ปัจจัยที่ส่งผลต่อความพึงพอใจของผู้ป่วยโรคหอบหืดที่ได้รับยาพ่นสูตรผสม

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วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาวิทยาศาสตรมหาบัณฑิต
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FACTORS INFLUENCING SATISFACTION OF ASTHMATIC PATIENTS TREATED WITH COMBINATION INHALER

Miss Katesiri Kitthongpoon

A Thesis Submitted in Partial Fulfillment of the Requirements
for the Degree of Master of Science Program in Social and Administrative Pharmacy
Department of Social and Administrative Pharmacy
Faculty of Pharmaceutical Sciences
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Thesis Title	FACTORS INFLUENCING SATISFACTION OF ASTHMATIC PATIENTS TREATED WITH COMBINATION INHALER
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เกศศิริ กิจทองพูล : ปัจจัยที่ส่งผลต่อความพึงพอใจของผู้ป่วยโรคหอบหืดที่ได้รับยาพ่นสูตรผสม. (FACTORS INFLUENCING SATISFACTION OF ASTHMATIC PATIENTS TREATED WITH COMBINATION INHALER) อ. ที่ปรึกษาวิทยานิพนธ์หลัก: รศ. ดร. วิทยา กุลสมบูรณ์ , อ. ที่ปรึกษาวิทยานิพนธ์ร่วม: ผศ. นพ. กมล แก้วกิติณรงค์ , 74 หน้า

การศึกษานี้มีวัตถุประสงค์เพื่อศึกษาปัจจัยที่ส่งผลต่อความพึงพอใจของผู้ป่วยโรคหอบหืดที่ได้รับยาพ่นสูตรผสมและเปรียบเทียบความพึงพอใจระหว่างผู้ป่วยโรคหอบหืดที่มีระดับการควบคุมโรคและมีลักษณะทางประชากรศาสตร์ที่แตกต่างกัน

การศึกษานี้เป็นการศึกษาวิจัยแบบภาคตัดขวาง โดยใช้เครื่องมือเก็บข้อมูลจากผู้ป่วยนอกที่มารักษาที่คลินิกโรคปอดและโรคภูมิแพ้ของโรงพยาบาลจุฬาลงกรณ์ โดยเก็บข้อมูลระหว่างวันที่ 1 มีนาคม ถึง 15 เมษายน 2552 มีผู้ป่วยจำนวน 110 รายที่เป็นโรคหอบหืดซึ่งมีอายุตั้งแต่ 18 ถึง 80 ปีและมีระดับความรุนแรงของโรคปานกลางถึงมากเข้าร่วมในการศึกษา ผู้ป่วยได้รับยาพ่นสูตรผสมของ ยาบิวดีโซนายผสมกับฟอร์โมเทรอล หรือ ยาซาลเมเทอรอลผสมกับฟลูติคาโซนนำส่งโดยเครื่องสูดยาแบบผงแห้งเป็นเวลานาน 3 เดือนขึ้นไป เครื่องมือเก็บข้อมูลประกอบด้วยแบบวัดความพึงพอใจในการใช้ยาพ่นรักษาโรคหอบหืด ซึ่งมี 4 องค์ประกอบได้แก่ ประสิทธิภาพของการรักษา ความง่ายในการใช้ ความยากลำบากในการพกพา และ ผลข้างเคียงและความกังวล พร้อมกับทำการประเมินปัจจัยที่มีความสัมพันธ์กับความพึงพอใจของผู้ป่วยต่อการใช้ยาพ่นสูตรผสมทั้ง 4 ปัจจัยคือ ลักษณะทางประชากรศาสตร์ ระดับของการควบคุมโรคหอบหืด จำนวนยาที่ผู้ป่วยได้รับ รวมทั้งการใช้ยาพ่นตามแพทย์สั่งโดยใช้การวิเคราะห์สมการถดถอยพหุคูณ

จากผลการศึกษาพบความสัมพันธ์กันอย่างมีนัยสำคัญทางสถิติระหว่างตัวแปรต้นทั้ง 4 ปัจจัยคือ ลักษณะทางประชากรศาสตร์ ระดับของการควบคุมโรคหอบหืด จำนวนยาที่ผู้ป่วยได้รับ รวมทั้งการใช้ยาพ่นตามแพทย์สั่ง กับคะแนนความพึงพอใจโดยรวมซึ่งเป็นตัวแปรตาม ($r = 0.50$, $p = 0.001$) โดยร้อยละ 25 ของความแปรปรวนในตัวแปรตามอธิบายได้ด้วยความแปรปรวนในตัวแปรต้น คะแนนจากการใช้ยาตามแพทย์สั่งมีความสัมพันธ์อย่างมีนัยสำคัญทางสถิติมากที่สุดกับคะแนนความพึงพอใจโดยรวมในทิศทางบวก ($r = 0.38$, $p < 0.01$) รวมทั้งการควบคุมโรคหอบหืดได้ไม่ดีมีความสัมพันธ์อย่างมีนัยสำคัญทางสถิติในทิศทางบวกกับคะแนนความพึงพอใจโดยรวม ($r = 0.23$, $p < 0.05$)

การใช้ยาตามแพทย์สั่ง และ การควบคุมโรคหอบหืดได้ไม่ดี เป็น 2 ปัจจัยหลักที่มีความสัมพันธ์กับความพึงพอใจของผู้ป่วยในการใช้ยาพ่นสูตรผสม โดยการใช้ยาตามแพทย์สั่งมีความสัมพันธ์กับความพึงพอใจมากที่สุด ผลการศึกษาเกี่ยวกับปัจจัยที่ส่งผลต่อความพึงพอใจในการใช้ยาพ่นสูตรผสมสามารถนำไปใช้ในการปรับปรุงแนวทางที่เป็นมาตรฐานและคำแนะนำสำหรับการให้คำปรึกษาแก่ผู้ป่วยโรคหอบหืดรายบุคคลเพื่อทำให้ความพึงพอใจในการใช้ยาและผลการรักษาดีขึ้นโดยเฉพาะในกลุ่มผู้ป่วยที่ไม่ใช้ยาตามแพทย์สั่งหรือแม้แต่ในกลุ่มผู้ป่วยที่สามารถควบคุมโรคหอบหืดได้ดีแล้วก็ตาม

ภาควิชา.....เภสัชศาสตร์สังคมและบริหาร..... ลายมือชื่อนิสิต.....เกศศิริ กิจทองพูล.....

สาขาวิชา.....เภสัชศาสตร์สังคมและบริหาร..... ลายมือชื่ออ.ที่ปรึกษาวิทยานิพนธ์หลัก.....

ปีการศึกษา.....2551..... ลายมือชื่ออ.ที่ปรึกษาวิทยานิพนธ์ร่วม.....

5076851733 : MAJOR SOCIAL AND ADMINISTRATIVE PHARMACY
KEYWORDS: SATISFACTION / ASTHMATIC PATIENT / COMBINATION INHALER
KATESIRI KITTHONGPOON: FACTORS INFLUENCING SATISFACTION OF ASTHMATIC PATIENTS TREATED WITH COMBINATION INHALER. THESIS ADVISOR: ASSOC. PROF. VITHAYA KULSOMBOON, Ph.D., THESIS CO-ADVISOR: ASST. PROF. KAMON KAWKITINARONG, M.D., 74 pp.

The objective of this study was to assess the factors influencing satisfaction of asthmatic patients treated with combination inhaler and to compare the patient satisfaction subscale scores among subgroup of asthmatic patients classified by level of asthma control and patient characteristics.

A cross-sectional survey was performed by using survey instrument. All patients were outpatients who visited chest clinic and allergy clinic of King Chulalongkorn Memorial Hospital during March 1, 2009 to April 15, 2009. Of the 110 patients, these patients had moderate to severe persistent asthma. Their age ranged from 18 to 80 years old. The patients had used dry powder combination inhaler of budesonide/formoterol or salmeterol/fluticasone not less than 3 months. The assessment of patient satisfaction with budesonide/formoterol or salmeterol/fluticasone was based on the scores that were measured by the Satisfaction with Asthma Treatment Questionnaire (SATQ). Satisfaction was classified into four domains including effectiveness of treatment, ease of use, medication burden, and side effects and worries. Patient demographics, level of asthma control, number of drugs, and adherence with medication were the factors that were explored the association with patient satisfaction with combination inhaler by using Multiple Regression Analysis (MRA).

The results showed that there were a significant relationship between patient demographics, level of asthma control, number of drugs, adherence with medication, and the satisfaction overall score in this model ($r = 0.50$, $p = 0.001$). The variance within the predictors can explain 25% of variance within the satisfaction overall score. The adherence score had significantly largest positive correlation with satisfaction overall score ($r = 0.38$, $p < 0.01$). Poorly-controlled level had significantly positive correlation with satisfaction overall score ($r = 0.23$, $p < 0.05$).

It can be concluded that two major factors associating with the patients' satisfaction to combination inhaler drugs were adherence and poorly-controlled level. Moreover, adherence score had significantly largest positive correlation with satisfaction overall score. The results on the influencing factors affecting satisfaction with combination inhaler could be used to improve the standard guidelines and the advice for counseling the asthmatic patients individually to give better treatment satisfaction and treatment outcome in the asthmatic patients who had poor adherence or who had totally-controlled level.

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INTRODUCTION

The introduction chapter described (1.1) background and rational, (1.2) research questions, (1.3) research objectives, (1.4) scope of the study, (1.5) operational definition, (1.6) conceptual framework, and (1.7) expected benefits.

1.1 Background and Rational

Asthma is one of the most common chronic diseases, with an estimated three hundred million people affected worldwide. Asthma is a chronic disease characterized by airway inflammation, hyperresponsiveness to a variety of stimuli, and reversible airway obstruction. Common aggravating factors include exposure to allergens (such as house dust mites, animals with fur, cockroaches, pollens and molds), occupational irritants, tobacco smoke, respiratory infections, exercise, emotional stresses, chemical irritants and drugs, such as aspirin and beta blockers. Symptoms of asthma are cough, wheezing, tightness of the chest, shortness of breath, and increased sputum production. Exacerbations are episodic but airway inflammation exists chronically. The pattern, frequency, and intensity of symptoms may vary in an individual over a period of time. Some patients have extended symptom-free periods. Some patients have symptoms only when they exercise or expose to a stimuli. Other patients have continuous symptoms or frequent recurrent acute episodes.

Current asthma management guidelines state that the aim of asthma treatment is to achieve and maintain asthma control without adverse effects from the therapies used. The Global Initiative for Asthma (GINA) recommended specific criteria relating to symptoms, exacerbations, emergency department (ED) visits, use of rescue medication, limitation of activity, and lung function that should be met over a sustain period.

The goals for successful management of asthma are defined as achieving and maintaining symptom control, preventing exacerbations, maintaining lung function as close to normal as possible, preventing asthma mortality and development of irreversible airflow limitation, maintaining normal activity levels, and avoiding treatment related adverse effects. In practice, these goals are rarely achieved and asthma control remains poor while many patients are continuing to suffer frequent symptoms and exacerbations.

Asthma can be effectively treated and most of the patients can achieve good control of the disease. The new Global Initiative for Asthma (GINA) guidelines has focused on level of control as a guide for selection of treatment. A classification of asthma by level of control into totally-controlled, well-controlled, and poorly-controlled are recommended. Medications are divided into three types as follows maintenance medications, reliever medications and medications for allergy-induced asthma. Controller medication must be taken daily to prevent symptoms, improve lung function, and prevent attacks. Reliever medications may occasionally be required to treat acute symptoms such as wheezing, chest tightness and cough. Varieties of controller and reliever medications for asthma are available. The treatment options for patients with asthma depend on a severity of symptom. Maintenance therapy with inhaled corticosteroids has been used to treat patients with persistent asthma by controlling airway inflammation. Patients who remain uncontrolled even using an inhaled corticosteroid (ICS) alone are recommended to be treated with combination inhaler of long-acting β2 agonist (LABA) plus corticosteroid.

Combination inhalers are more convenient to use. Controlling asthma at lower doses of corticosteroids ensures that the corticosteroid is not discontinued when the bronchodilator is used, and is cost-effective. There is a convincing scientific rationale for giving LABA and corticosteroid together. They have complementary actions on the complex pathophysiology of asthma and may enhance each other's effects at a molecular level. It is in normal practice to administer this combination inhaler twice daily at a dose that is related to the severity of asthma and use a short-acting β2-agonist (SABA), such as salbutamol to relieve any breakthrough symptoms. Frequent

use of SABA indicates either poor adherence or need for higher maintenance dose of a combination inhaler. Control was more easily and rapidly achieved with the salmeterol/ fluticasone or formoterol/budesonide combination inhalers than fluticasone or budesonide alone and at a lower total dose of inhaled corticosteroid.

Health-related quality of life, patient perception of asthma control, and patient satisfaction are designed for measure patient-reported outcome. HRQL relates to the impact of health on a person's physical, psychological, social/occupational functioning and well-being. HRQL is based on the patient's own assessment of his/her status regarding these dimensions by using a wide variety of generic and/or disease-specific instruments. Self-reports of symptoms deal with a patient's assessment of the presence/absence or the severity of symptoms and usually obtained via standardized symptom questionnaires. As with the case for assessing HRQL, self-reports of symptoms will typically result in a score for a patient on a given symptom or symptom category. Although observers would agree that less severe is better than more when it comes to symptoms, there is nothing inherently evaluative about these symptom scores. The symptom score is distinct from the patient's evaluation of the medication's impact on his/her symptoms. Satisfaction with medication deals specifically with the evaluative aspect of the patient's experience with the medication. Experience involves both the process and the outcomes associated with the medication. Under this concept, satisfaction with medication is influenced by the outcomes of treatment, especially HRQL and symptom status. Satisfaction with medication is conceptually distinct from health-related quality of life (HRQL), symptom assessment, functional status, or any other patient-reported outcome that may be assessed. HRQL and self-reported symptoms represent patient reports of the patient's status on each of the constructs in question, whereas satisfaction takes into account the extent to which the patient values each of these status points, as well as other factors that enter into determining satisfaction. Patient-reported satisfaction is frequently used to evaluate the impact of treatments or disease on the patient's functioning, well-being, and daily life. Patient-reported satisfaction can increase the data obtained from physiologic measures because changes in clinical parameters may not be necessarily correlate with patient's function or perception.

Asthma is a long-term condition requiring prolonged treatment. Adherence is used within the medical setting and defines as a patient follows a prescribed treatment plan in order to effectively treat an underlying illness. Poor adherence with the prescribed therapy leads to increased mortality and morbidity. Although patients feel that the prescribed medication can control their symptoms and adverse effects are limited and tolerated, it is important to know patients' satisfaction about treatment regimens whilst assessing the potential benefit in terms of degree of adherence.

Treatment satisfaction is a patient-reported outcome that may give useful insights into patient's perspective on their current treatment among alternative treatments.[2] Patient satisfaction is an important measurement that should be included in healthcare evaluation.[3] Asthma is a chronic disease which its specific treatment have the greatest impact on patient outcomes and needs long-term care, so it is reasonable to evaluate patients with asthma about their satisfaction on treatment. Patient satisfaction may be associated with level of asthma control and should be considered as one of the goals in management of asthma.

Patient satisfaction is an important indicator of future adherence to a given treatment. If patients satisfied with the benefits from the medications, they may be likely to comply with the prescribed treatment regimen. Inhaled medications are difficult for patients to use. Thus, patients often become non-adherence, especially during their symptom-free episodes. Patients' non-adherence may result in the loss of expenditures from emergency visits and hospitalizations, which can be prevented by patient education, appropriate therapy, and patient adherence to physicians' recommendation. Therefore, it is important to assess which treatments achieve the best outcomes not only clinically but also in terms of patients-reported outcomes such as patient satisfaction with medication.

A number of questionnaires have been developed to measure health care from patients' perspective. Ideally, the satisfaction questionnaire in asthmatic patients should measure patient satisfaction with inhaled asthma medication. However, most of the researches has focused on satisfaction with generic aspects of patient care, such

as helpfulness of the health care provider. Although drug adherence is an important and complex medical issue, there are few studies on the topic of treatment satisfaction with inhaled medication. This deficiency reflects the general lack of research involving patient satisfaction with medication. Many studies that assess satisfaction along with adherence have focused on satisfaction with care rather than satisfaction with medication. Therefore, it is important to assess treatment satisfaction with combination inhaler for asthma disease. The objective of this study was to assess the factors influencing satisfaction of asthmatic patients treated with combination inhaler, long-acting β2 agonist plus corticosteroid in one inhaler.

The assessment of the asthma control, patient satisfaction, and adherence with budesonide/formoterol combination inhaler and fluticasone/salmeterol combination inhaler was based on the self-reporting from asthma outpatients visited at King Chulalongkorn Memorial Hospital.

1.2 Research questions

RQ1: Are the patient satisfaction overall score different among subgroup of asthmatic patients defined by level of asthma control?

RQ2: Are the patient satisfaction overall score different among subgroup of asthmatic patients classified by patient characteristics?

RQ3: What are the factors influencing satisfaction of asthmatic patients treated with combination inhaler?

1.3 Research objectives

1) To compare overall score of patient satisfaction among subgroup of asthmatic patients defined by level of asthma control

2) To compare overall score of patient satisfaction among subgroup of asthmatic patients classified by patient characteristics

3) To assess the factors influencing satisfaction of asthmatic patients treated with combination inhaler

1.4 Scope of the study

The patients had moderate to severe persistent asthma and came to the allergy and pulmonary department during November 1, 2008 to January 31, 2009. All patients have been using budesonide/formoterol turbuhaler or fluticasone/salmeterol accuhaler for maintenance therapy plus inhaled short-acting β2 agonist as the reliever therapy for their asthma treatment for at least three months prior to enroll in the study. The study focuses on the relationship between the asthma control level, patient characteristics, number of drugs, adherence, and patient satisfaction with combination inhaler. The dependent variable is the patient satisfaction. There were 8 independent variables in this study. The independent variable are the adherence score, gender, age, length of time having diagnosis of asthma, number of drugs, marital status, educational level, and level of asthma control. Therefore, Multiple Regression Analysis (MRA) was used to analyze the relationship between the satisfaction overall score and the 8 independent variables.

1.5 Operational definition

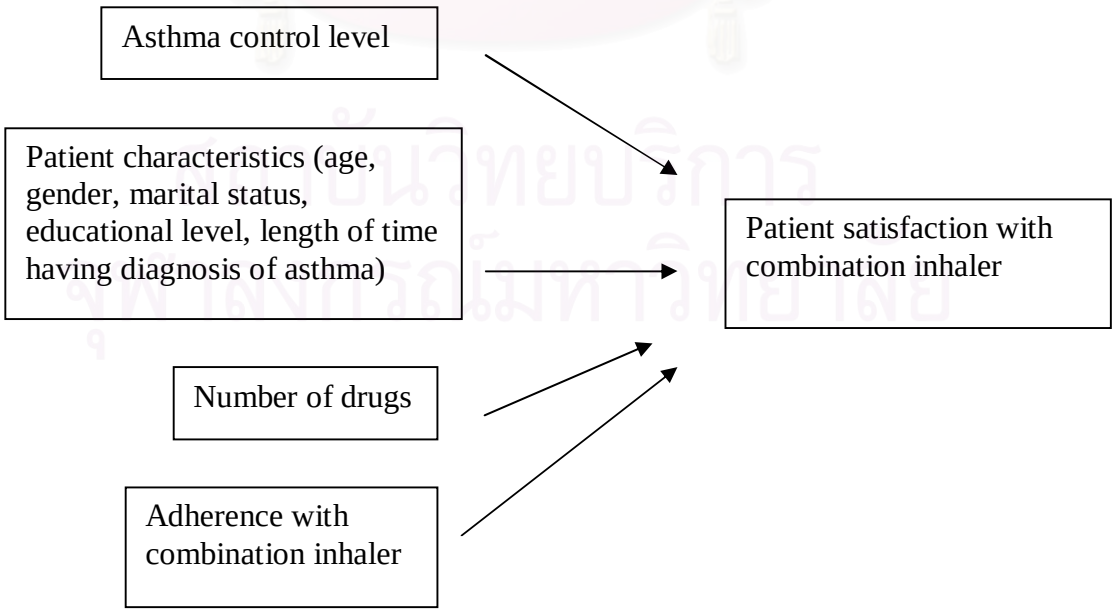
1) Adherence is defined by the degree to which a patient follows prescribed management plan in order to treat underlying disease effectively.

2) Combination inhaler is an inhaler that consists of long-acting β2 agonist (LABA) and corticosteroid (ICS) in one inhaler. The two ICS/LABA combination inhalers used in the study are budesonide/formoterol (Symbicort®; Astrazeneca, Lund, Sweden) and, salmeterol/fluticasone (Seretide®; GlaxoSmithKline, Brenford, UK).

3) Asthma control level is defined by the asthma symptoms, limitation of activities, need for reliever medication, and patients' self-rating of asthma control.

4) Patient satisfaction is defined by the patient's evaluation of the processing of taking combination inhaler and the outcomes associated with combination inhaler.

1.6 Conceptual framework



1.7 Expected benefits

1) Knowing the influencing factors affecting satisfaction of asthmatic patients treated with combination inhaler will help practitioners to provide the appropriate treatment.

2) Results on influencing factors affecting satisfaction with combination inhaler could be used to tailor the special advice for the asthmatic patients individually.

3) Information on patient satisfaction with a given combination inhaler could be used to improve a standard guideline for counseling which will result in better treatment outcome.

CHAPTER II

LITERATURE REVIEW

The literature review chapter described (2.1) prevalence, (2.2) diagnosis of asthma, (2.3) treatment of asthma, (2.4) health satisfaction and treatment satisfaction, (2.5) Satisfaction with Asthma Treatment Questionnaire, (2.6) measurement of asthma control, and (2.7) patient adherence to inhaled medication.

2.1 Prevalence

Asthma is a major global health problem which utilizes a substantial burden on family, health care provider, and society. Health care technology has rapidly grown and leading to an expensive medicines and therapies to treat a variety of asthma control. Whereas, health care provider are dealing with limited resources.

Asthma has been the target of powerful activity in the areas of clinical practice guidelines, disease management, drug formulary design, and other efforts that are aimed to reduce medical expenditures and increase quality of asthma care. With its general increase in prevalence, morbidity, and mortality over the last decades, asthma is one of the public health challenges in children and adults. Therefore, health care provider must consider the clinical aspects of the disease in their effort to control the costs of asthma care.

The total estimated cost of illness related to asthma in the United States was approximately $6.2 billion in 1990. Effective asthma therapies have become more important at this time. The emphasis on treating asthma as an inflammatory disease focuses an attention on the use of anti-inflammatory agents to control asthma more effectively.

Although highly effective therapies are available, many patients with asthma continue to suffer from symptoms and exacerbations which are consider disrupting their daily life. This may reflect under-diagnosis, inappropriate therapy, and poor adherence to standard prophylactic therapy. Inhaled corticosteroids are the basis of asthma therapy but it is now required the evidence that addition of a long-acting inhaled β2-agonist (LABA) such as salmeterol or formoterol, gives better control in terms of reducing symptoms, improving lung function, and reducing exacerbations in patients with mild, moderate, and severe persistent asthma. It leads to the development of fixed combination inhalers such as salmeterol/fluticasone, formoterol/budesonide, which are now increasingly used in asthma management.

Asthma prevalence has dramatically increased in many countries over recent decades. Environmental exposures play a dominant role in the etiology of this disease (Tricia and John, 2004). In 1990, the management of asthma among USA population already accounted for more than $6.2 billion in medical expenditures (Camargo et al., 1999) In Egypt, the WHO (2006) estimated that chronic respiratory diseases account for 6.9% of diseases and in terms of specific conditions, osteoarthritis, injuries, and asthmatic bronchitis are the leading causes of disability. Although asthma is not a major cause of death, it is one of the most common problems managed by doctors, and is a frequent reason for hospitalization.

Few reports on the prevalence of asthma in Thai children have been published. The studies reported the prevalence of asthma symptoms in Thai children in three cities (Bangkok, Khon Kaen, and Chiang Mai), were 11.7 to 13.6%, 10.2 to 11.0%, and 5.5 to 12.6%, respectively. The nationwide cross-sectional survey revealed the prevalence of current diagnosed asthma in 2.15%, definite asthma in 2.91%, and bronchial hyperresponsiveness in 3.31 to 3.98% of the adult Thai population. The prevalence of asthma in Thailand is much lower than western countries and Australia/New Zealand (Wanchai Dejsomritrutai et al., 2006).

2.2 Diagnosis of Asthma

Asthma can be diagnosed based on the basis of a patient's symptoms, and medical history. Measurements of lung function provide an assessment of the severity, reversibility and variability of airflow limitation, and confirm the diagnosis of asthma. Traditionally, the degrees of symptoms, airflow limitation, and lung function variability have allowed asthma to be classified by severity. The severities of asthma are divided into four levels, intermittent, mild persistent, moderate persistent, and severe persistent. However, it is important to recognize that asthma severity involves both the severity of underlying disease and its responsiveness to treatment. In addition, severity is not an unvarying feature of an individual patient's asthma but may change over a period of time. Therefore, classification of asthma by level of control is more relevant and useful in the management of asthma.

There are several evidence-based guidelines for management which aim to standardize and improve quality of management such as Global Initiative for Asthma (GINA) Guideline. Thai Thoracic Society initiated the Thai Asthma Guideline in 1994 and revised it in 1997 to improve asthma management and outcome. Peak flow meter and spirometry are not used in usual for diagnose of lung function. Less than 17% of respondents used a peak flow meter in acute asthma management (Vichyanond Hatchaleelaha et al., 2001). Therefore, asthma is diagnosed on the basis of a patient's symptoms and medical history.

Physicians usually make an assessment to treatment by asking a few questions about symptoms and a physical examination in clinical practice. The severities of asthma are classified by the degree of symptoms, airflow limitation, and lung function. Asthma severity should be assessed at an initial assessment. However, asthma severity can change over a period of time. Therefore, the level of asthma control is useful than the asthma severity. The levels of asthma control are divided by daytime symptoms, limitation of activities, nocturnal symptoms, need for reliever

medication, lung function, and exacerbations. The levels of asthma control are divided into controlled, partly controlled, and uncontrolled.

2.3 Treatment of Asthma

The guidelines promote an assessment of the patients to classify the severity of asthma followed by a step-wise approach of treatment to achieve the goals for asthma management. On the other hand, asthma control reflects on how well the clinical manifestations of asthma are suppressed by the management strategy and it is a dynamic occasion. It is possible for a patient to have severe persistent asthma but good control if properly managed. Furthermore, there may be a patient with mild persistent asthma but poor control. Therefore, the emphasis in asthma management shift from severity to control is remarkable change in the 2006 Global Initiative for Asthma (GINA) update.

International guidelines on asthma management indicate that the primary goal of treatment is to achieve control on diurnal or nocturnal symptom that should be absent or minimal with exacerbations and lung function should be normal.

Inhalers are the main treatment for asthma. There are many different types of inhaler. The drug inside an inhaler goes straight into the airways. The airways are treated but little of the drug gets into the rest of the body. Therefore, side-effects are unlikely to occur or are minor. Drugs inside inhalers can be grouped into relievers, preventers, and long-acting bronchodilators for the treatment of asthma. Reliever inhalers contain bronchodilator drugs. The drug in a reliever inhaler relaxes the muscle in the airways. This opens the airways wider and symptoms usually quickly relieve. These drugs are called bronchodilators because they dilate the bronchi airways. There are several different reliever drugs. For example, salbutamol and terbutaline. These come in various brands made by different companies. There are different inhaler devices that deliver the same reliever drug. Preventer inhalers usually contain a steroid drug. Preventer inhalers are taken every day to prevent symptoms

from developing. Steroids work by reducing the inflammation in the airways. When the inflammation has gone, the airways are much less likely to become narrow and cause symptoms. It takes 7-14 days for the steroid in a preventer inhaler to build up its effect. Therefore, it will not give any immediate relief of symptoms. It can take up to six weeks for maximum benefit. Long-acting bronchodilator inhalers work in a similar way to relievers but work for up to 12 hours after taking each dose. They are salmeterol and formoterol. One may be advised in addition to a steroid inhaler if symptoms are not fully controlled by the steroid inhaler alone. Some brands of inhaler contain a steroid plus a long acting bronchodilator for people who need both to control their symptoms.

Different inhaler devices suit different people. They can be divided into four groups as follows Metered Dose Inhalers, Inhalers with spacer devices, Dry powder inhalers, and Nebulisers.

Metered Dose Inhaler has been used for over 40 years. This type of inhaler is used to deliver various types and brands of drugs. The Metered Dose Inhalers contains a pressurized inactive gas that propels a dose of drug in each puff. Each dose is released by pressing the top of the inhaler. This type of inhaler is quick to use, small, and convenient to carry. It needs good co-ordination to press the canister and breathe in fully at the same time. The Metered Dose Inhalers is the most widely used inhaler. However, many people do not use it to its best effect. Common errors are not shaking the inhaler before using it, inhaling too jerkily or at the wrong time, and not holding the breath long enough after breathing in the contents.

Spacer devices are used with pressurized Metered Dose Inhaler. The spacer between the inhaler and the mouth holds the drug like a reservoir when the inhaler is pressed. A valve at the mouth end ensures that the drug is kept within the spacer until the breathe in. It doesn’t need good co-ordination in order to press the canister and breathe in fully at the same time. They are commonly used by children but many adults also use them.

Dry powder inhalers do not have a gas propellant to spray the drug out of a canister. Instead, each dose contains a small amount of drug in a powder. Various devices are made by different companies. Each has a different method of providing the correct amount of powder for each dose.

Nebuliser is a device that generates an aerosol vapor of the drug. Nebuliser doesn't need a good co-ordination to use it. Nebulisers are mainly used in hospitals for severe attacks of asthma when large doses of inhaled drugs are needed. Some of the inhaler drug has an effect on the back of the throat. Sometimes this can cause problems such as thrush in the mouth. This tends to be more problem with higher doses of steroid inhalers. Fewer drugs have an effect on the throat when using a spacer device.

Clinical guidelines suggested that an appropriate treatment paradigm for uncontrolled persistent asthma by inhaled corticosteroids alone is maintenance therapy with an inhaled corticosteroid plus long-acting β2 agonist (LABA) combination administered twice daily plus a short-acting β2 agonist (SABA) as needed for symptom relief. If asthma patients remain unstable, the addition of a long-acting β2-agonist to maintenance treatment is a clinically preferable option to increasing the dose of inhaled corticosteroid (Greening et al., 1994; Woolcock et al., 1996; Pauwel et al., 1997; O'Byrne et al., 2001). A rapid-acting β2-agonist is given for prompt relief from exacerbations and an inhaled corticosteroid is recommended as a maintenance treatment for chronically airway inflammation.

The two ICS/LABA combination inhalers are available as follows budesonide/formoterol (Symbicort®, Astrazeneca, Lund, Sweden) and salmeterol/fluticasone (Seretide®, GlaxoSmithKline, Brenford, UK). Salmeterol/Fluticasone is available both as a dry powder inhaler, and as a metered-dose inhaler but budesonide/formoterol is available only as a dry powder inhaler. Formoterol is a long-acting β2-agonist bronchodilator that has a rapid onset of action as rapid as short-acting β2-agonist (Ringdal et al., 1998; Seberova et al., 2000; Ketchell et al., 2002; Boonsawat et al., 2003; Balanag et al., 2006). Therefore,

budesonide/formoterol can be use as a rescue medication, and be use daily as controller. Patients take budesonide/formoterol for a maintenance therapy and take as needed short-acting β2 agonist for reliever therapy. A new approach for asthma therapy is budesonide/formoterol maintenance and reliever therapy (SMART) using one inhaler without the requirement for a separate short-acting β2-agonist. With SMART, patients take a maintenance dose of budesonide/formoterol in line with normal practice to establish asthma control and take as needed inhalations of budesonide/formoterol if symptoms occur to provide both rapid symptom relief, and increased asthma control. Patients take a maintenance dose of salmeterol/fluticasone for maintenance therapy to provide asthma control and take as needed short-acting β2-agonist to provide rapid symptom relief.

2.4 Health satisfaction and treatment satisfaction

Previously, only clinical and economic outcomes of asthma care received more attention. At present, evaluation of patient care across a range of medical conditions also includes measures of patient satisfaction. Health care organizations have started to incorporate patient satisfaction to assess the performance of the plans and the quality of patient management programs. Over the past decades, there has been the interest in the issue of patient satisfaction with the receiving medical care. This interest reflects the perspective that has developed over this time which emphasize that a patient is as an active consumer of healthcare services rather than merely a passive recipient of these services. Increased direct-to-consumer (DTC) advertising over the past decade, three-tier co-pays, and misinformation sources reinforce the patient as consumer roles. And, like those responsible for providing many of life's goods and services, including automobile manufacturers, hotel chains, television networks, and so on, providers of health-care services have become increasingly interested in obtaining feedback about their product from the primary consumers of these products. The demonstration of greater satisfaction with one product over another provides a competitive marketing advantage, provided that such claims are based on empirical data. Thus, there has been an increasing interest on the

part of pharmaceutical firms in assessing patient satisfaction with their medications over the past few years.

There are three levels of health satisfaction. The broadest level of the hierarchy is satisfaction with health-care delivery which includes issues of accessibility, patient–physician interaction, perceived quality of staff, and facilities. From the perspective of researchers or practitioners who are interested in patient evaluation of a specific medication, assessment of patient satisfaction with the entire delivery of health care is much too broad. The latter will include a number of factors that go far beyond satisfaction with medication such as access to appropriate medical staff on a timely basis, perceived quality and responsiveness of medical staff and quality of medical facilities, patient's own personal experience with respect to the duration and severity of the disease, and expectations for receiving efficacious and timely medical care. The middle level represents treatment satisfaction. Treatment satisfaction is defined as the individual's rating important aspects of the process and outcomes of patient treatment experience. Treatment satisfaction involves evaluation of more than just the patient's satisfaction with the medication. It will include issues of physician– patient interaction, recommendations by the physician that go beyond the specific medication such as dietary restrictions, behavioral changes, and concomitant therapies such as physical rehabilitation. Finally, the narrowest end of the hierarchy is the satisfaction with medication. Although not denying the importance of the other aspects of satisfaction, satisfaction with medication is the appropriate target of inquiry for a number of purposes and should not be confused with the other levels of the hierarchy. Satisfaction with medication is influenced by a variety of factors which are subject to assessment. Whilst the treatment is focused entirely on the medication, treatment satisfaction will devolve to satisfaction with medication.

Patient satisfaction is a patient-reported outcome which is considered to be included in the study about medications because of three main reasons. Firstly, satisfaction with medication can be related to patient adherence to prescription regimens. If the intention is to determine the relationship between adherences to a

regimen for prescription of a medication, the appropriate level of assessment of satisfaction is at the level of satisfaction with medication, not satisfaction with treatment or satisfaction with health-care delivery. In addition, the lack of empirical support for the relation between adherence and satisfaction with medication also reflects measurement difficulty, both in measuring adherence and in adequately measuring satisfaction with medication. Secondly, detailed feedback about patient satisfaction can be used in improving products. For example, if it is found that lack of convenience of taking the medication is a key factor resulting in the decrease of satisfaction, the drug might be reformulated in a way that results in a less frequent dosing requirement. Finally, all other things being equal, satisfaction can be related to patients' preferences and their requests for specific medications. In the case of a patient who had the opportunity to try several different medications, the one with which he or she is most satisfied will likely be the drug of choice. For patients who have not yet had medication prescribed for their disease, the situation is a bit more complicated. Nonetheless, patients' expectations about being satisfied with a drug can be shaped by a variety of information sources, including direct-to-consumer advertising.

Treatment is designed to positively impact or prevent patients' symptoms. The extent of this impact can be measured by clinical examination or patient assessment of symptoms. A patient's satisfaction with medication will be determined by the extent to which the patient attributes the change in symptoms to the action of the medication. If the patient believes the medication has improved disease-related symptoms, then all other things being equal, that treatment medication should be positively evaluated. For example, consider a patient with chronic lower back pain who has already tried physical therapy, weight loss, and standard OTC drugs. If the physician now prescribes a pain medication, and the pain symptoms are greatly improved, then the patient is likely to attribute the improved health status to the prescribed medication. If the patient had not previously tried physical therapy and weight reduction, and the physician recommends both as well as prescribing the pain medication and the pain symptoms decrease substantially as a result of the medication, the patient may not attribute the improvement entirely to the drug. Although it is conceptually simple to

design controlled experiments to tease out the impact of the different aspects of the treatment, in practice these types of tightly controlled experiments will not usually take place for the sole purpose of determining patient satisfaction.

Thus, the medication should be a major component of the treatment if the goal is to determine satisfaction with medication as opposed to the more general treatment satisfaction. The medication impacts not only disease symptoms but also result in side effects that the patient finds bothersome. If the patient attributes negatively valued side effects to the action of the drug, patient satisfaction with medication should decrease.

Therefore, it is important to determine the patient's satisfaction with the action of the drug on his or her symptoms and with the side effects of the drug in assessing satisfaction with medication. Determining patients' satisfaction with the impact of the drug on symptoms and side effects is different from assessing symptoms and side effects directly and requires a different set of questions. Because symptoms and side effects owing to medication are affected by medication, they in turn influence HRQL and functional status. Nonetheless, if a medication has an impact on HRQL or functional status, it is important to assess the patient's satisfaction with this effect, even though it may occur indirectly through the drug's action on symptoms and side effects.

There are factors that may influence satisfaction with medication that have little or nothing to do with the perceived effect of the drug on symptoms, HRQL, or functional status. These factors include the ease and convenience with which a patient can adhere to their medication. For example, the mode of administration or medication storage requirements of a new medication may be more tolerable than previous treatments. Patients would then be more satisfied with this medication because it would be easier to use. Other factors include the medication's dosing schedule, the patient's confidence in his or her ability to take the medication properly, or the comfort level a patient feels with the amount of information received on the medication from the physician or other health-care provider. Although these factors

may have negligible impact on the patient's well-being, they may very well be a determining factor in satisfaction in cases where the drug and its comparators have similar clinical efficacy.

2.5 Satisfaction with Asthma Treatment Questionnaire (SATQ)

Patient satisfaction is one of the patient reported outcomes from patients' perspective. Although satisfaction with asthma treatment is an important indicator for assess the patient's compliance, it received little attention and only few validated measurement instruments are available.

Mathias et al. (2000) developed the Patient Satisfaction with Asthma Medication (PSAM) questionnaire. Adult moderate asthmatics residing in Canada using an inhaled medication (either salmeterol, formoterol or albuterol) self-administered the questionnaire, which also included the Asthma Quality of Life Questionnaire (AQLQ). A total of 53 asthmatics (70% female, 45% married, mean age: 47 years) completed the questionnaire. Using variable clustering, four PSAM scales were identified: Inhaler Properties, Comparison with Other Medications, Overall Perception of Medication, and Relief. In conclusion, the PSAM questionnaire demonstrated reliability and validity in moderate asthmatics.

Atkinson et al. (2004) developed and evaluated a general measure of patients' satisfaction with medication, the Treatment Satisfaction Questionnaire for Medication (TSQM). The content and format of 55 initial questions were based on a formal conceptual framework, an extensive literature review, and the input from three patient focus groups. The psychometric performance of items and resulting TSQM scales were examined using eight diverse patient groups (arthritis, asthma, major depression, type I diabetes, high cholesterol, hypertension, migraine, and psoriasis) recruited from a national longitudinal panel study of chronic illness. Participants were then randomized to complete the test items using one of two alternate scaling methods (Visual Analogue vs. Likert-type). In conclusion, the TSQM is a psychometrically sound and valid measure of the major dimensions of patients' satisfaction with

medication. Preliminary evidence suggests that the TSQM may also be a good predictor of patients' medication adherence across different types of medication and patient populations.

Campbell et al. (2003) developed the Satisfaction with Asthma Treatment Questionnaire (SATQ). The study involved focus group meetings, development, testing and modification of a preliminary instrument and testing of the revised instrument use different samples of the patients with asthma. Factor analysis of the 26-item questionnaire identified four domains of satisfaction: effectiveness of treatment, ease of use, medication burden and side-effects. The result showed that the Satisfaction with Asthma Treatment Questionnaire was a useful instrument for gaining insight into patient satisfaction with inhaled treatment for asthma.

Fernández et al. (2006) assessed the psychometric properties and the feasibility of the Spanish adaptation of the Satisfaction with Asthma Treatment Questionnaire (SATQ) for inhaled medication. The result showed that the Spanish adaptation of the SATQ is a useful, user-friendly instrument for measuring satisfaction with inhaled treatment.

The Satisfaction with Inhaled Asthma Treatment Questionnaire (SATQ) consisted of 26 items covering four aspects including effectiveness (8 items), ease of use (7 items), burden of medication (6 items), and side-effects and worries (5 items). The SATQ is a specific questionnaire to measure the overall patient satisfaction with inhaler treatment. The SATQ is a patient-completed instrument which is brief and easy to use. Moreover, the questionnaire can be used in a wider variety of clinical setting.

2.6 Measurement of asthma control: Asthma Control Test (ACT)

Measures of asthma control are different from measures of disease-specific quality of life. Control is defined as a multidimensional function that includes the self-perception of symptoms, day or night; change in activity level due to the disease and

the use of reliever medications to control symptoms. There are three type of tools that developed to assessing asthma control in adult patients with asthma; Asthma Control Questionnaire (ACQ), Asthma Control Test (ACT) and Asthma Therapy Assessment Questionnaire (ATAQ). The tools are similar for quantify asthma control. All contain questions regarding nocturnal symptoms, rescue medication use and functional limitations.

Juniper et al. (1999) developed and validated the Asthma Control Questionnaire (ACQ) by generated a list of all symptoms used to assess control and sent it to 100 asthma clinicians who were members of guidelines committees (18 countries). They scored each symptom for its importance in evaluating asthma control. The questionnaire was very responsive to change in asthma control ($p<0.0001$). Cross-sectional and longitudinal validity were supported by correlations between the ACQ and other measures of asthma health status being close to a priori predictions. The study has shown that the ACQ has strong measurement properties both as an evaluative and as a discriminative instrument and can be used with confidence in both clinical trials and cross-sectional surveys.

The Asthma Therapy Assessment Questionnaire (ATAQ) for children and adolescents was developed to assist clinicians and health plans to identify children at risk for adverse outcomes of asthma. A cross-sectional mail survey with telephone follow-up was conducted with parents of 434 children aged 5-17 years being treated for asthma and enrolled in three managed care organizations in the Midwestern and Northeastern United States. ATAQ scales were evaluated using correlations with measures of health status, asthma impact, and healthcare utilization. ATAQ demonstrated good internal consistency and the hypothesized relationships to corresponding measures from existing instruments. Asthma control was significantly associated with measures of physical health, psychosocial health, resource use, and family impact. ATAQ appears to have satisfactory measurement properties and is ready for use to identify patients who might benefit from further disease management efforts or medical attention (Skinner et al., 1999).

Nathan et al. (2004) developed and validated the Asthma Control Test (ACT). A 22-item survey was administered to 471 patients with asthma in the offices of asthma specialists. The specialist's rating of asthma control after spirometry was collected. Five items were selected from regression analyses. The result has shown that Asthma control test (ACT) is a simple method for assessing asthma control without lung function testing. The ACT is a patient-based tool for identifying patients with poorly controlled asthma.

The Asthma Control Test is a patient self-assessment tool of asthma control. Asthma Control Test is a simple five-point questionnaire, which is self completed by patients. Each item is scored from one (poor control) to five (good control) and the scores added to give a final score with a maximum of 25. The ACT provides a more simplified assessment of asthma control by not requiring FEV1. The ACT is providing a meaningful and easy to use scoring method, which is easy than the ACQ and more comprehensive than ATAQ for evaluating the range of asthma control.

2.7 Patient adherence to inhaled medication

Adherence is used within the medical setting and defines as a patient follows a prescribed management plan in order to treat effectively an underlying disease. The gold standard for assessing adherence to asthma regimens would be direct measure of whether patients used their inhaler at the prescribed times and in the prescribed amounts. However, no gold standard measures are currently available. There exist a variety of methods to assess medication adherence. There are two basic methods to evaluate compliance as follows self-reporting which is easy and pill counting or weighing inhalers that is more objective but inadequate to distinguish between correct use and deliberate dumping medication. The other alternative method is the invasive testing of blood drug levels.

Lindberg et al. (2001) identified the important factors that can influence patient compliance with prescribed medication. The result has shown that increasing age and female gender were significant factors with respect to taking the prescribed

medication. Conversely, increasing the length of time with airway problems decreased the compliance with prescribed medication. A patient-centered model of doctor-patient interaction was related to significantly higher compliance with prescribed medication. Also, the patient felt that she/he had received information and education about their asthma was shown to be of great value with respect to compliance with prescribed medication.

Koch et al. (2006) assessed the association between treatment compliance, asthma symptom control and patient satisfaction. The survey was administered at the baseline visit of a prospective cohort study in patients with mild asthma treated with low dose ICS. The result shown that non compliant patients had significantly higher dissatisfaction vs. those who were compliance ($P=0.04$). A significantly higher proportion of non compliant patients also had uncontrolled asthma when compared to patients who were compliance ($P<0.001$).

Tavasoli et al. (2006) identified factors that can influence asthmatic patients' compliance with the prescribed metered dose inhaler drugs. The result was a significant correlation between compliance and patient's literacy level, attitude about using drugs and their knowledge about asthma. However, there was a significant negative correlation symptom control score and compliance.

The adherence questionnaire was derived from the questionnaire described by Brooks et al. (1994). They demonstrated that asking several key questions regarding inhaler use could yield a representative estimate of adherence. The original questionnaire used yes/no responses. For this study, five-point Likert scale was used for the responses. The items also were monitored adherence during the last three months to improve the accuracy of recall. This method is easy to use, and can assess the adherence problem of inhalers for asthma in a timely manner.

CHAPTER III

RESEARCH METHODOLOGY

The research methodology described (3.1) research design, (3.2) subjects, (3.3) measurement, (3.4) data collection, (3.5) data analysis, and (3.6) ethics.

3.1 Research Design

This research was a cross-sectional survey at King Chulalongkorn Memorial Hospital. The study was conducted to compare the patient satisfaction overall scores among subgroup of asthma patients defined by degree of disease control and patient characteristics and to assess for the factors influencing satisfaction of asthmatic patients treated with combination inhaler, budesonide/formoterol or salmeterol/fluticasone. The patients were assessed the degree of satisfaction, the level of asthma control and their adherence with combination inhaler. The asthma patients were selected from outpatient department of King Chulalongkorn Memorial Hospital.

Patient characteristics including age, gender, marital status, educational level, and length of time having diagnosis of asthma were recorded at baseline. The assessment of patient satisfaction with budesonide/formoterol turbuhaler and salmeterol/fluticasone accuhaler for maintenance therapy was based on the score that was measured by the Satisfaction with Asthma Treatment Questionnaire (SATQ) which was developed by Campbell et al. (2003). The level of asthma control was measured by the Asthma Control Test and the evaluation of patient adherence was based on the self-reporting questionnaire from outpatients visiting King Chulalongkorn Memorial Hospital. The patients had moderate to severe persistent asthma and came to the allergy and chest clinics during November 1, 2008 to January 31, 2009. All patients have been using budesonide/formoterol turbuhaler or fluticasone/salmeterol accuhaler for maintenance therapy plus inhaled short-acting β2 agonist as the reliever therapy for their asthma treatment for at least three months

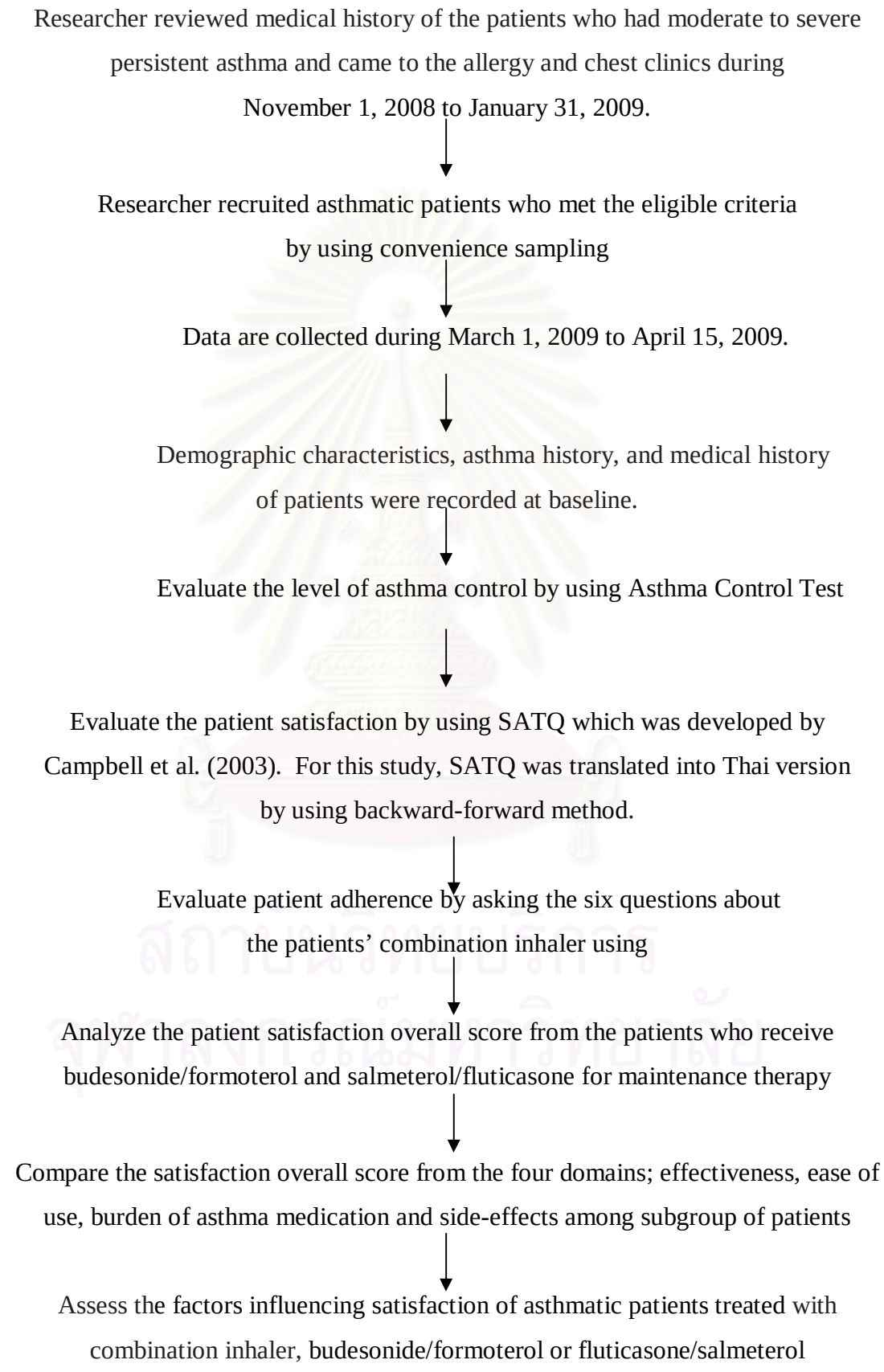
prior to enroll in the study. Totally 150 asthmatic patients who met the eligible criteria and came to allergy and chest clinics during November 1, 2008 to January 31, 2009 were enrolled the study by using convenience sampling. The data are collected during March 1, 2009 to April 15, 2009 by using self-reporting questionnaire. The total number that was used in this study was 110 asthmatic patients based upon sample size calculation in section 3.2, page 28.

All patients obtained an explanation on each part of a questionnaire and received information about the combination inhaler before they completed questionnaires. After all patients completed questionnaires, if they had questions about combination inhaler, researcher answered the question of the patients.

For the purpose of the study, the patient satisfaction overall scores among subgroup of asthma patients classified by degree of disease control and patient characteristics and the factors influencing satisfaction of asthmatic patients treated with the combination inhaler, budesonide/formoterol or salmeterol/fluticasone were assessed for the disease management of moderate to severe persistent asthmatic patients.

The study was conducted in accordance with Good Clinical Practice (GCP) and was approved by the ethical committees of the King Chulalongkorn Memorial Hospital. All patients received verbal and written information about the study and gave their written informed consent to participate in the study.

Figure 3.1: Flow Diagram of the Method



3.2 Subjects

Patients with moderate to severe persistent asthma who visited the outpatient department of King Chulalongkorn Memorial Hospital were studied. Totally 150 asthmatic patients who met the eligible criteria and came to allergy clinic and chest clinic during November 1, 2008 to January 31, 2009 were enrolled the study. All patients met asthma diagnosis criteria based on the Global Initiative for Asthma (GINA) guideline. All patients met asthma diagnosis criteria based on GINA guideline and had been using budesonide/formoterol turbuhaler or salmeterol/fluticasone accuhaler for maintenance therapy least three months prior to their enrollment into the study. They were allowed to use inhaled short-acting β2 agonist for relieving symptoms. Eligible patients who visited the clinic were recruited until the number of patients met the required number from the sample size calculation.

All patients obtained an explanation on each part of a questionnaire and received information about combination inhaler before all patients completed questionnaires. Furthermore, the researcher answered questions which patients asked about combination inhaler after all patients completed questionnaires.

All patients included in the study met the asthma diagnosis criteria based on the Global Initiative for Asthma (GINA) guideline. They were patients with diagnosed moderate to severe persistent asthma. All patients have been using budesonide/formoterol turbuhaler or fluticasone/salmeterol accuhaler for maintenance therapy plus inhaled short-acting β2 agonist for reliever therapy at least three months prior to enroll in the study.

Exclusion criteria were the presence of other conditions such as; heart disease, chronic liver disease, chronic kidney disease, chronic lung disease and chronic obstructive pulmonary disease. An informed consent was obtained from patients prior to enroll in the study.

Sample size calculation

Sample size is estimated from Jacob Cohen table with the medium effect size of 0.15. The power was 0.8 and ∝ was 0 .05. There were eight independent variables including age, sex, marital status, educational level, length of time having diagnosis of asthma, number of drugs used, asthma control level, and patient adherence towards combination inhaler. From the Jacob Cohen table, the required sample size is 107, thus the expected total number of subjects in this study was 110 patients.

Multiple Regression analysis

	∝ =0.05		
	small	medium	large
Number of independent variables			
2	481	67	30
3	547	76	34
4	599	84	38
5	645	91	42
6	686	97	45
7	726	102	48
8	757	107	50

Cohen, J. (1992). A power Primer. Psychological Bulletin 112: 155-159.

3.3 Measurement

Data were collected by using a questionnaire that was designed to collect data on patient characteristics (age, gender, marital status, educational level, length of time having diagnosis of asthma), asthma control level and patient adherence towards combination inhaler.

The assessment of patient satisfaction with budesonide/formoterol turbuhaler or fluticasone/salmeterol accuhaler for maintenance therapy was based on the score, as measured by the Satisfaction with Asthma Treatment Questionnaire (SATQ), which was developed by Campbell et al. (2003). For this study, SATQ was translated

into Thai version by using backward-forward method by the expert who graduated the Doctoral degree from the university in the USA, and has a good command of English. Thai version of SATQ was translated into a simple language and easy to understand. Scale of SATQ was modified from 7 Likert scale to 5 Likert scale which was suitable for Thai culture, and easy to understand. SATQ was divided into four domains; effectiveness, ease of use, burden of asthma medication, and side-effects/worries.

The Asthma Control Test (ACT) was consisted of five questions as suggested by the GINA asthma management guidelines; asthma symptoms, use of reliever medications, the impact of asthma on daily functioning, and patients' self-rating of asthma control in the past four weeks were evaluated. The sum score was ranged from 5 to 25. The levels of control are divided into 3 levels. If a score is 25, the patient is in the totally-controlled level. If a score is 20-24, the patient is in the well-controlled level. If a score is less than 20, the patient is in the poorly-controlled level.

The Satisfaction with Asthma Treatment Questionnaire is a self-administered questionnaire with 26 items, in which the patients response to 26 affirmations with scores 1 (strongly disagree) to 5 (strongly agree). The 26 items are grouped into 4 domains; effectiveness (items 5,7,12,13,22,24,25 and26), ease of use (items 1,2,4,8,10,16 and 19), burden of asthma medication (items 3,9,15,17,20 and 23) and side-effects and worries (items 6,11,14,18 and 21). The overall satisfaction score is calculated from the mean overall score. The overall satisfaction score range from 1 to 5.

Patients' adherence to prescribed asthma inhalers was assessed by six questions. The items also monitor adherence during the last three months to improve the accuracy of recall. During the last three months: 'Have you been careless about using your inhaler?', 'Have you ever forgotten to use your inhaler?', 'Have you ever stopped using your inhaler because you felt better?', 'Have you ever stopped using your inhaler because you felt worse?', 'Have you ever used your inhaler less than the doctor prescribed because you felt better?', 'Have you ever used your inhaler more than the doctor prescribed because you felt you were having an attack?. The response

of each question is a five-point Likert scale. A mean score of 5 indicates perfect adherence with the medication regimen, while a mean score < 5 indicates to lower levels of adherence.

The internal consistency of Satisfaction with Inhaled Asthma Treatment Questionnaire (SATQ), Adherence Questionnaire, and Asthma Control Test (ACT) were assessed by Cronbach's alpha value.

3.4 Data collection

The data are collected during March 1, 2009 to April 15, 2009 by using self-reporting questionnaire. The patient characteristics (age, gender, marital status, educational level, length of time having diagnosis of asthma) were recorded at baseline. The adherence with inhaled medications was also recorded. In this study, the patient satisfaction score was measured with the Satisfaction with Asthma Treatment Questionnaire which developed by Campbell et al. (2003) in Thai version. The satisfaction score were recorded by divided into four subscale scores: effectiveness, ease of use, burden of asthma medication and side-effect/worries. The level of asthma control was measured with Asthma Control Test which developed by Nathan et al (2004). Patients' adherence to prescribed asthma inhalers was also collected by asking six questions about the combination inhaler using.

3.5 Data Analysis

Descriptive statistical analysis was used to analyze the characteristics of patients (age, gender, marital status, educational level, length of time having diagnosis of asthma). The satisfaction score was shown as mean overall satisfaction score. The level of asthma control was shown as mean asthma control score and standard deviation. The adherence was shown as mean compliance score and standard deviation. Differences in satisfaction overall score among subgroup of asthma patients classified by degree of disease control and patient characteristics were tested using

analysis of variance (ANOVA). The relationship between the factors influencing satisfaction of asthmatic patients treated with the combination inhaler, budesonide/formoterol or salmeterol/fluticasone was assessed by multiple regression analysis (MRA).

The ρ value < 0.05 is considered significant for all statistic values. Analyses are performed by using the SPSS version 13.

3.6 Ethics

The study was conducted in accordance with good clinical practice (GCP) and was approved by the Institutional Review Board of Faculty of Medicine, Chulalongkorn University.

No patients got the risk from this study because the patients complete only the self-reporting questionnaire. All patients have self-determination to refuse the participation in this study. Furthermore, the information of all patients are kept confidentially and are presented in the summarizing data.

All patients received oral and written information about the study and gave their informed consent to participate in the study before the participation. All patients signed consent form with willingness.

CHAPTER IV
RESULTS

The result chapter described (4.1) baseline characteristics, (4.2) satisfaction overall score among subgroup of asthmatic patients, (4.3) satisfaction with combination inhaled asthma treatment, (4.4) reliability of measurement tool, and (4.5) the factors influencing satisfaction overall score based on MRA.

4.1 Baseline Characteristics

A total of 110 patients were interviewed and their data were collected. Demographic data and asthma control level of patients are shown in Table 4.1. Of all patients who participated in the study, 76% were female, 24% were male, 70% were married, 25% were single, and 5% were widowed. Of all patients, 49% finished lower levels than undergraduate, and 51% finished undergraduate including higher levels. The largest part of co-disease was allergy which was 40% of all patients. Mostly patients were under health insurance scheme. Moreover, 45% have been using only 2 inhalers including (1) budesonide/formoterol turbuhaler or salmeterol/fluticasone accuhaler and (2) short-acting β_2 agonist, 55% have been using (1) budesonide/formoterol turbuhaler or salmeterol/fluticasone accuhaler, (2) short-acting β_2 agonist inhaler, and (3) others. Patients could be classified into 3 groups based on their frequency of asthma control level scores which were (1) totally-controlled 50(45%), (2) well-controlled 46(42%), and (3) poorly-controlled 14(13%).

Demographic data and adherence score of patients are also shown in Table 4.2. The scores of adherence and asthma control were calculated according to the methods explained in research methodology part, chapter 3, (page 24-31). The mean age of the participants was 54.13 years old. The mean length of time having diagnosis of asthma was 192.62 months. The mean adherence score was 4.34.

Table 4.1: Demographic data and level of asthma control of patients

	Number of patients (%)
Gender	
Female	84 (76)
Male	26 (24)
Marital status	
Single	28 (25)
Married	77 (70)
Widowed	5 (5)
Educational level	
Lower levels than undergraduate	54 (49)
Undergraduate including higher levels	56 (51)
Co-diseases	
Allergy	44 (40)
Hypertention	18 (16)
Hyperlipidemic	7 (6)
Diabetes mellitus	8 (7)
Thyroidism	1 (1)
Osteoarthritis	4 (3)
Rheumatoid arthritis	3 (2)
Glaucoma	1 (1)
Right of medical treatment	
Out of pocket	19 (17)
Universal Coverage	3 (3)
Social Security Scheme	10 (9)
Civil Servant Medical Benefit Scheme	74 (67)
Private insurance	4 (4)
Number of drugs	
Group 1 (two inhalers)	50 (45)
Group 2 (two inhalers with others)	60 (55)
Level of asthma control	
Poorly-controlled	14 (13)
Well-controlled	46 (42)
Totally-controlled	50 (45)

Table 4.2: Demographic data and adherence score of patients

Age (years)	
Mean (min-max)	54.13 (32-80)
SD	12.251
Length of time having diagnosis of asthma (months)	
Mean (min-max)	192.62 (6-600)
SD	151.311
Score of adherence	
Mean (min-max)	4.34 (2.83-5.00)
SD	0.55

Adherence questionnaire consists of 6 items. Asthma Control Test (ACT) consists of 5 items. The Adherence item scores and Asthma Control Test item scores are shown in Table 4.3, and 4.4.

Table 4.3: Adherence item scores

	Mean	Min	Max	SE	SD
1. During the last 3 months, have you at times been careless about using your inhaler?	4.25	2	5	0.09	0.9
2. During the last 3 months, have you ever forgotten to use your inhaler?	3.94	2	5	0.09	0.92
3. During the last 3 months, have you ever stopped using your inhaler because you felt better?	4.33	2	5	0.09	0.94
4. During the last 3 months, have you ever stopped using your inhaler because you felt worse?	4.89	4	5	0.03	0.31
5. During the last 3 months, have you ever used your inhaler less than the doctor prescribed because you felt better?	4.31	2	5	0.09	0.94
6. During the last 3 months, have you ever used your inhaler more than the doctor prescribed because you felt you were having an attack?	4.33	2	5	0.08	0.88

Table 4.4: Asthma Control Test item scores

	Mean	Min	Max	SE	SD
1. In the past 4 weeks, how often did your asthma prevent you getting as much done at work, school or home?	4.14	1	5	0.1	1.05
2. During the past 4 weeks, how often have you had shortness of breath?	3.85	1	5	0.1	1.08
3. During the past 4 weeks, how often did your asthma symptoms (wheezing, coughing, shortness of breath, chest tightness or pain) wake you up at night or earlier than usual in the morning?	3.92	1	5	0.13	1.33
4. During the past 4 weeks, how often have you used your blue puffer or reliever medication?	3.65	1	5	0.13	1.34
5. How would you rate your asthma control during the past 4 weeks?	3.71	1	5	0.08	0.83

4.2 Difference of satisfaction overall score among subgroup of asthmatic patients

4.2.1 Defined by level of asthma control

The dependent variable is a satisfaction overall score. The independent variable is a level of asthma control. The level of asthma control is divided into poorly-controlled, well-controlled, and totally-controlled. Therefore, analysis of variance (ANOVA) was used to compare the mean satisfaction overall score between three groups. The analysis results are shown in Table 4.5, 4.6, 4.7, 4.8, and 4.9.

Table 4.5 showed the test of homogeneity of variances. Homogeneity of variance is not significantly different ($p= 0.48 > \alpha\ 0.05$). Therefore, three groups of patient which defined by level of asthma control have an equal variance.

Table 4.5: Test of Homogeneity of Variances of different groups of patient which defined by level of asthma control

Levene Statistic	df1	df2	Sig.
0.74	2	107	0.48

Table 4.6 showed the descriptive data of four domains in each level of asthma control as follows; number, mean, and standard deviation. The mean scores of four domains of poorly-controlled group had higher than well-controlled group and totally-controlled group.

Table 4.6: Mean and standard deviation of four domains in each group of level of control

	Mean (SD)			
Domains	Poorly-controlled (n=14)	Well-controlled (n=46)	Totally-controlled (n=50)	Total
Effectiveness	4.3 (0.86)	4.2 (0.53)	4.07 (0.48)	4.15 (0.56)
Ease of use	4.19 (0.46)	3.94 (0.38)	3.99 (0.41)	3.99 (0.41)
Burden of medication	3.7 (0.78)	3.54 (0.61)	3.56 (0.6)	3.57 (0.62)
Side-effects and worries	3.67 (0.85)	3.37 (0.68)	2.96 (0.67)	3.22 (0.74)

Table 4.7 showed overall satisfaction scores in each level of asthma control including; number, mean, standard deviation, standard error of mean, lower bound of 95% confidence interval, and upper bound of 95% confidence interval. Mean satisfaction overall scores in poorly-controlled group was 3.97, in well-controlled group was 3.76and in totally-controlled group was 3.65.

Table 4.7: Descriptive data of overall satisfaction score in each group of level of control

	Level of control	Number of patients	Mean	SD	SE	95% CI	
						Lower Bound	Upper Bound
Overall score	Poorly-controlled	14	3.97	0.52	0.14	3.67	4.27
	Well-controlled	46	3.76	0.35	0.05	3.66	3.86
	Totally-controlled	50	3.65	0.35	0.05	3.55	3.74
	Total	110	3.73	0.38	0.04	3.66	3.81

Table 4.8 showed the analysis of variance test which compared the mean between poorly-controlled group, well-controlled group, and totally-controlled group. P-value from ANOVA is significantly different ($p = 0.02 < \alpha\ 0.05$). Therefore, mean satisfaction overall score of at least one group was significantly different from other groups.

Table 4.8: ANOVA which compared mean between poorly-controlled group, well-controlled group, and totally-controlled group

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.19	2	0.60	4.30	**0.02**
Within Groups	14.82	107	0.14		
Total	16.01	109			

Table 4.9 showed Post hoc analysis by Scheffe's multiple comparisons test. Homogeneity of variance is not significantly different from Levene's test ($p = 0.48 > \alpha\ 0.05$). Moreover, mean satisfaction overall score of at least one group was significantly different from other groups ($p = 0.02 < \alpha\ 0.05$). Therefore, Post hoc analysis by Scheffe's multiple comparisons test was used to explore which group was significantly different from other groups. The result showed that mean satisfaction overall score of poorly-controlled group was significantly higher than totally-controlled group ($p = 0.02 < \alpha\ 0.05$) but mean satisfaction overall score of poorly-controlled group was not significantly higher than well-controlled ($p = 0.19 > \alpha\ 0.05$) and mean satisfaction overall score of well-controlled group was not significantly higher than totally-controlled group ($p = 0.33 > \alpha\ 0.05$).

Table 4.9: Post hoc analysis by Scheffe's multiple Comparisons test

	(I) level_c	(J) level_c	Mean Difference (I-J)	SE	Sig.	95% CI	
						Lower Bound	Upper Bound
Scheffe	Poorly-controlled	Well-controlled	0.21	0.11	0.19	-0.07	0.49
		Totally-controlled	0.32	0.11	0.02*	0.04	0.60
	Well-controlled	Poorly-controlled	-0.21	0.11	0.19	-0.49	0.07
		Totally-controlled	0.12	0.08	0.33	-0.07	0.30
	Totally-controlled	Poorly-controlled	-0.32	0.11	0.02*	-0.60	-0.04
		Well-controlled	-0.11	0.08	0.33	-0.30	0.07

*The mean difference is significant at the .05 level.

4.2.2 Defined by patient characteristics

4.2.2.1 Gender

The dependent variable is a satisfaction overall score. The independent variable is a gender. Gender is divided into female and male. Therefore, analysis of variance (ANOVA) was used to compare the mean satisfaction overall score between two groups. The analysis results are shown in Table 4.10, 4.11, and 4.12.

Table 4.10 showed the test of homogeneity of variances. Homogeneity of variance is not significantly different ($p = 0.34 > \alpha\ 0.05$). Therefore, variance of female and male are equal.

Table 4.10: Test of Homogeneity of Variances of different groups of patient which defined by gender

Levene Statistic	df1	df2	Sig.
0.92	1	108	0.34

Table 4.11 showed the descriptive data of each group as follows; number, mean, standard deviation, standard error of mean, lower bound of 95% confidence interval, and upper bound of 95% confidence interval. Mean satisfaction overall score of female is higher than male.

Table 4.11: Descriptive data of each gender

	Gender	Number of patients	Mean	SD	SE	95% CI	
						Lower Bound	Upper Bound
Overall score	Female	84	3.75	0.41	0.04	3.66	3.84
	Male	26	3.69	0.30	0.06	3.56	3.81
	Total	110	3.73	0.38	0.04	3.66	3.81

Table 4.12 showed the analysis of variance test which compared mean between female group and male group. P-value from ANOVA is not significant different ($p= 0.46 > \alpha\ 0.05$). Therefore, mean satisfaction overall score of female group was not significantly higher than male group.

Table 4.12: ANOVA which compared mean between female group and male group

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	0.08	1	0.08	0.54	0.46
Within Groups	15.93	108	0.15		
Total	16.01	109			

4.2.2.2 Marital status

The dependent variable is a satisfaction overall score. The independent variable is a marital status. Marital status is divided into single, married, and widowed. Therefore, analysis of variance (ANOVA) was used to compare the mean satisfaction overall score between three groups. The analysis results are shown in Table 4.13, 4.14, and 4.15.

Table 4.13 showed the test of homogeneity of variances. Homogeneity of variance is significantly different (p= 0.0005 < α 0.05). Therefore, three groups of patient which defined by marital status have an unequal variance.

Table 4.13: Test of Homogeneity of Variances of different groups of patient which defined by marital status

Levene Statistic	df1	df2	Sig.
8.10	2	107	0.0005

Table 4.14 showed the descriptive data of each marital status as follows; number, mean, standard deviation, standard error of mean, lower bound of 95% confidence interval, and upper bound of 95% confidence interval. Mean satisfaction overall scores were different between single, married, and widowed group.

Table 4.14: Descriptive data each marital status

	Marital status	Number of patients	Mean	SD	SE	95% CI	
						Lower Bound	Upper Bound
Overall score	Single	28	3.72	0.55	0.11	3.50	3.93
	Married	77	3.75	0.30	0.03	3.68	3.81
	Widowed	5	3.67	0.50	0.23	3.04	4.29
	Total	110	3.73	0.38	0.04	3.66	3.81

Table 4.15 showed the analysis of variance test which compared mean between single group, married group, and widowed group. P-value from ANOVA is not significant different (p= 0.87 > α 0.05). Therefore, mean satisfaction overall score were not significantly different between single group, married group, and widowed group.

Table 4.15: ANOVA which compared mean between single group, married group, and widowed group

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	0.04	2	0.02	0.14	0.87
Within Groups	15.97	107	0.15		
Total	16.01	109			

4.2.2.3 Educational level

The dependent variable is a satisfaction overall score. The independent variable is an educational level. Educational level is divided into lower levels than undergraduate, and undergraduate including higher levels. Therefore, analysis of variance (ANOVA) was used to compare the mean satisfaction overall score between two groups. The analysis results are shown in Table 4.16, 4.17, and 4.18.

Table 4.16 showed the test of homogeneity of variances. Homogeneity of variance is not significantly different ($p= 0.11 > \alpha\ 0.05$). Therefore, two groups of patient which defined by educational level have an equal variance**.**

Table 4.16: Test of Homogeneity of Variances of different groups of patient which defined by educational level

Levene Statistic	df1	df2	Sig.
2.60	1	108	0.11

Table 4.17 showed the descriptive data of each educational level as follows; number, mean, standard deviation, standard error of mean, lower bound of 95% confidence interval, and upper bound of 95% confidence interval. Mean satisfaction overall scores were different between lower levels than undergraduate, and undergraduate including higher levels.

Table 4.17: Descriptive data of each educational level

Overall score	Educational level	Number of patients	Mean	SD	SE	95% CI	
						Lower Bound	Upper Bound
	Lower levels than undergraduate	54	3.81	0.33	0.04	3.72	3.90
	Undergraduate including higher levels	56	3.66	0.42	0.06	3.54	3.77
	Total	110	3.73	0.38	0.04	3.66	3.81

Table 4.18 showed the analysis of variance test which compared mean between lower levels than undergraduate, and undergraduate including higher levels. P-value from ANOVA is significant different ($p= 0.03 < \alpha\ 0.05$). Therefore, mean satisfaction overall score of lower levels than undergraduate group was significantly different from undergraduate including higher levels.

Table 4.18: ANOVA which compared mean between lower levels than undergraduate, and undergraduate including higher levels

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	0.69	1	0.69	4.84	**0.03**
Within Groups	15.33	108	0.14		
Total	16.01	109			

4.2.2.4 Number of drugs

The dependent variable is a satisfaction overall score. The independent variable is number of drugs that patients have been receiving. Number of drugs is divided into each group of patients who have been receiving two inhalers, and two inhalers with others. Therefore, analysis of variance (ANOVA) was used to compare

the mean satisfaction overall score between two groups. The analysis results are shown in Table 4.19, 4.20, and 4.21.

Table 4.19 showed the test of homogeneity of variances. Homogeneity of variance is not significantly different (p= 0.11 > α 0.05). Therefore, two groups which defined by number of drugs have an equal variance.

Table 4.19: Test of Homogeneity of Variances of different groups of patient which defined by number of drugs

Levene Statistic	df1	df2	Sig.
2.66	1	108	0.11

Table 4.20 showed the descriptive data of each group of patients which defined by number of drugs as follows; number, mean, standard deviation, standard error of mean, lower bound of 95% confidence interval, and upper bound of 95% confidence interval. Mean satisfaction overall scores were different between group of patients who have been receiving two inhalers, and two inhalers with others.

Table 4.20: Descriptive data of each number of drugs

		Number of patients	Mean	SD	SE	95% CI	
						Lower Bound	Upper Bound
Overall score	2 inhalers	50	3.84	0.33	0.05	3.75	3.94
	2 inhalers with others	60	3.64	0.40	0.05	3.54	3.75
	Total	110	3.73	0.38	0.04	3.66	3.81

Table 4.21 showed the analysis of variance test which compared mean between group of patients who have been receiving two inhalers, and two inhalers with others. P-value from ANOVA is significantly different (p= 0.01 < α 0.05). Therefore, mean satisfaction overall score of patients who have been receiving two

inhalers was significantly different from patients who have been receiving two inhalers including others.

Table 4.21: ANOVA which compared mean between group of patients who have been receiving two drugs, and more than two drugs

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.085	1	1.09	7.85	**0.01**
Within Groups	14.93	108	0.14		
Total	16.01	109			

4.2.2.5 Age

The dependent variable is a satisfaction overall score. The independent variable is age of patients. Therefore, Pearson's Correlation was used to analyze the relationship between satisfaction overall score and age of patients. The analysis results are shown in Table 4.22.

Table 4.22 showed the Pearson's correlation test which analyzed the relationship between satisfaction overall score and age of patients.

1) P-value from Pearson's Correlation is not significantly different ($p= 0.745 > \alpha$ 0.05). Therefore, age of patients was not significantly correlate with satisfaction overall score.

2) Pearson's Correlation (r) is 0.031.

3) Direction is positive.

4) Coefficient of Determination (R^2) is 0.000961.

Table 4.22: Pearson's correlation test which analyzed the relationship between satisfaction overall score and age of patients

		age	Overall score
age	Pearson Correlation	1	0.031
	Sig. (2-tailed)		0.745

The result showed that there was a weak relationship but not significant between the age of patients and the satisfaction overall score.

4.2.2.6 Length of time having diagnosis of asthma

The dependent variable is a satisfaction overall score. The independent variable is a length of time having diagnosis of asthma. Therefore, Pearson's Correlation was used to analyze the relationship between satisfaction overall score and length of time having diagnosis of asthma. The analysis results are shown in Table 4.23.

Table 4.23 showed the Pearson's correlation test which analyzed the relationship between satisfaction overall score and length of time having diagnosis of asthma.

1) P-value from Pearson's Correlation is not significantly different ($p= 0.644 > \alpha$ 0.05). Therefore, length of time having diagnosis of asthma was not significantly correlate with satisfaction overall score.

2) Pearson's Correlation (r) is 0.045.

3) Direction is positive.

4) Coefficient of Determination (R^2) is 0.002025.

Table 4.23: Pearson's correlation test which analyzed the relationship between satisfaction overall score and length of time having diagnosis of asthma

		Length of time having diagnosis of asthma	Overall score
length	Pearson Correlation	1	0.045
	Sig. (2-tailed)		0.644

The result showed that there was a weak relationship but not significant between the length of time having diagnosis of asthma and the satisfaction overall score.

4.2.2.7 Adherence score

The dependent variable is a satisfaction overall score. The independent variable is an adherence score. Therefore, Pearson's Correlation was used to analyze the relationship between satisfaction overall score and adherence score. The analysis results are shown in Table 4.24.

Table 4.24 showed the Pearson's correlation test which analyzed the relationship between satisfaction overall score and adherence score.

1) P-value from Pearson's Correlation is significantly different ($p= 0.000 < \alpha$ 0.05). Therefore, adherence score was significantly correlate with satisfaction overall score.

2) Pearson's Correlation (r) is 0.377.

3) Direction is positive.

4) Coefficient of Determination (R^2) is 0.142129.

Table 4.24: Pearson's correlation test which analyzed the relationship between satisfaction overall score and adherence score

		Adherence score	Overall score
Adherence score	Pearson Correlation	1	0.377**
	Sig. (2-tailed)		**0.000**

**Correlation is significant at the 0.01 level (2-tailed).

The result showed that the adherence score was a weak significant predictor of the satisfaction overall score (r = 0.377, p= 0.000). The variance within adherence score can explain 14.2129% of variance within satisfaction overall score.

4.3 Satisfaction with combination inhaled asthma treatment

There are four domains reflecting four aspects of satisfaction as follows; effectiveness of treatment, ease of use, medication burden, and side-effects and worries.

Table 4.25 showed the distribution of the effectiveness of treatment score, the ease of use score, the medication burden score, the side-effects and worries score, and the overall score (average of the four domain scores) as follows; minimum, maximum, mean, standard deviation, and standard error of mean. Patients in this study were generally satisfied with their combination inhaled medication; mean domain score values indicate they were most satisfied with the effectiveness and ease of use of their combination inhaled medication and least satisfied with medication burden and side-effects and worries.

Table 4.25: Satisfaction with Asthma Treatment Questionnaire distribution properties

Domains of medication satisfaction	Mean	Minimum	Maximum	Standard Deviation	Standard Error of Mean
Effectiveness	4.15	1.63	5.00	0.56	0.05
Ease of use	3.99	2.71	5.00	0.41	0.04
Burden of medication	3.57	1.50	4.83	0.62	0.06
Side-effects and worries	3.22	1.40	5.00	0.74	0.07
Overall score	3.73	2.63	4.71	0.38	0.04

4.4 Reliability of measurement tool

The reliability of Satisfaction with Inhaled Asthma Treatment Questionnaire (SATQ), Adherence, and Asthma Control Test (ACT) are presented in Table 4.26.

Table 4.26: Reliability of SATQ, Adherence questionnaire, and ACT

Measurement tool	Items (n)	Cronbach's alpha
(1) SATQ Domain		
Effectiveness	8	0.85
Ease of use	7	0.73
Burden of medication	6	0.68
Side-effects and worries	5	0.68
(2) Adherence questionnaire	6	0.73
(3) ACT	5	0.8

Firstly, Cronbach's alpha values of SATQ domain ranged 0.68-0.85 for four scales, indicating evidence of reliability of the scales and no redundancy of the items. Secondly, Cronbach's alpha value of adherence questionnaire was 0.73, indicating evidence of reliability of the scales and no redundancy of the items. Cronbach's alpha value of adherence questionnaire was 0.73, indicating evidence of reliability of the scales and no redundancy of the items. Finally, Cronbach's alpha value of ACT was 0.80, indicating evidence of reliability of the scales and no redundancy of the items.

4.5 The factors influencing satisfaction overall score

There were 8 independent variables in this study. The dependent variable is a satisfaction overall score. The independent variable are the adherence score, sex, age, length of time having diagnosis of asthma, number of drugs, marital status, educational level, and level of asthma control. Therefore, Multiple Regression Analysis (MRA) was used to analyze the relationship between the satisfaction overall score and the 8 independent variables as follows; adherence score, gender, age, length of time having diagnosis of asthma, numbers of drug, marital status, educational level, and level of asthma control.

The analysis results are shown in Table 4.27, 4.28, 4.29, and 4.30.

Table 4.27: Correlations matrix

	Overall score	Adherence score	male	age	Length of time	Two inhalers with others	married	widow	Undergrad and higher levels	Poorly-control	Well-control
Overall score	1										
Adherence score	**0.38	1									
male	-0.07	-0.05	1								
age	0.03	-0.05	0.01	1							
Length of time	0.04	-0.06	0.02	0.1	1						
Two inhalers with others	**-0.26	**-0.30	0.04	-0.13	0.05	1					
married	0.04	-0.08	**0.27	0.15	0.1	*-0.16	1				
widow	-0.04	-0.12	0.08	*0.21	0.07	0.02	**-0.33	1			
Undergrad and higher level	*-0.21	-0.03	0.12	*-0.19	0.15	0.13	**-0.44	*0.21	1		
Poorly-control	**0.23	0.12	-0.02	-0.004	-0.01	*0.20	*-0.17	*0.18	-0.06	1	
Well-control	0.06	0.07	0.08	-0.03	**0.23	0.11	*-0.17	-0.1	-0.02	**-0.32	1
Mean	3.73	4.34	0.24	54.13	192.6	2.55	0.7	0.05	0.51	0.13	0.42
Std. Deviation	0.38	0.55	0.43	12.25	151.3	0.5	0.46	0.21	0.5	0.33	0.5

*p< 0.05, **p< 0.01

There were 8 independent variables in this study. Table 4.27 showed that the adherence score had significantly largest correlation with satisfaction overall score ($r = 0.38$, $p < 0.01$). It meant the more adherence score the more satisfaction overall score. The patients who had two inhalers with others, and undergraduate including higher levels had significant correlation with satisfaction overall score ($r = -0.26$, and -0.21, respectively). The patients who had two inhalers with others had negative correlation with satisfaction overall score. It meant the patients who had two inhalers with others had less satisfaction overall score than the patients who had two inhalers (because the patients who had two inhalers were a reference). Undergraduate including higher level had negative correlation with satisfaction overall score. It meant the undergraduate including higher levels had less satisfaction overall score than the lower levels than undergraduate (because the patients who finished lower levels than undergraduate were a reference). Poorly-controlled level had significant positive correlation with satisfaction overall score ($r = 0.23$, $p<0.01$). It meant the poorly-controlled patients had the higher satisfaction overall score than the totally-controlled patients (because the patients who had totally-controlled level were a reference).

The patients who had two inhalers with others had significant negative correlation with adherence score ($r = -0.30$, $p< 0.01$). It meant the patients who had two inhalers with others the less adherence score they had.

Married had significant positive correlation with male ($r = 0.27$). It meant male had more numbers of married than female. Married had significant negative correlation with the patients who had two inhalers with others ($r = -0.16$). It meant married had more number of patients who had two inhalers than single. Widowed had significant positive correlation with age ($r = 0.21$). It meant the older had more numbers of widowed.

Undergraduate including higher levels had significant negative correlation with age and married ($r = -0.19$, -0.44, respectively). It meant the older had less

number of patients who finished undergraduate including higher levels and the patients who finished undergraduate including higher levels had less number of married than the patients who finished lower levels than undergraduate. Undergraduate including higher levels had significant positive correlation with widowed (r = 0.21). It meant the patients who finished undergraduate including higher levels had more numbers of widowed than the patients who finished lower levels than undergraduate.

Poorly-controlled level had significant negative correlation with two inhalers with others and married (r = -0.20, and -0.17, respectively). It meant poorly-controlled patients had less number of drugs and also had less numbers of married than totally-controlled level. Poorly-controlled level had significant positive correlation with widowed (r = 0.18). It meant poorly-controlled patients had more numbers of widowed than totally-controlled. Well-controlled level had significant negative correlation with length of time having diagnosis of asthma and married (r = -0.23,-0.17, respectively). It meant well-controlled patients had shorter time of having diagnosis of asthma and also had less numbers of married than totally-controlled level.

Table 4.28: Model Summary

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate	Change Statistics				
					R^2 Change	F Change	df 1	df 2	Sig. F Change
1	0.50	0.25	0.18	0.35	0.25	3.32	10	99	0.001[a]

a Predictors: (Constant), poorly-controlled, widowed, number of drugs, male, age, length of having diagnosis of asthma, adherence score, undergraduate and higher level, married, well-controlled

1) P-value from Pearson's Correlation is significantly different (p= 0.001< α 0.05). Reject null hypothesis. Therefore, the predictors in this model were significantly correlate with satisfaction overall score.

2) Pearson's Correlation (r) is 0.50.

3) Direction is positive.

4) Coefficient of Determination (R^2) is 0.25.

The result showed that there were a medium significant relationship between the predictors and the satisfaction overall score in this model (r = 0.50, p= 0.001). The variance within the predictors can explain 25% of variance within the satisfaction overall score.

Table 4.29: Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		b	Std. Error	Beta		
1	(Constant)	3.106	0.482		6.444	0.000
	Adherence score	0.216	0.065	0.311	3.304	0.001
	Male	-0.027	0.087	-0.030	-0.306	0.760
	Age	-0.001	0.003	-0.021	-0.227	0.821
	Length of time having diagnosis of asthma	0.000	0.000	0.126	1.360	0.177
	Two inhalers including others	-0.093	0.074	-0.122	-1.260	0.211
	Married	0.036	0.102	0.043	0.352	0.726
	Widowed	0.053	0.186	0.029	0.288	0.774
	Undergrad including higher levels	-0.132	0.082	-0.173	-1.604	0.112
	Poorly-controlled	0.244	0.115	0.213	2.128	0.036
	Well-controlled	0.116	0.077	0.150	1.518	0.132

a Dependent Variable: Satisfaction overall score

Table 4.30: Coefficients

Model 1			
	b	Std. Error	Beta
(Constant)	3.106	0.482	
Adherence score	0.216	0.065	0.311
Male	-0.027	0.087	-0.030
Age	-0.001	0.003	-0.021
Length of time having diagnosis of asthma	0.0003	0.0002	0.126
Two inhalers with others	-0.093	0.074	-0.122
Married	0.036	0.102	0.043
Widowed	0.053	0.186	0.029
Undergrad including higher levels	-0.132	0.082	-0.173
Poorly-controlled	0.244	0.115	0.213
Well-controlled	0.116	0.077	0.150
R	0.501		
R Square	0.251		
Adjusted R Square	0.176		
R Square Change	0.251		
F Change	3.320		
Sig. F Change	0.001		

Dependent variable: Satisfaction overall score

The most influence predictor was the adherence score (Beta = 0.311). The equation that used to predict the satisfaction overall score produced from b and Beta in table 4.30.

The equations for predict score is as follows;

Satisfaction overall score = 3.106+ 0.216 Adherence score- 0.027 Male- 0.001 Age+ 0.0003 Length of time having diagnosis of asthma- 0.093 Two inhalers with others+ 0.036 Married+ 0.053 Widowed- 0.132 Undergraduate including higher levels+ 0.244 Poorly-controlled level+ 0.116 Well-controlled level

The equation for predict Z score is as follows;

$Z_{\text{satisfaction overall score}} = 0.311\ Z_{\text{Adherence score}} - 0.030\ Z_{\text{Male}} - 0.021\ Z_{\text{Age}} + 0.126\ Z_{\text{Length of time having diagnosis of asthma}} - 0.122\ Z_{\text{Two inhalers with others}} + 0.043\ Z_{\text{Married}} + 0.029\ Z_{\text{Widowed}} - 0.173\ Z_{\text{Undergraduate including higher level}} + 0.213\ Z_{\text{Poorly-controlled level}} + 0.150\ Z_{\text{Well-controlled level}}$

The equation showed that the patients who had more adherence score the more satisfaction overall score. Male had less satisfaction overall score than female. The older patients had less satisfaction overall score than the younger patients. The patients who had longer time of having diagnosis of asthma had more satisfaction overall score. The patients who have been using two inhalers with others had less satisfaction overall score than the patients who have been using two inhalers. Married and widowed had more satisfaction overall score than single. The patients who finished undergraduate including higher levels had less satisfaction overall score than the patients who finished lower levels than undergraduate. Poorly-controlled level and well-controlled level had more satisfaction overall score than totally-controlled level.

CHAPTER V
DISCUSSIONS AND CONCLUSIONS

Asthma is a long-term condition requiring prolonged treatment. From the Global Initiative for Asthma (GINA) guideline, the management of asthma is based on a level of control. Maintenance therapy with inhaled corticosteroids are treated all patients with persistent asthma for control airway inflammation. However, patients who remain symptomatic on an inhaled corticosteroid (ICS) alone are treated with inhaled long-acting β2 agonist (LABA) plus corticosteroid. It is normal practice to administer this combination inhaler twice daily at a dose that is related to the severity of asthma and use a short-acting β2-agonist (SABA), such as salbutamol as required for relieve any breakthrough symptoms. Although patients belief the prescribed medication that they feel they can control their symptoms and adverse effects are limited and tolerated, it is important to know patients' satisfaction about treatment regimens whilst assess the potential benefit in terms of adherence enhancement. Treatment satisfaction is a patient-reported outcome that may give useful insights into patient's perspective on their current treatment. Satisfaction has come to be considered as one of the aim of management of asthma patients. Therefore, it is also rational to ask patients with chronic diseases about their satisfaction with treatment because there is a specific treatment that will likely have the greatest impact on patient outcomes.

As new drugs are developed, there is a need to assess the satisfaction in reducing and controlling asthma symptoms, and determine the influencing factors of patients' satisfaction.

The discussions and conclusions chapter described (5.1) discussions, (5.2) limitations, (5.3) recommendations, and (5.4) conclusions.

5.1 Discussions

The objective of this study was to assess the factors influencing satisfaction of asthmatic patients treated with combination inhaler, budesonide/formoterol combination inhaler and fluticasone/salmeterol combination inhaler.

Cronbach's alpha values of SATQ, Adherence questionnaire, and ACT indicated evidence of reliability of the scales and no redundancy of the items. Moreover, the questionnaires are easy to apply in routine clinical practice.

There are few validated questionnaires measuring patient satisfaction. Campbell et al. developed a specific questionnaire to measure the overall patient satisfaction with inhaler treatment. In this study, there was an evaluation of satisfaction with combination inhalers in asthmatic patients by using the Satisfaction with Inhaled Asthma Treatment Questionnaire (SATQ) developed by Campbell et al. Satisfaction overall score was found to be higher in the effectiveness and ease of use domains and lower for burden of asthma medication and side-effects and worries domains. This finding agrees with a previous study by Basyigit et al.

This study showed that adherence score had significantly largest positive association with satisfaction overall score. The patients who had higher adherence score also had more satisfaction overall score than the patients who had lower adherence score. Poorly-controlled level also had significant association with satisfaction overall score. Thus, the patients who had poorly-controlled level had more satisfaction overall score than the patients who had totally-controlled level.

In the correlation matrix, the patients who had two inhalers with others, and the patients who finished undergraduate level and higher, had significant negative correlation with satisfaction overall score. The associations were reasonable since using more medications could disturb patient satisfaction more than less medications, and patients who had higher education may have higher expectation than lower

educational level. However, these two variables did not have statistically significant association with patient satisfaction overall score in the MRA model.

It is reasonable that adherence was associated with satisfaction level in a positive direction. The patients who had good adherence to combination inhaler also had higher satisfaction level than the patients who had poor adherence. This finding agrees with a previous study by Koch et al. (2006).

However, level of asthma control affect satisfaction level in a negative direction. The patients who had poorly-controlled level had more satisfaction overall score than the patients who had totally-controlled level. The satisfaction level was relatively lower when the patients had totally-controlled level may be due to the reason that their expectation of the treatment is higher than the patients who had poorly-controlled level.

5.2 Limitations

There were a number of limitations to this study that need to be considered. Firstly, this study was conducted by choosing asthmatic patients who came to the outpatient department (OPD) of King Chulalongkorn Memorial Hospital for the evaluation. However, asthmatics patients in different hospitals may have different health care systems, different treatment patterns, and cultural differences in health care utilization. Secondly, backward-forward translation was used to translate the Satisfaction with Inhaled Asthma Treatment Questionnaire from English to Thai. There was not a full validation of Thai version of the Satisfaction with Inhaled Asthma Treatment Questionnaire in this study. Finally, self-reported method was used to measure the adherence which might affect the result of the study.

5.3 Recommendations

This study provided further evidence of the factors influencing satisfaction of asthmatic patients treated with combination inhaler. The result on the influencing factors affecting satisfaction with combination inhaler could be used to improve the standard guideline and the advice for counseling the asthmatic patients individually to give better treatment outcome.

In addition, larger scale study would be beneficial to further validate the finding of this study. Other factors that should be considered in future studies are family support, adherence with oral medications, good inhaler technique use, and psychological factors that may influence satisfaction with medications.

5.4 Conclusions

There were 8 independent variables in this study. The dependent variable is a satisfaction overall score. The independent variable are the adherence score, gender, age, length of time having diagnosis of asthma, number of drugs, marital status, educational level, and level of asthma control.

The results of this study showed that there are two major factors influencing the patients' satisfaction to combination inhaler drugs: adherence, and level of asthma control. There were a medium significant relationship between the predictors and the satisfaction overall score in this model. The variance within the predictors can explain 25% of variance within the satisfaction overall score. The patients who had higher adherence score also had more satisfaction overall score than the patients who had lower adherence score. However, patients who had poorly-controlled level had more satisfaction overall score than the patients who had totally-controlled level. All these independent variables should be considered when evaluating patient satisfaction. The study emphasizes on the importance of enhancing the patients' adherence. In addition, it is logical that adherence affect satisfaction level in a positive direction. However, level of asthma control affect satisfaction level in a negative direction. It is well-accepted that we must provide the special advice about the asthma medication to the patients who had lower levels of adherence. Concerning the results of this study, we should not ignore the patients who had totally-controlled asthma. Lower satisfaction among this group of patient indicated their high expectation in medication satisfaction. The increasing of medication satisfaction could be achieved by providing patients with adequate information regarding their treatment regimens in order to enhance their knowledge and improving their satisfaction towards using combination inhaler drugs.

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APPENDICES

Appendix A

No……

<u>แบบสัมภาษณ์ผู้ป่วยโรคหอบหืด</u>

<u>ส่วนที่1</u> ประวัติทั่วไป

1. เพศ ☐ ชาย ☐ หญิง

2. อายุ.....ปี

3. โรคประจำตัว.....

4. สถานภาพ

☐โสด ☐ สมรส ☐ ม่าย

5. ระดับการศึกษา

☐ ไม่ได้เรียน ☐ ประถมศึกษา ☐ มัธยมศึกษา

☐ ปริญญาตรี ☐ สูงกว่าปริญญาตรี ☐ อื่นๆ ระบุ.....

6. สิทธิในการรักษาพยาบาล

☐ ชำระเงินเอง ☐ บัตรทอง ☐ ข้าราชการ

☐ ประกันสังคม ☐ อื่นๆ ระบุ.....

7. เป็นโรคหอบหืดมานานประมาณ..... ปี..... เดือน

ส่วนที่2 การใช้ยาของผู้ป่วย

คำถามมีทั้งหมด 6 ข้อ โดยในแต่ละข้อมีทั้งหมด 5 ตัวเลือกให้คุณเลือกตอบโดยวงกลมล้อมรอบตัวเลขคำตอบที่ตรงกับความเป็นจริงที่สุดเพียงคำตอบเดียว

9. ในระยะเวลา 3 เดือนที่ผ่านมาคุณเคยละเลยในการใช้ยาพ่นหรือไม่

1. ตลอดเวลา 2. บ่อยมาก 3. บางครั้ง 4. น้อยมาก 5. ไม่เคยเลย

10. ในระยะเวลา 3 เดือนที่ผ่านมาคุณเคยลืมพ่นยาหรือไม่

1. ตลอดเวลา 2. บ่อยมาก 3. บางครั้ง 4. น้อยมาก 5. ไม่เคยเลย

11. ในระยะเวลา 3 เดือนที่ผ่านมาคุณเคยหยุดใช้ยาพ่นเพราะคุณรู้สึกดีขึ้นหรือไม่

1. ตลอดเวลา 2. บ่อยมาก 3. บางครั้ง 4. น้อยมาก 5. ไม่เคยเลย

12. ในระยะเวลา 3 เดือนที่ผ่านมาคุณเคยหยุดใช้ยาพ่นเพราะคุณรู้สึกแย่ลงหรือไม่

1. ตลอดเวลา 2. บ่อยมาก 3. บางครั้ง 4. น้อยมาก 5. ไม่เคยเลย

13. ในระยะเวลา 3 เดือนที่ผ่านมาคุณเคยใช้ยาพ่นน้อยกว่าที่แพทย์สั่งเพราะคุณรู้สึกดีขึ้นหรือไม่

1. ตลอดเวลา 2. บ่อยมาก 3. บางครั้ง 4. น้อยมาก 5. ไม่เคยเลย

14. ในระยะเวลา 3 เดือนที่ผ่านมาคุณเคยใช้ยาพ่นมากกว่าที่แพทย์สั่งเพราะคุณรู้สึกว่ามีอาการกำเริบหรือไม่

1. ตลอดเวลา 2. บ่อยมาก 3. บางครั้ง 4. น้อยมาก 5. ไม่เคยเลย

ส่วนที่3 แบบสอบถามความพึงพอใจต่อการรักษาโรคหอบหืด

คำถามเหล่านี้ถามถึงความคิดเห็นของคุณเกี่ยวกับการใช้ยาพ่นรักษาโรคหอบหืดในปัจจุบัน **คำถามมีทั้งหมด 26 คำถาม โปรดอ่านและตอบทุกคำถามโดยกากบาทลงในช่องที่บ่งบอกถึงความคิดเห็นของคุณต่อการใช้ยาพ่นในปัจจุบันได้ดีที่สุด** โดยในแต่ละข้อมีทั้งหมด 5 ตัวเลือกให้คุณเลือกตอบได้ โดยช่องที่ 1 แสดงถึงการไม่เห็นด้วยอย่างยิ่งกับข้อความดังกล่าว ช่องที่ 2 แสดงถึงการไม่เห็นด้วยกับข้อความดังกล่าว ช่องที่ 3แสดงถึงการไม่แน่ใจ ช่องที่ 4 แสดงถึงการเห็นด้วยกับข้อความดังกล่าว และ ช่องที่ 5 แสดงถึงการเห็นด้วยอย่างยิ่งกับข้อความดังกล่าว

คำถาม	ไม่เห็นด้วยอย่างยิ่ง	ไม่เห็นด้วย	ไม่แน่ใจ	เห็นด้วย	เห็นด้วยอย่างยิ่ง
1. การใช้ยาพ่นของฉันทำได้อย่างสะดวก					
2. ฉันมียาพ่นที่จำเป็นติดตัวเสมอ					
3. การพกยาพ่นติดตัวไว้ทำให้ฉันลำบาก					
4. ฉันสามารถหายาพ่นที่เหมาะสมได้ทันใช้					
5. ยาพ่นช่วยให้ฉันควบคุมอาการหอบได้					
6. ฉันกังวลว่ายาพ่นที่ใช้ไม่เหมาะสมกับอาการที่เป็น					
7. ฉันรู้สึกว่าโรคของฉันควบคุมได้					
8. การใช้ยาพ่นในชีวิตประจำวันของฉันทำได้ง่าย					
9. การใช้ยาพ่นของฉันในที่สาธารณะเป็นสิ่งที่น่าอาย					
10. น้อยครั้งที่ฉันออกจากบ้านโดยไม่ได้นำยาพ่นติดตัวไปด้วย					
11. ยาพ่นทำให้ฉันคอแห้ง					
12. ฉันพอใจในการใช้ยาพ่นแบบเดิมนี้ต่อไป					
13. ในขณะที่ใช้ยาพ่นฉันมั่นใจว่าจะควบคุมอาการหอบได้					
14. ยาพ่นทำให้ปากขม					
15. ขวดของยาพ่นเหมาะกับการพกพา					
16. การจดจำวิธีการใช้ยาพ่นทำได้ง่าย					

คำถาม	ไม่เห็นด้วยอย่างยิ่ง	ไม่เห็นด้วย	ไม่แน่ใจ	เห็นด้วย	เห็นด้วยอย่างยิ่ง
17. ฉันเคยนำยาพ่นผิดอันติดตัวออกจากบ้านไปด้วย					
18. ยาพ่นทำให้เสียงแหบ					
19. ฉันมั่นใจในการใช้ยาพ่น					
20. การใช้ยาพ่นมากกว่าหนึ่งอันเป็นสิ่งที่ยุ่งยาก					
21. ฉันกังวลว่าการใช้ยาพ่นไม่เพียงพอต่อการรักษาโรคหอบหืด					
22. ฉันจะแนะนำยาพ่นที่ใช้อยู่ในขณะนี้ให้กับผู้อื่น					
23. ฉันต้องการให้ยาพ่นที่ใช้อยู่ใช้ได้ง่ายขึ้น					
24. การใช้ยาพ่นทำให้อาการหอบของฉันดีขึ้น					
25. ยาพ่นของฉันใช้ควบคุมอาการหอบได้ดีมาก					
26. ยาพ่นทำให้ฉันมีความมั่นใจในการดำเนินชีวิตประจำวัน					

ส่วนที่4 แบบประเมินการควบคุมโรคหืด (Asthma Control Test)

คำถามมีทั้งหมด5 ข้อ กรุณาตอบคำถามแต่ละข้อโดยวงกลมล้อมรอบตัวเลขคำตอบที่ตรงกับความเป็นจริงที่สุดเพียงคำตอบเดียว

คำถาม1 ในช่วง 4 สัปดาห์ที่ผ่านมา บ่อยแค่ไหนที่โรคหืดทำให้คุณไม่สามารถทำงานที่เคยทำได้ ไม่ว่าจะเป็นงานที่ทำงาน ที่โรงเรียน หรือที่บ้าน?

1. ตลอดเวลา 2. บ่อยมาก 3. บางครั้ง 4. น้อยมาก 5. ไม่เคยเลย

คำถาม 2 ในช่วง 4 สัปดาห์ที่ผ่านมา บ่อยแค่ไหนที่คุณรู้สึกหายใจไม่อิ่ม?

1. > 1 ครั้งต่อวัน 2. วันละครั้ง 3. 3-6 ครั้งต่อสัปดาห์ 4. 1-2 ครั้งต่อสัปดาห์ 5. ไม่เคยเลย

คำถาม 3 ในช่วง 4 สัปดาห์ที่ผ่านมา บ่อยแค่ไหนที่คุณมีอาการของโรคหืด (หายใจมีเสียงวี๊ดๆ ไอ หายใจไม่อิ่ม แน่นหน้าอกหรือเจ็บหน้าอก) จนทำให้ต้องตื่นขึ้นกลางดึกหรือตื่นเช้ากว่าปกติ?

1. ≥ 4 คืนต่อสัปดาห์ 2. 2-3 คืนต่อสัปดาห์ 3. 1 คืนต่อสัปดาห์ 4. 1-2 คืน 5. ไม่เคยเลย

คำถาม 4 ในช่วง 4 สัปดาห์ที่ผ่านมา คุณต้องใช้ยาพ่นสูดขยายหลอดลมชนิดออกฤทธิ์เร็ว หรือยาเม็ดขยายหลอดลมชนิดออกฤทธิ์เร็ว บ่อยแค่ไหนเพื่อช่วยให้คุณหายใจดีขึ้น?

1. ≥ 3 ครั้งต่อวัน 2. 1-2 ครั้งต่อวัน 3. 2-3 ครั้งต่อสัปดาห์ 4. ≤ 1 ครั้งต่อสัปดาห์ 5. ไม่เคยเลย

คำถาม 5 ในช่วง 4 สัปดาห์ที่ผ่านมา คุณคิดว่าคุณสามารถควบคุมโรคหืดของคุณได้ดีมากน้อยแค่ไหน?

1. ควบคุมไม่ได้เลย 2. ควบคุมได้ไม่ค่อยดี 3. ควบคุมได้บ้าง 4. ควบคุมได้ดี 5. ควบคุมได้สมบูรณ์

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