating a high satisfaction level, which was positively correlated with high ACT scores. There were differences in asthma control based on ethnicity, number of unscheduled visits and treatment compliance.

Conclusions: Symbicort SMART resulted in a high satisfaction level and asthma control among Malaysian patients treated in the primary care setting and it is an effective and appealing treatment for asthmatic patients. (*Asian Pac J Allergy Immunol* 2013;32:145-52)

Key words: asthma control, primary care, satisfaction level, Symbicort, SMART

Introduction

Asthma is a common chronic respiratory disease affecting 235 million people worldwide.¹ Most asthma-related mortality occurs in low- and low-middle income countries.¹ With appropriate treatment and care, most asthma-related morbidity and deaths can be prevented.² According to the Malaysian National Health Morbidity Survey 2006 (NHMS III), the prevalence of asthma in Malaysians aged 18 years and above was 4.5%;³ more than 50% of adult asthmatics made unscheduled visits to their doctors due to an asthma attack or acute dyspnoea in the preceding 12 months. Of these, 10% were hospitalised due to acute asthma exacerbations. The survey also reported that 21% of adult asthmatics have asthma-related sleeping difficulty, 16.9% have difficulty breathing during physical exertion and 15.6% have difficulty doing house chores.

Despite the availability of effective asthma treatment, asthma control in Malaysia remains suboptimal. A comparative analysis of asthma control by Zainudin et al⁴ using the Global Initiative for Asthma (GINA) guidelines and Asthma Insights and Reality in Asia Pacific (AIRIAP) findings showed an underachievement in asthma control in Malaysia. It was reported that 32.6% of Malaysian patients had emergency visits and 31.4% missed work due to exacerbations. A recent retrospective study comparing moderate to severe asthmatics using Symbicort (budesonide/formoterol combination) maintenance and reliever treatment (SMART)® intervention and standard care by Loh et al⁵ had shown promising outcomes for patients with inadequately controlled moderate to severe asthma in the Malaysian setting. Using the same approach, the outcomes improvements shown in the previous study were related to requirement of rescue medication, FEV₁ and hospital admission rate. The Symbicort SMART® (Symbicort Maintenance and Reliever Therapy) approach allows patients to take regular maintenance doses of budesonide-formoterol

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Submitted date: 28/2/2013

Accepted date: 12/6/2013



and additional doses as needed instead of a short-acting reliever to counteract both inflammation and bronchoconstriction when symptomatic.⁶

SMART therapy is a new approach to asthma management and has proven to be safe and efficacious in treating adult asthmatic patients.⁷ Based on our literature review, studies had also shown improved asthma control and asthma-related quality of life using SMART therapy when assessed with Asthma Control Questionnaire (ACQ)⁸⁻¹⁰ and Asthma Quality of Life Questionnaire (AQLQ).^{11,12} However, real-world evidence on patients using SMART is limited and patients' satisfaction with asthma treatment is rarely assessed although a validated asthma treatment satisfaction tool is available i.e. the Satisfaction with Asthma Treatment Questionnaire (SATQ).¹³ The Asthma Control Test (ACT) is another validated tool developed by Nathan et al¹⁴ and Schatz et al¹⁵ to evaluate asthma control in clinical setting.

We conducted a cross-sectional study to investigate asthma control and treatment satisfaction among patients currently being treated with Symbicort® maintenance and reliever therapy in a real-life general practice setting in Malaysia. Secondary objectives of the study included assessing the effect of demographic characteristics on asthma control and treatment satisfaction as well as correlations between asthma control and treatment satisfaction.

Methods

Patients diagnosed to have bronchial asthma based on (1) a history of cough, shortness of breath, and/or wheezing; and (2) peak expiratory flow reversibility of more than 20% following an inhaled short-acting beta2-agonist or peak expiratory flow variability of at least 20% over a 2-week period were recruited by physicians from 44 general practice clinics (16 from the Klang Valley region, 13 from the state of Penang, 8 from the state of Johor and 7 from other parts of the country). Such asthma patients were eligible to participate in the study if they (1) were prescribed with Symbicort® (budesonide 160 µg/formoterol 4.5 µg) SMART (1 or 2 inhalations twice a day and when required) for at least three months prior to recruitment and still taking the medication as indicated by their physician, (2) were able to use the Symbicort turbuhaler correctly, (3) required short courses (3-5 days) of oral corticosteroid / methylxanthines less than twice a month, (4) were aged between 18 to 59

years old, (5) were able to complete the questionnaire independently, and (6) provided written informed consent prior to survey enrolment by the participating physicians. Patients who failed to meet any of the inclusion criteria were excluded from the study. Exclusion criteria were (1) regular (more than twice a month) requirement of additional oral or inhaled asthma medication from any class and (2) requiring treatment for acute exacerbation of asthma more than once a month.

Those who consented were asked to complete a set of questionnaires, which included a self-administered questionnaire about the patient's demographics, asthma status, Satisfaction with Asthma Treatment Questionnaire (SATQ) and Asthma Control Test (ACT). Both the ACT and SATQ questionnaires had been developed and validated by Nathan et al¹⁵ and Campbell et al,¹³ respectively. The ACT is a patient self-administered questionnaire with 5 items assessing asthma symptoms, use of rescue medications, and effect of asthma on daily functioning over the last 4 weeks. Each item includes 5 response options corresponding to a 5-point Likert-type rating scale. Responses for each of the 5 items are summed to yield a score ranging from 5 (poor control) to 25 (complete control).

The SATQ is a 26-item questionnaire designed for self-administration to evaluate the satisfaction with asthma treatment for patients using inhaled medication. The SATQ assessments comprised of 4 domains covering treatment effectiveness (8 questions), ease of medication use (7 questions), burden of asthma medication (6 questions), and side-effect and worries (5 questions). SATQ utilised a 7-point Likert psychometric test. A higher SATQ score indicates better treatment satisfaction. The maximum score is 7.

For the purpose of this study, patients had the option to answer both questionnaires in English, Malay or Chinese which were strictly self-administered. The Malay and Chinese language versions of both instruments had been validated.¹⁶ A self-administered 3-questions global assessment of treatment compliance utilising a 7-point Likert scale was also used to assess patient's compliance to doctor's instructions and the prescribed Symbicort®.

The primary outcome of this study was the overall ACT and SATQ score of the study population. Secondary outcomes include SATQ sub-domain score of asthmatic patients treated with



Symbicort® SMART therapy and analysis of association between asthma control and satisfaction of asthma treatment, as well as patient demographics. This study was approved by the University of Malaya Medical Centre Ethics Committee. This clinical study was carried out in accordance with ICH-GCP guidelines. AstraZeneca undertook a GCP audit programme to ensure compliance with its procedures and to assess the adequacy of its quality control measures. Audits were directed towards all aspects of the clinical study process and its associated documentation. These were conducted by a Global Quality Assurance group operating independently of the study monitors and in accordance with documented policies and procedures.

Statistical Analysis

The sample size was calculated using the single mean formula. The standard deviation of SATQ score was previously reported as 0.88.¹³ Therefore assuming a precision of 0.1 and z-value is 1.96, the required sample size calculated was 297.

Data was presented descriptively using percentages and means. The Chi-Square test was used to compare age groups, ethnicity, gender, education, work status, smoking status, unscheduled clinic or hospital visits, frequency of Symbicort® use and treatment compliance between patients with controlled and uncontrolled asthma measured by the ACT score. The Fisher Exact test was used when 20% or more of the cells had an expected frequency of less than 5. Pairwise comparison was conducted when the variation within the variables was statistically significant ($p < 0.05$).

Normality of ACT and SATQ scores were examined by the Shapiro-Wilk test. Apart from the SATQ burden of medication domain, all the other SATQ domain scores, the overall SATQ score and ACT score were found to be not normally distributed. Thus, the statistical significance of differences in ACT and SATQ scores between age groups, gender, ethnicity, education, working status, smoking status, unscheduled visits to clinic or hospital, frequency of Symbicort® use and treatment compliance was analysed by the non-parametric Kruskal-Wallis test. The ANOVA test was conducted to determine the difference between SATQ medication burden domain against the variables listed above. Median (interquartile range) and mean [\pm standard deviation (SD)] were reported while the two-sided test at the 0.05 level was used to

Table 1. Demographic characteristics of 228 asthmatic patients

Demographic characteristic	n (%)
Age group (year)	
18-29	27 (11.8)
30-39	63 (27.6)
40-49	78 (34.2)
50-59	60 (26.3)
Gender	
Male	93 (40.8)
Female	135 (59.2)
Ethnicity	
Malay	87 (38.2)
Chinese	102 (44.7)
Indian	30 (13.2)
Others	9 (3.9)
Education Status	
Completed primary education	6 (2.6)
Completed secondary education	135 (59.2)
Completed post-secondary education	27 (11.8)
Completed tertiary education	51 (22.4)
No education	3 (1.3)
Still in education	6 (2.6)
Occupational Status	
Full time	144 (63.2)
Part time	15 (6.6)
Unpaid work	36 (15.8)
Unemployed / retired	15 (6.6)
Student / full time education	18 (7.9)
Smoking Status	
Smoker	15 (6.6)
Non-smoker	213 (93.4)
Asthma control	21.76 (\pm 3.60)
Mean score (\pm SD)	39 (17.1)
Uncontrolled asthma (Total ACT)	189 (82.9)
Score < 20	
Well-controlled asthma (Total ACT)	
Score \geq 20	
Duration of using Symbicort SMART	
3-6 months	30 (13.2)
6-12 months	24 (10.5)
>12 months	174 (76.3)
Average number of puffs of Symbicort taken per day during the last 4 weeks	
Not more than 2	198 (86.8)
3 to 4	21 (9.2)
5 to 6	0
7 to 8	0
9 to 10	9 (3.9)
Overall SATQ score* ^a	
mean, \pm SD	5.65 (\pm 0.75)
median (IQR)	5.62 (1.23)
SATQ Domain score* ^a	6.25 (1.25)
Effectiveness domain (median, IQR) [#]	6.14 (1.57)
Ease of Use domain (median, IQR) [#]	4.89 (\pm 1.06)
Burden of Medication domain (mean, \pm SD)	5.40 (1.70)
Side Effects & Worries domain (median, IQR) [#]	

* The maximum SATQ score is 7

[#] Median value & IQR were presented as the data was not normally distributed

determine significant differences in SATQ scores. Correlation between ACT score and SATQ score was checked by the Spearman rank correlation test. All analyses were performed using STATA IC (version 11.2).

Results

Forty-four general practice physicians participated in this study. Of the 300 asthmatic patients screened, 228 who fulfilled the inclusion and exclusion criteria were enrolled and completed the study. Table 1 shows the demographic characteristics and status of asthma as well as its treatment of all 228 patients. Most of the patients were of Chinese or Malay ethnicity and aged 30 years and above. Fifty-nine percent of the patients had completed secondary school education only and 34% had post-secondary or tertiary education. Sixty-three percent of the patients were in full time employment. Most (93.4%) of the patients were non-smokers.

The mean ACT score was 21.76, which signified good asthma control among this sample population. There were 189 (83%) asthmatic patients in this study population who achieved good asthma control with a total ACT score ≥ 20 (Figure 1). Patients' overall median SATQ score was 5.62 (maximum score = 7), which indicated good satisfaction with their asthma treatment. Analysis of SATQ sub-domain scores showed that patients on SMART therapy reported high satisfaction across the four SATQ domains, especially on treatment effectiveness (median = 6.25, IQR 1.25) and ease of use domains (median = 6.14, IQR 1.57).

When we compared patients with good asthma control (ACT score ≥ 20) and uncontrolled asthma (ACT score < 20), there were no significant differences in terms of their age, gender, education

attainment, working status and smoking status (Table 2). However, there were significantly more Chinese patients who achieved good asthma control ($p < 0.001$) compared to Malays when analysed using pairwise comparison. Patients with uncontrolled asthma had higher frequency of unscheduled healthcare facility visits ($p < 0.001$). In addition to the prescribed number of inhalations, patients who had good control reported using an average of 3.2 additional "as-needed" inhalations; whereas patients with poor control report an average of 4.6 additional inhalations ($p < 0.001$). Patients with good asthma control also reported to have better treatment compliance compared to the uncontrolled asthmatic patients ($p < 0.001$) (Table 3).

With regards to SATQ scores, there were significant differences in overall SATQ scores among patient grouped by age, education attainment, unscheduled visits to the doctor due to exacerbation of asthmatic symptoms and treatment compliance ($p < 0.001$). Table 4 illustrates the comparison between SATQ scores (overall and 4 domain scores) and patient characteristics.

Older patients were more satisfied with their asthma treatment. Significantly higher SATQ scores (overall and 4 domain scores) were observed among patients who had no education or attained primary education only. Low satisfaction scores were observed among patients who were still studying. Patients who made unscheduled visits to clinic and hospital due to exacerbation of asthma symptoms had lower SATQ scores compared to those who did not. There was a negative relationship between frequency of unscheduled visits and overall SATQ scores ($r = -0.2988$, $p < 0.001$), i.e., the higher the frequency of unscheduled visits to clinic and hospital, the lower the SATQ scores. Patients who had poor compliance had lower SATQ overall and domain scores compared to those who had good compliance. No significant association was found between overall SATQ scores, ethnicity and average daily use of Symbicort®.

Patients with well-controlled asthma (ACT score ≥ 20) were more satisfied with their asthma treatment (median SATQ score, 5.73) compared to those whose asthma was uncontrolled (median SATQ score, 5.27), $p < 0.001$. Significant positive correlation between ACT and SATQ scores were detected when analysed using Spearman's correlation test ($r = 0.5148$, $p < 0.001$) (Figure 2).

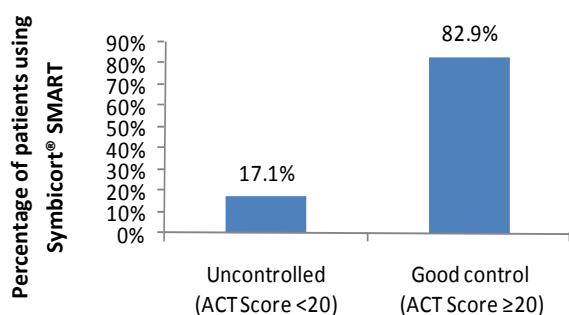


Figure 1. Distribution of asthma control among Symbicort® SMART users based on the ACT Score

Table 2. Comparison of patient demographics against asthma control based on the Asthma Control Test (ACT) score

Characteristic	N = 228	Asthma control		P-value*
		Good control (Total ACT score ≥ 20) N=189	Uncontrolled (Total ACT score < 20) N=39	
Age group (year)				
18-29	27	21 (11.11)	6 (15.38)	0.187
30-39	63	48 (25.40)	15 (38.47)	
40-49	78	66 (34.92)	12 (30.77)	
50-59	60	54 (28.57)	6 (15.38)	
Gender				
Male	93	78 (41.27)	15 (38.46)	0.745
Female	135	111 (58.73)	24 (61.54)	
Ethnicity				
Malay	87	63 (33.33)	24 (61.54)	0.003
Chinese	102	93 (49.21)	9 (23.08)	
Indian	30	24 (12.70)	6 (15.38)	
Other	9	9 (4.76)	0 (0.00)	
Education				
Complete primary education only	6	6 (3.17)	0 (0.00)	0.162
Complete secondary education only	135	114 (60.32)	21 (53.85)	
Complete post-secondary education only	27	24 (12.70)	3 (7.69)	
Complete Tertiary education only	51	39 (20.63)	12 (30.77)	
Still in education	6	3 (1.59)	3 (7.69)	
No education	3	3 (1.59)	0 (0.00)	
Occupational status				
Full time	144	114 (60.32)	30 (76.93)	0.141
Part time	15	12 (6.35)	3 (7.69)	
Unpaid work	36	33 (17.46)	3 (7.69)	
Unemployed / retired	15	15 (7.94)	0 (0.00)	
Student / full time education	18	15 (7.94)	3 (7.69)	
Smoking status				
Smoker	15	12 (6.35)	3 (7.69)	0.726
Non-smoker	213	177 (93.65)	36 (92.31)	
Unscheduled visits to clinic or emergency department because of asthma symptoms				
≤ 3 times per year	99	96 (50.79)	3 (7.69)	<0.001
4 times per year	30	21 (11.11)	9 (23.08)	
5 times per year	6	0 (0.00)	6 (15.38)	
6-10 times per year	24	9 (4.76)	15 (38.46)	
>10 times per year	9	9 (4.76)	0 (0.00)	
Never	60	54 (28.57)	5 (15.38)	
Treatment Compliance				
Poor (Score ≤ 2)	6	3 (1.59)	3 (7.69)	<0.001
Fair (Score 3-5)	57	39 (20.63)	18 (46.15)	
Good (Score ≥ 6)	165	147 (77.78)	18 (46.15)	

* Chi-square test

Discussion

Symbicort SMART® therapy has been proven to be effective in improving lung function, asthma control and reducing asthma exacerbation at lower steroid load.¹⁷⁻¹⁹ A post hoc pooled analysis²⁰ of results from 5 large clinical trials involving more than 12,000 patients and a meta-analysis²¹ of 6 randomised controlled trials (RCTs) had also demonstrated that Symbicort SMART® therapy is highly effective in treating asthmatics requiring treatment adjustments across steps 2 to 4 in the GINA or Joint BTS/SIGN treatment guidelines, especially among patients whose asthma control is

suboptimal because of under-treatment or whose asthma condition is more severe. Our study showed that 83% of Malaysian adult asthmatic patients treated with Symbicort® SMART in the primary care setting had good asthma control as defined by ACT scores ≥ 20 . Most patients were also satisfied with the Symbicort® SMART approach in the management of their asthma. With regards to treatment satisfaction, it is logical that patients with good asthma control have a greater level of satisfaction with their asthma management as demonstrated in this study.



Table 3. Treatment compliance and asthma control

Asthma Control	Good Compliance* N (%)	Poor Compliance** N (%)	Total	p-value
Good Control ACT \geq 20	147 (89.1)	42 (66.7)	189	<0.001
Poor Control ACT<20	18 (10.9)	21 (33.3)	39	
Total	165	63	228	

* Good compliance is defined as compliance score of 6 or more

** Poor compliance is defined as compliance score of less than 6

This study indicates that good asthma control using Symbicort® SMART therapy is dependent on several important factors. First of all, the severity of the asthma plays an important role in determining the outcomes of asthma control. In the absence of asthma severity data, the number of unscheduled visits to hospital can be used as proxy to determine asthma severity. As reported by Lai et al,²² asthma severity correlated with the frequencies of hospitalisation and emergency visits for asthma. A study by Lundborg et al.²³ had shown that budesonide/formoterol 160/4.5microgram, one inhalation twice daily maintenance plus additional doses as needed is more effective in asthma control compared to one inhalation once daily for patients with moderate to severe asthma. A review by Selroos et al.²⁴ also recommended that single maintenance dose of Symbicort SMART® per day should not be recommended for patients with moderate persistent asthma. Dose adjustment will be required if patients failed to achieve asthma control with 2 or less puffs of Symbicort® per day. Although the standard is to prescribe a minimum of 1 inhalation twice daily, our study data showed that a significant number of patients reported only single daily dose of Symbicort. Surprisingly, these patients reported adequate asthma control and perhaps this finding requires further future investigation.

As can be expected, the study demonstrated that another important factor that determines good asthma control with the use of Symbicort SMART® therapy is treatment compliance. Appropriate adherence to chronic daily treatment forms the basis of effective asthma treatment.²⁵ Studies have shown that non-adherence to asthma therapy is associated with significant asthma morbidity and mortality.^{26,27} Although poor adherence to asthma treatment is common, early identification with targeted multi-level intervention can improve asthma treatment adherence.²⁸

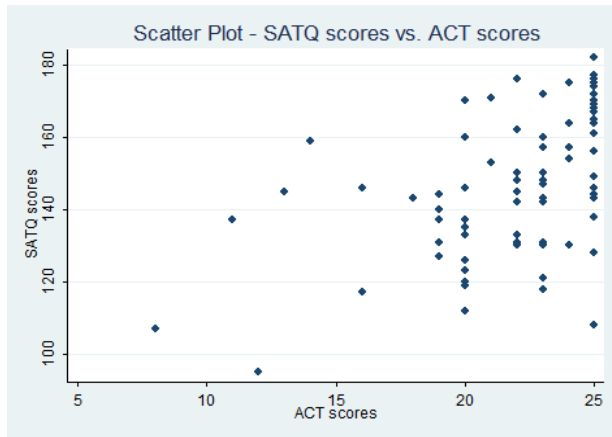
Table 4. Comparison of SATQ scores with patients' characteristics, treatment compliance and ACT

Characteristic	Overall SATQ score, Median (IQR)	p-value*
Age group (year)		
18-29	5.27 (0.92)	<0.001
30-39	5.50 (0.65)	
40-49	5.65 (1.12)	
50-59	6.17 (1.15)	
Education attainment		
No education	6.73 (0.00)	<0.001
Primary	6.63 (0.19)	
Secondary	5.62 (1.27)	
Post-secondary	5.77 (0.77)	
Still in education	5.08 (0.38)	
Tertiary/Degree	5.54 (0.69)	
Unscheduled visits to clinic or emergency department because of asthma symptoms		
Never	6.02 (1.00)	<0.001
1 time per year	5.35 (1.15)	
2 times per year	5.52 (1.37)	
3 times per year	5.77 (1.35)	
4 times per year	5.67 (0.88)	
5 times per year	5.44 (0.12)	
6-10 times per year	5.15 (1.44)	
>10 times per year	4.62 (2.15)	
Treatment compliance		
Poor - Point \leq 2	4.13 (0.96)	<0.001
Fair - Point 3-5	5.27 (0.58)	
Good - Point \geq 6	5.77 (1.00)	
Asthma control		
Uncontrolled (ACT <20)	5.27 (0.65)	0.001
Controlled (ACT \geq 20)	5.73 (1.35)	

*Kruskal Wallis test

This study showed that patients in the older age group were more satisfied with their asthma treatment compared to younger patients. An earlier study demonstrated that older patients were more likely to have lower lung function with higher incidence of exacerbations compared to younger patients.²⁹ We are unable to explain this finding definitively, but it could be that older patients tend to be more satisfied since they start off in a poorer state of asthma severity. It is possible that the greater degree of improvement among older patients might have contributed to a higher level of treatment satisfaction as observed in our study. However, we were unable to verify the severity levels of the older patients based on the current data.

Another observation made from our study was the negative correlation between frequency of unscheduled visits and overall SATQ scores whereby a high frequency of unscheduled visits to clinic and emergency departments was associated with low treatment satisfaction. We surmise that this is most likely attributed to poor disease control leading to frequent acute exacerbation of asthma symptoms requiring unscheduled visits to the clinic or emergency department, thus disrupting the patient's



$r = -0.5148, p < 0.001$

Figure 2. Scatter plot comparing treatment satisfaction (SATQ scores) versus asthma control (ACT scores)

quality of life and hence contributing to a low satisfaction with their asthma treatment. This phenomenon was well documented in another study by Markson et al.³⁰ In addition to that, low satisfaction of prescribed treatment regimen could well have contributed to poor treatment compliance (as shown in our study results), which compounded on the existing problem of uncontrolled asthmatic symptoms, resulting in a vicious cycle. A survey of disease management programmes had echoed the positive associations between patient satisfaction and clinical outcomes, and the suggestion was made that patient satisfaction measures may be used as a means to increase treatment compliance and consequently improve disease outcomes.³¹

Although this study contributes to the existing pool of knowledge about asthma control using Symbicort SMART® in Malaysia, there are several limitations to the study design. Firstly, the study reported only patients who were prescribed with Symbicort SMART® therapy and there was no direct comparison with patients who are on other conventional treatments using dual inhalers involving other short or long acting β -agonists and inhaled corticosteroids as maintenance and relief treatment regimens. In addition, treatment compliance was subjectively assessed using an unvalidated self-reporting 7-point Likert scale. Matching of patient reported adherence with existing medical records of treatment prescriptions might have elicited a more objective and valid measure of adherence. However, this was not possible within the constraints of the study. We did not assess for the presence of comorbid illnesses such as allergic rhinitis to keep the study in the

general practice clinic setting less complicated. The presence of comorbid illnesses such as allergic rhinitis and its treatment might have an impact on asthma control.

Conclusion

Symbicort SMART resulted in a high level of asthma control and satisfaction among Malaysian patients treated in a real-life primary care setting. The Symbicort SMART® approach is an effective and useful treatment for patients with asthma.

Acknowledgments

The study was funded by a grant from AstraZeneca (Malaysia) Sdn Bhd. However, AstraZeneca has no influence over the drafting of the manuscript, nor the decision to publish. The responsibility for the contents of this manuscript rests entirely with the authors. All authors were independent investigators of the study. The authors' gratitude extends to all individuals who have directly or indirectly contributed to the successful execution of the study.

Authors' contributions

All authors have contributed significantly to the success of this study. CKL was responsible for the conception and the design of the study as well as drafted the manuscript. YKP and CKT had significant input during the design of the study and in reviewing the drafted manuscript.

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