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Guideline Use in Asthma Management in Primary Care Setting: A Systematic Review

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This is to certify that the doctoral study by

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has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

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MSN, University of Maryland, 2005

BSN, University of Maryland, 2000

Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Nursing Practice

Walden University

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Abstract

Asthma is a chronic airway inflammatory disease that is characterized by reversible airway obstruction due to hyper-responsiveness of the tracheobronchial tree. The condition disproportionately affects male children, females, and the aged globally, and its prevalence keeps rising despite being a preventable condition in terms of relapse. Most asthmatic patients receive care in primary care settings. Various health agencies have developed asthma management guidelines to improve the quality of asthma care; however, in some cases, adherence to these guidelines is substandard. The overarching aim of this study was to determine whether primary care providers manage asthma in line with the available guidelines. A qualitative systematic review was conducted by searching for journal articles published between 2005 and 2016 relating to guideline use in primary care management of asthma. Twenty-nine primary studies evaluating adherence to asthma management guidelines were included. The collected data were analyzed through thematic data analysis techniques, and various themes emerged with regard to the research questions. Generally, the findings suggest that there is a mismatch between what is needed by patients/caregivers and what is currently provided by primary care providers (PCPs) in primary care settings and that asthma management guidelines are only partially followed or not used. Emerging themes were classified into 3 main categories: physician-, patient-, and institution-related barriers. The study provides recommendations on how adherence to asthma management can be improved.

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Dedication

This project is dedicated to my mother, Justina, and father, Aloysius, for teaching me that even the largest task can be accomplished if done one step at a time. Although you are no longer here, your spirits have given me the strength to succeed as a wife, a mother, and a lifelong learner.

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Lastly, I am indebted to my husband, Ike, who lovingly allowed me to pursue my dreams over the years. You were always there for me and understood my drive for excellence. Thank you for all your love, support, encouragement, and patience. I look forward to spending more time together.

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Introduction

Asthma is an airway inflammatory disorder characterized by variable and reversible airway obstruction due to hyper-responsiveness of the tracheobronchial tree. Physiologic manifestations of asthma include airway narrowing that is relieved spontaneously or with bronchodilators. According to Johnbull, Olaiya, & Efosa (2012), clinical manifestations of the disease are a triad of paroxysms that include cough, chest tightness (dyspnea), and wheezing. However, these signs do not always manifest in all affected persons; hence, accurate diagnosis of the sickness requires spirometry. Chronic features of asthma call for long-term treatment with the aim of attaining optimal control of these respiratory symptoms (Scichilone et al., 2010).

Prevalence

Asthma has become a common global condition. A survey conducted by the National Health Interview Survey (NHIS) in 2011 indicated that at least 39.5 million U.S. citizens had been diagnosed with asthma at some point in their lifespan (Cohen & Martinez, 2012). According to the American Lung Association (2012), since 1999, children aged between 5 and 17 years in the United States have been excessively affected by asthma and have recorded the highest level of prevalence and frequencies since then. By 2011, approximately 8.7 million children aged 5 to 17 years had already been confirmed to be suffering from asthma (American Lung Association, 2012).

Gender seems to have an effect on the prevalence of asthma in the U.S. and across the globe. In the U.S., women are reported to have been affected disproportionately and have always had a higher prevalence of asthma compared to males (Cohen & Martinez,

2012). In 2011, women had a 14% higher chance of being diagnosed with asthma than men. Ethnicity also seems to constitute a risk factor, with the prevalence of this condition reported to be higher by about 36.9% among Blacks in comparison to the White population (American Lung Association, 2012).

At the global level, the Global Asthma Network (GAN, 2015) reported that the number of people living with asthma may be as high as 334 million. In line with this finding, the World Health Organization (WHO) projected that there will be more than 100 million cases of asthma by the year 2025. Epidemiological investigations carried out around the world have also revealed a striking inequity in asthma occurrences and prevalence with regard to sexual category. For example, Kynyk, Mastronarde, and McCallister (2014) asserted that females have a greater chance (10.5%) of developing asthma compared to males.

Children have also been categorized as a vulnerable group, with boys having a higher chance (54%) of developing asthma in comparison to girls in same age quartile (Global Asthma Network, 2015). Age appears to have a correlation with the prevalence of asthma. There seems to be a global trend wherein incidents of asthma among females rise after puberty at a higher rate than in males. For instance, a survey carried out by the National Health Interview Survey (NHIS) in the U.S. in 2011 indicated that male children (younger than 15 years of age) had an 11.9% chance of being diagnosed with asthma, while girls of the same age group had a lower chance (7.7%) of being diagnosed with asthma (Global Asthma Network, 2015).

However, after puberty, the prevalence trend changes; male youths (15-35 years) have been reported to have an asthma prevalence of 6.3%, whereas females in the same

age bracket have a higher prevalence (9.6%; American Lung Association, 2012). This disproportionality has been found to also exacerbate with age; females 35 years of age have a prevalence of about 10.1%, whereas the prevalence among males in the same age group is reported to be as low as 5.5% (American Lung Association, 2012). These trends are reported to be similar across continents, according to empirical data from studies conducted in Europe (American Academy of Allergy: Asthma & Immunology, 2015).

Morbidity and Mortality

It is estimated that about 250,000 deaths occur every year across the globe as a result of asthma. The disease has a low case mortality rate, and it causes about 1% of total annual deaths in developed countries (American Academy of Allergy, Asthma & Immunology, 2015). However, according to Kynyk et al. (2014), the number of cases may be higher than this because there is a great chance of diagnostic confusion with other types of long-term respiratory illnesses, particularly among older age groups. In addition, aged people suffering from asthma may have other diseases such as tuberculosis (TB) or human immunodeficiency virus (HIV); hence, it becomes a daunting task to determine the actual cause of death.

In the U.S., age and sex differences still have an influence on mortality patterns, a trend that is similar to that of morbidity. For instance, in 2006, there were about 3,600 asthma-related deaths in the country. Similar to morbidity data, females were disproportionately affected, with about 64% of all asthma related deaths occurring among women. The same year, upon performing statistical analysis for unbiased comparison between the two groups, the cause-specific mortality rate among women was 44% higher in comparison to that in men (American Lung Association, 2012).

Ethnicity still appears to have an influence on mortality, with Black having a higher mortality rate from asthma than White in the U.S. However, in searching for data on mortality, I did not find a study that had statistically adjusted mortality data with respect to race; hence, such results need to be interpreted cautiously, given that there may be other confounding elements, such as social and economic predispositions (American Academy of Allergy, Asthma & Immunology, 2015).

Much of the morbidity associated with asthma is thought to arise from lack of use of the evidence-based asthma guidelines and inadequate preventive medicine. The objective of asthma treatment guidelines is to gain control of clinical symptoms for lengthy periods and ensure that the minimum possible doses of medications are used in the treatment. The control of asthma is optimal when the patient has no nighttime or diurnal symptoms, has no hospitalizations, and can do daily activities, including exercise (Martínez-González, Ullman, Busato, & Egger, 2014). The overarching aim of this project, therefore, was to examine the current evidence on guideline use in asthma management in a primary care setting in the United States.

The Burden of the Disease

Asthma is one of the major causes of hospitalization in the U.S., and the world. According to the Global Asthma Network (2015), an admission to the hospital as a result of an asthma attack may give an indication of the ineffectiveness of the preventive and primary care programs established with an aim of controlling asthma in a given country. However, factors that influence hospitalizations are not well understood, and the relationship among severity, morbidity, and mortality has been complex, particularly in developed nations.

About 0.6% of all cases of hospitalizations in developed countries such as the U.S., and most of the European countries are attributed to asthma (American Lung Association, 2012). The disease also has undesirable economic impacts, with available public data indicating that the U.S. spends about $56.0 billion on asthma management yearly (American Lung Association, 2012). The disease is also a major cause of disability and premature death, an aspect that contributes to about $5.9 billion lost productivity annually in the U.S. (American Academy of Allergy, Asthma & Immunology, 2015; Global Asthma Network, 2015).

Problem Statement

According to Wechsler (2009), numerous challenges are associated with asthma management, a situation that has forced most countries to focus more on acute treatment than on prevention of illness and promotion of asthma management. In most countries, there is neither a well-established constant support nor an interdisciplinary physician team for monitoring the disease prognosis among patients. This phenomenon has been complicated by an inadequate health workforce and the busy nature of primary care providers (PCPs), who may neither have time for personalized care nor provide healthcare aligned with evidence-based practices. For instance, in the United States, epidemiologic data indicate that primary care for asthmatic patients is inadequate (Wechsler, 2009). Further, a 3-month study in the U.S. indicated that about 74% of asthma patients met the inclusion criteria for inadequately controlled asthma (Wechsler, 2009).

There is a broad range of factors that have been attributed to inadequate asthma control. These factors can be classified into two main categories, patient-related factors

and physician-related factors. According to Rabe et al. (2007), one patient-related factor is that most patients overrate their scope of disease control and hence tolerate extensive asthma signs and symptoms. In addition, a large number of asthma patients do not adhere to the recommended controller medications. Other patient-related factors include costs of medications, inability to recall dosages, improper use of inhalers, and cigarette smoking.

Inadequate asthma control has also been attributed to physician-related factors. For example, Sapra, Broder, and Chang (2009) claimed that PCPs may underestimate the level of asthma symptoms or overvalue the magnitude of a patient's asthma control. This would result in inadequate care and poor control of asthma conditions because the PCP might not recommend a suitable dosage for therapy. The PCP may fail to communicate clearly with the patient, thus making it a daunting task to establish a therapeutic schedule that the patient has the ability and is ready to follow.

Empirical evidence with regard to asthma primary care practices is inadequate, and some of the studies that have been carried out in this area have reported contradictory results; hence, there is a need for a systematic review. In addition, few studies have focused on the primary care context. However, a number of studies, such as Sapra, Broder, and Chang (2009); Wechsler (2009); Holgate, Price, and Valovirta (2006); and Scichilone, Morandi, Bellini, and Papi (2014) have shown that the care of an asthmatic patient is below the international guidelines for asthma management. There is also evidence that the guidelines that have been in use over the years have not been adequately followed, a situation that has resulted in inadequate asthma control levels.

Purpose Statement

The overarching aim of this study was to examine extant literature on the use of asthma management guidelines and to determine whether PCPs manage asthma in line with the available guidelines. The study also determined barriers to the use of asthma management guideline recommendations. I further sought to determine the contextual differences that should be considered in the application of evidence-based asthma management guidelines in light of the different socioeconomic backgrounds of patients. Finally, I sought to establish the role of the primary care physician or provider and community partnerships in the application of evidence-based guidelines in the management of asthma (Johnbull, Olaiya, & Efosa, 2012).

Goals and Objectives

This systematic review was aimed at assisting PCPs in enhancing the management of asthma conditions, in part by providing evidence-based practices with regard to primary care for asthma patients. This was done by examining pertinent literature on the use of asthma guidelines in primary care; the extracted information was used to develop a resource tool for patient-centered management. The study evaluated barriers to the use of asthma management guidelines and recommendations that can be made to improve adherence to guidelines on asthma management in a primary care context.

Research Questions

1. To what extent do primary care providers follow the stated primary asthma control guidelines?

2. What barriers hinder the application of the published asthma management guidelines?
3. What recommendations can be made to improve adherence to the use of guidelines for asthma management in the primary care context?

Significance of the Project

The relevance of this study resides in the identification of barriers to guideline use and the provision of recommendations to address these barriers in primary care settings through an examination of the literature on the use of asthma guidelines in primary care. Because asthma mostly affects children at a young age, it is best to manage the condition early to ensure that its manifestation does not progress into adulthood. Considering the debilitating consequences of uncontrolled asthma, its prevalence, the poor quality of life of those afflicted, and the financial toll of the condition on a national level, any attempt at studying how asthma management can be improved is a worthwhile venture (Cicutto et al., 2008).

The Affordable Care Act introduced novel health delivery models like the patient-centered medical home and accountable care organizations, which were found to be useful and helpful in the management of people with asthma by the Quality Improvement Initiative (Marchant et al., 2006). Treatments involving evidence-based medicine were championed by the Asthma and Allergy Foundation of America (AAFA) and factored into the new health care bill. The new healthcare delivery model is based on reimbursing providers for care that is transparent and guideline focused. Thus, this systematic review of guideline use in the management of asthma in the primary care setting might not have

found a stronger justification for its need than is evident now (Johnbull, Olaiya, & Efosa, 2012).

Asthma guidelines are updated yearly, and with each new guideline, new evidence is incorporated. At a time when the prevalence of chronic conditions is rising, there is a need to review progress in the recent past in terms of treatment guidelines (Johnbull, Olaiya, & Efosa, 2012). The prevalence rate of asthma has been rising over the past few years in the U.S. but it has also been reported that the incidence rate has fallen in the same period. This is attributed to measures such as the introduction of improved treatment guidelines every year and regular campaigns to reach out to those affected and their families. Reviewing asthma guideline use will improve current knowledge of asthma management in primary care settings, and this will most likely reduce the prevalence rate of asthma in the country (Sapra, Broder, & Chang, 2009).

There is a wide array of knowledge on asthma and asthma management, but one factor that has led to the increased prevalence of the condition is lack of knowledge in terms of its management among affected people (Scichilone et al., 2014). Pharmacological interventions help greatly in managing the condition clinically, but clinicians need to pass asthma management knowledge on to patients and relatives for purposes of self-management. Findings from this project add to the existing body of knowledge, and it is expected that asthma management outcomes will improve as knowledge becomes more widespread.

This systematic review identified factors related to good asthma control in the primary care setting and indicates factors that can be implicated in compliance with guidelines, such as type of practice, volume of practice, and involvement in incentive

measures, among others (National Asthma Education and Prevention Program Expert Panel, 2007). This study identifies the factors that impede implementation of asthma guidelines in primary care, as well as provides recommendations on how to improve compliance in order to curb epidemics of asthma exacerbations. Mild and moderate asthma are not fatal conditions. The advent of inhaled corticosteroids has led to improved outcomes.

Currently, asthma patients do not have the same limitations in physical activity as compared to previous times (Lang, 2008). Severe asthma occurs in some cases, and this may be related to the severity of the disease or to inadequate management. Therefore, by researching factors related to asthma management, clinicians are able to know the factors that hinder asthma management. Morbidity and mortality occur with severe asthma and *status asthmaticus*, the most severe form of the disease. However, even with this, the right medication has improved outcomes and reduced the mortality rate (Marchant et al., 2006).

The recommendations provided might be of use even to people outside the medical profession. Teachers, caregivers, and parents who have children with asthma or those who interact with asthmatic patients might find the recommendations useful in the process of taking care of asthma patients at home or at school. In addition, the recommendations may also be of interest to health planners across the globe.

Role of Advanced Primary Care Nurses in Asthma Management

With the Affordable Care Act (ACA) and its emphasis on cost containment, disease prevention, health promotion, and affordable care, advanced practice nurses (APNs) are, for the first time in recent history, placed in a position to advance nursing as

a profession (Mund, Zaccagnini, & White, 2011). APNs, as members of the teams involved, can take the lead in what nursing has always done best—providing holistic care, patient education, and patient empowerment, thereby creating a fundamental shift in how asthma is managed in the primary care setting. Practice guidelines developed by APNs have a key role in health prevention and chronic disease management, as APNs have now been given an opportunity to advance nursing as a profession with full practice authority by most states in the U.S. APNs have the potential to contribute immensely toward asthma management.

Implications for Social Change in Practice

In this study, I took into consideration economic, social, political, and environmental changes in the ways in which healthcare services are delivered. Through analysis of the strategies used by healthcare providers in managing asthma and providing the right recommendations, the current study is aimed toward ensuring that practitioners stay at par with the changes that are taking place in the social, political, and economic environment. I hope that this study has a positive impact on how health care practitioners handle and manage asthma patients who have different social, economic, and political backgrounds by promoting patient-centered care. Additionally, I hope that this study contributes toward reducing inequalities that exist in the treatment and management of asthma cases. By focusing on these areas in this review, my aim is to ensure that asthma cases among children as well as adults are significantly reduced in the long term through appropriate management and treatment, if adopted and implemented.

Definition of Key Terms

The following definitions were used to guide this project.

Asthma: According to Bernstein et al. (2006), asthma is defined as a chronic respiratory disorder characterized by variable and reversible airway obstruction due to hyper-responsiveness of the tracheobronchial tree.

Dyspnea: The state of breathlessness or difficulty in breathing as a result of respiratory compromise or other causes, such as cardiovascular causes (Parshall et al., 2012)

Prevalence: Refers to the "proportion of persons in a population who have a particular disease or attributes at a specified point in time or over a specified period of time" (CDC, 2012, p. xx). Prevalence therefore includes all the cases—new, old, and preexisting in the population at the specified time (CDC, 2012).

*Incidence***:** Refers to the "occurrence of new cases of disease or injury in a population over a specified period of time" (CDC, 2012,). Incidence therefore is strictly limited to new cases only (CDC, 2012).

Evidence-based: Integration of clinical expertise, patient values, and the best research basis for the decision-making process for patient care (Sackett, 2002).

Self-management: An approach that encourages the patient to participate in the management of the condition and not fully depend on the interventions of the caregiver/ doctor/clinician (Rubin, 2001).

Guidelines: A rule or set of rules giving guidance on how to behave in a situation or manage conditions in medical contexts involving treatment measures being presented for use in a larger population.

Chapter Summary

Asthma is a chronic airway disorder due to airway hyperactivity that usually resolves spontaneously or with the help of bronchodilator therapy (Johnbull, Olaiya, & Efosa, 2012). The prevalence of asthma keeps rising due to inadequate preventive therapies and lack of compliance with the latest treatment guidelines. Corticosteroids' efficacy in the management of asthma is evidence based. Further, evidence has continued to indicate that mild and moderate asthma are both manageable conditions. Even with severe asthma, pharmacological therapy has been found to be effective. Moreover, self-management has been recommended in recent guidelines because the condition is a lifelong disorder that does not need to be managed in a healthcare facility. Patients do not need to be with doctors to be treated. Because the condition usually relapses in the home/work/school setting, recent guidelines recommend that affected individuals need to be told about all aspects of asthma for self-management.

The highest prevalence of asthma is among young people; 85% of asthma patients are aged 40 years and younger. Children younger than 10 years also have a high prevalence of asthma. In the U.S., millions of children and young people miss school and work due to asthma. This is frustrating for those involved and leads to work-related deficiencies. As the disease responds well to therapy, guidelines on asthma management need to be updated regularly and be made available to those concerned with asthma so that asthma morbidity and mortality can be reduced.

The aim of treatment is to reduce symptoms and relapses with the lowest possible dosage of pharmacological agents (Johnbull, Olaiya, & Efosa, 2012). The aim is also to reduce complications so that there is no limitation to normal activities and other forms of

physical exertion. Many age groups are affected by asthma. The management principles are the same across these groups, but the dosages and approaches are not identical. With recent guidelines in place, clinicians are able to know what approach to use when faced with different age groups and types of patients (Lang, 2008).

This study, through the analysis of evidence-based guidelines and systematic review, involved examining literature on the use of asthma guidelines in primary care and using this information to develop recommendations for patient-centered management. The study also addressed challenges faced by clinicians and relevant stakeholders in the management of asthma in the primary care setting. Through the study, gaps in current asthma guidelines and evidence-based approaches are addressed. The study answers the question of the role of the primary health caregiver in the management of asthma in the contemporary health setting. By answering all of these questions, the study addresses all issues involved in asthma management and increases the body of knowledge related to asthma management. Findings from the study may improve outcomes and serve to reduce the prevalence rate of asthma in the population. Children and young people deserve to have healthy lives, and managing asthma will assist in this (Johnbull, Olaiya, & Efosa, 2012).

Section 2: Review of the Scholarly Literature

Introduction

Asthma has become a major cause of mortality in both developing and developed countries. Consequently, this medical condition has attracted the attention of practitioners and researchers, which has led to the publication of numerous findings about asthma. The purpose of this chapter is to present a general review and a specific review of the currently available literature related to asthma management in primary care settings. Specific concepts such as asthma pathogenesis, approach to diagnosis, risk factors, and assessing and monitoring asthma are explored.

Asthma Risk Factors

The most common risk factors for developing asthma include family history such as having a parent with asthma; allergens (animal fur, mites, pollens, and house dust, among others); smoking and tobacco smoke; having frequent respiratory infections, especially viral infections; occupational exposure to substances such as chemical irritants and air pollution; exercise; obesity; strong emotions; and drugs such as beta-blockers and aspirin (White & Brown, 2011).

Types of Asthma

There are various types of asthma, including exercise-induced asthma, cough variant asthma, nighttime (nocturnal) asthma, and occupational asthma. *Exercise-induced asthma* is a type of asthma that occurs with exercise or physical exertion. Most asthmatic people experience exercise-induced asthma as they exercise, though there are some individuals without asthma who develop the symptoms while participating in physical activities. With regard to *cough-variant asthma*, severe coughing is the most common

symptom. This type of asthma can also be caused by other conditions such as sinusitis, chronic rhinitis, and postnasal drip. *Nocturnal asthma* is a common type of asthma and occurs mostly at night during sleep; this has been attributed to circadian rhythms. Asthma symptoms including coughing, wheezing, and difficult breathing are more severe at night. The last type of asthma is *occupational asthma*, which, as the name suggests, is attributed to workplace triggers. This type of asthma is commonly associated with professions such as hairdressing, animal breeding, and painting (Wechsler, 2009). It is important for asthmatic people to understand their type of asthma so that they can seek appropriate therapy.

Diagnosis of Asthma

Diagnosis of asthma is determined through the patient's symptoms, medical history, and physical assessment. The presence of the following signs and symptoms raises suspicion for asthma: wheezing (high-pitched expiratory sound), cough that is particularly worse at night, recurrent chest tightness and breathlessness, worsening night symptoms, seasonal pattern of symptoms, and history of atopy (a clinical hypersensitivity state or allergy with a hereditary predisposition) in the patient or a family history of the same and asthma. Response to antiasthma therapy in a patient further indicates that the condition is asthma (Johnbull, Olaiya, & Efosa, 2012). When there is high clinical suspicion, lung function measurements help with the confirmation of the diagnosis. Spirometry is the best method used in measuring airflow limitation. However, peak expiratory flow measurements further aid in the diagnosis and monitoring of asthma. Furthermore, skin tests and immunological tests (serum IgE levels) and methacholine/ histamine challenge tests may aid in the diagnosis (White & Brown, 2011). However,

diagnostic challenges occur in cough-variant asthma, exercise-induced bronchoconstriction, and asthma in the elderly and children younger than 5 years.

Differential diagnosis of asthma is essential and is the first step in ascertaining that a patient is asthmatic. The most commonly included conditions in differential diagnosis of asthma in adults include vocal cord dysfunction, congestive heart failure, mechanical obstruction of the airways, and chronic obstructive pulmonary disease (COPD). In children, chronic cough can be a severe problem, and it is usually challenging to distinguish bronchiolitis from asthma. The differential diagnosis for diagnosis of asthma in children and infants includes allergic rhinitis and sinusitis, obstructions involving large airways such as foreign bodies in the trachea, obstructions involving small airways such as cystic fibrosis, and aspiration due to dysfunction of the swallowing mechanism (Reddel et al., 2015; Wechsler, 2009).

Management of Asthma

In most patients, controller medications are taken to avoid relapse of symptoms, prevent attacks, and improve lung function. Acute symptoms usually resolve spontaneously, but reliever medication may be used to treat them. The best and commonest treatment in the acute phase consists of inhaled corticosteroids and bronchodilators. In maintaining asthma control, there is a need for a significant partnership among asthma patients, their relatives/friends, and the healthcare team (White & Brown, 2011).

Asthma care has four main components: developing a patient/provider partnership, identifying and reducing exposure to risk factors, assessing and treating asthma, and managing asthma exacerbations. The first component is developing a strong

patient/provider partnership. Through the help of health caregivers, patients are able to avoid asthma risk factors/triggers and take medications correctly. Patients are also able to monitor their condition using their symptoms and, in some cases, peak expiratory flow (PEF; White & Brown, 2011).

Patients may be educated on how to categorize the different levels of asthma triggers and symptoms. Based on this knowledge, they can understand the urgency of a situation and the right time to seek medical attention. Patients need to be taught about asthma to enable them take part in self-management. A wide range of methods is used in patient education, including discussions, group classes, video/audio tapes, patient support groups, and demonstrations. Working together, the medical provider and the patient should prepare an action plan to be used for management. The plan should be simple, practical, and easy to follow.

The second component of asthma management involves the identification and reduction of exposure to risk factors. Many asthma patients react to many environmental factors, and avoiding these factors is almost impossible, given that most of them are found to occur freely. The most realistic approach involves prevention and long-term control, such as taking daily asthma medications to keep symptoms under control. With the help of these medications, patients become less sensitive to the risk factors (White & Brown, 2011). In case of an asthma flare-up, the patient may need to use a quick-relief inhaler, such as albuterol.

Physical activity is one of the commonest causes of asthmatic attacks, but this does not mean that patients should avoid exercise. Rapid-acting beta agonists (Salbutamol) taken before exercise aid in asthma control. Alternatively, leukotriene

modifiers may also be used. However, patients can avoid some allergens and pollutants so as to reduce medication need (Marchant et al., 2006).

The third goal of asthma treatment is achieving and maintaining clinical control through thorough assessment, treatment, and monitoring. All patients need thorough assessment so that it is possible to assess current treatment regimens, adherence to treatment, and degree of asthma control (White & Brown, 2011). What follows is treating the patient to achieve control. Quick symptomatic relief is achieved through reliever medications, and caregivers are required to know the amount of reliever medication being used.

According to White and Brown (2011), any increase in symptoms indicates poor control. After symptomatic quick relief, patients need regular controller medications. The aim of these drugs is to reduce symptoms and exacerbations. Inhaled glucocorticosteroids are the preferred treatment for long-term control of mild persistent, moderate persistent, and severe persistent asthma (White & Brown, 2011). However, for newly diagnosed patients or those who have asthma but are not yet on medication, the therapy begins with controller medications. If the current treatment guideline does not relieve asthma, the treatment needs to be stepped up until total control becomes achievable.

Inhaled medications are preferred to oral medications because they deliver the chemical compound to the airways directly. With this, the therapeutic effects are potent. Moreover, there are fewer side effects. These inhaled medications are usually in the form of metered dose inhalers (MDIs), which may be pressurized or breath actuated, as in the case of nebulizers or dry powder inhalers. Spacer devices make it easier for inhalers to be used. Patients need to be taught the best methods of using inhaler devices, given that

different companies produce different inhalers that operate in different ways (White & Brown, 2011).

Strict monitoring needs to be done so as to maintain better asthma control. Monitoring also enables the caregiver to use the lowest dose possible for purposes of minimizing safety and costs. After the initial visit, patients need to be seen regularly (once every 3 months; Scottish, 2003). However, after adverse exacerbations, the frequency of office visits should increase for purposes of closer management. If asthma is not being controlled, White and Brown (2011) suggested that caregivers should check the medication technique, patient compliance with medication, and whether the patient avoids risk factors.

However, if the asthma is well controlled for at least 3 months, the medication needs to be stepped down in a stepwise manner. In the stepwise approach to asthma therapy, the number of medications, the dose, and the frequency of administration are increased with exacerbation or when the patient's asthma status is unstable, then decreased when symptoms improve and the status becomes stable (see Figure 1). The aim of asthma stepwise guidelines is to maintain control with the smallest dosage possible and with low side effects. Even after control is achieved, asthma monitoring needs to be continued. This is because asthma is a variable disease (White & Brown, 2011).

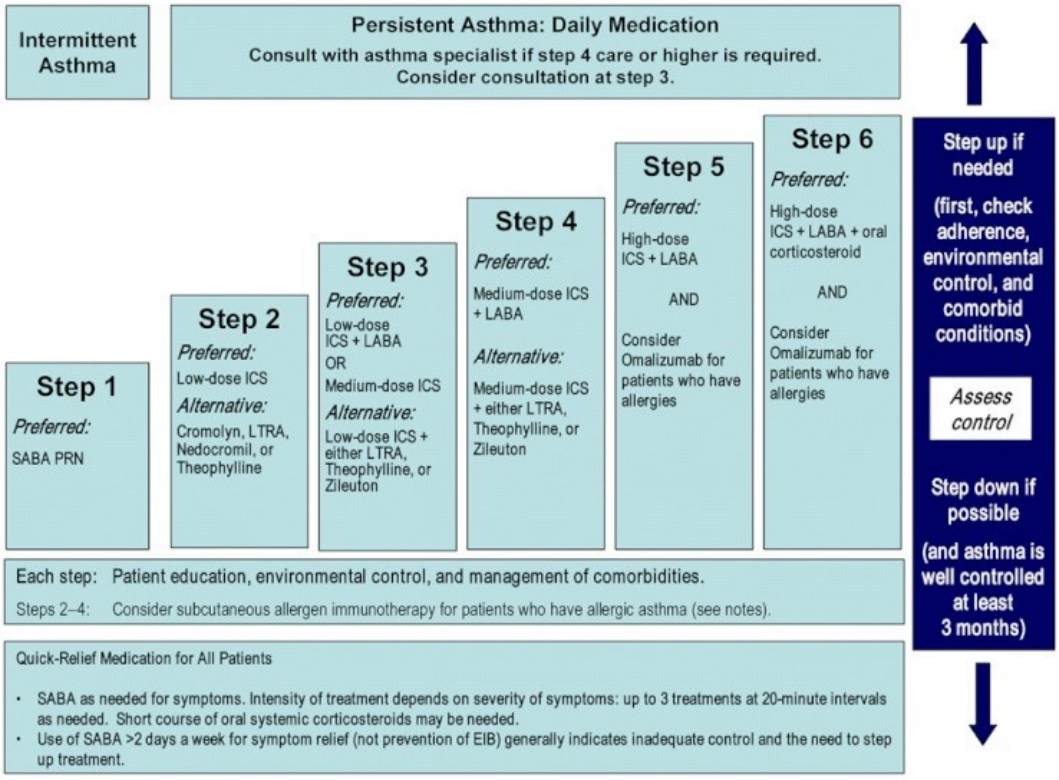

Figure 1. Stepwise approach for managing asthma in youths > or = 12 years of age and adults. From *Expert Panel Report 3: Guidelines for the diagnosis and management of asthma* (Figure 4-5), by National Heart, Lung, and Blood Institute, 2007, Bethesda, MD: Author (http://www.ncbi.nlm.nih.gov/books/NBK7222/). In the public domain.

The fourth and final component of asthma management involves the management of asthma exacerbations (acute or subacute episodes of progressively worsening shortness of breath, coughing, wheezing, and chest tightness). Severe asthma attacks are life threatening, and for this reason, they need close observation. Patients are advised to seek early interventions to prevent exacerbations (White & Brown, 2011).

Managing Asthma in Primary Care Settings

Asthma is one of the most common chronic diseases in the world, with global estimates currently standing at 300 million. The incidence increases by the day,

especially among children (Johnbull et al., 2012). Nevertheless, asthma can be effectively managed, and most patients' signs and symptoms can be put under control (Johnbull et al., 2012). When the disease is well controlled, patients use little or no medication, have normal lung function, and live productive lives. Moreover, asthma control enables patients to avoid troublesome day and night symptoms.

Projections show that the number of asthma patients is likely to increase in the future (Johnbull et al., 2012). The main cause of this is an increase in the number of people living in urban areas who are of a low or middle income class. There are a number of lifestyle and environmental factors (e.g., animals such as dogs and cats; insects such as cockroaches; and foods such as chocolate, peanut butter, and fish) that are associated with urban living, which are suspected to promote asthma development (Johnbull et al., 2012).

It is evident that early exposure to the adverse lifestyle and environmental factors that are commonly associated with a disadvantaged urban environment tend to modify immune development to increase the risk for asthma. According to the Global Initiative for Asthma (2014), "four elements are crucial in the treatment of asthma":

1. Using objective measures in lung function to identify the severity of asthma and measure the impact of therapy;
2. Application of pharmacological therapy over a long period in management of asthma exacerbations;
3. Application of environment control tools to eliminate factors that cause or increase asthma severity; and

4. Implementing patient education programs that create a partnership between the patient, his or her family, and the primary care physician.

According to Vollmer et al. (2012), evidence-based research has shown great improvement in the health of asthma patients when primary caregivers are given in-depth education on asthma. Quality improvement initiatives developed by physicians and payers have increased the level of adoption of proper prescription of long-term asthma controller and short-term rescue medications. However, there have been insignificant improvements in controlling environmental triggers and ensuring adequate access to asthma education (Vollmer et al., 2012).

Successful use of clinical guidelines such as those published by the National Asthma Education and Prevention Program (NAEPP) for asthma depends on the approach used in disseminating and implementing them. The ability of providers to understand evidence-based guideline recommendations also has a bearing on the outcome of asthma treatment. The gap that still exists between evidence-based practice and current practice in asthma treatment is also caused by differences in the contexts of different clinics. Guidelines education must be tailored to meet the needs of different organizations (Myers, 2008). The 2007 NAEPP guidelines coordinated by the National Heart, Lung, and Blood Institute (NHLBI) titled *Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma* described accepted best-practice methods for making clinical decisions and promoting patient-centered management of asthma. This is aimed at eliminating the discrepancy that exists between the reports given by providers about their practices and those given by patients (Cicutto et al., 2008).

There is reluctance in applying evidence-based guidelines in the management of asthma due to lack of conclusive evidence on the positive outcomes of these practices. However, these inconsistencies are the result of differences in methodology, population, and program implementation in the studies. For example, most of the results were based on studies from adolescents and children. In addition, weak results were observed in studies focusing on short-term effects of interventions (Angier et al., 2010).

Implementing a program based on the severity of asthma cases will achieve these results. The improvements observed in these clinical parameters were sustained over time, showing the importance of consistent and prolonged treatment. Furthermore, research shows that combining several intervention strategies instead of relying on one improves outcomes for patients (Johnbull et al., 2012).

The National Institute for Health and Clinical Excellence (NIHCE) developed updated guidelines on the management of asthma in 2013. These guidelines were based on research on recent asthma therapy. As part of these guidelines, factors that need to be monitored and recorded in primary health care include symptomatic asthma control, lung function, asthma attacks, oral corticosteroid use, inhaler technique, adherence, bronchodilator reliance, and possession of and use of personal action plans (NIHCE, 2013). NIHCE 2013 guidelines further support self-management in asthma therapy. The guidelines stipulate that people with asthma need to be equipped with self-education to aid in the management of the condition.

Before patients are discharged from the hospital, they need written asthma action plans. Additionally, health care experts need to address adherence to long-term asthma management and treatment (NIHCE, 2013). NIHCE guidelines also recommend

nonpharmacological interventions in the management of asthma. Such interventions include advising parents on the dangers of risk factors such as smoking in the presence of their asthmatic children. Weight loss has also been seen to be beneficial to asthma patients (NIHCE, 2013). Breathing exercises are an adjuvant to pharmacological methods to reduce symptoms and improve quality of life.

Pharmacological interventions are the mainstay of asthma management, and treatment. The role of these agents is to reduce airway inflammation, and hyperactivity. Before beginning a new drug, caregivers need to check adherence to existing therapies, how patients use inhalers, and how they eliminate trigger factors (White & Brown, 2011). The recommended preventive drugs for children, and adults are inhaled corticosteroids. This is the first line therapy for non-complicated asthma (NIHCE, 2013).

The second line therapy in addition to the inhaled corticosteroids is an inhaled long acting beta2 agonist. This combination is effective in adults, and children aged between 5 to 12 years. For children under 5 years, leukotriene receptor antagonists are an effective add-on therapy instead of the beta2 agonists (Johnbull, Olaiya, & Efosa, 2012). However, if the asthma control is suboptimal even after the addition of the long acting beta2agonist, then the inhaled corticosteroid dosage is increased to 800 micrograms/day in adults, and 400 micrograms/day in children (NIHCE, 2013).

Inhaler devices need to be prescribed once patients receive training on their use and after they demonstrate satisfactorily that they are competent in using the devices. In children, pressurized metered dose inhalers are the preferred mode of administration of inhaled corticosteroids, and beta2 agonists. A face mask is required to enable the child breathe well, but when this is ineffective, a nebulizer is used (Marchant et al., 2006).

Those handling the patient must refer acute severe asthma to the hospital immediately. In these cases, oxygen supplementation is recommended. Normally, the first line drug in mild asthma is inhaled corticosteroids, but for acute asthma, a high dose inhaled beta2 agonist is administered early. Steroids are then given (Johnbull et al., 2012). The same applies to children over two years. In this case, these children receive high flow oxygen via facemasks or nasal cannula.

Asthma in pregnancy needs to be managed well and promptly as asthma affects birth outcomes and leads to maternal morbidity when not well managed. Pregnant women need to be advised of the need to continue with their medications, so that there is noteworthy asthma control. In occupational asthma, patients need to be advised on the best ways to avoid the occupational causes (Walters, 2015).

With the Affordable Care Act and its emphasis on cost containment, disease prevention, health promotion, and affordable care, Advanced Practice Nurses (APNs) are for the first time in recent history placed in a position to advance nursing as a profession. APNs guide patients in self-management of their symptoms, and use of inhaler devices. They also advise patients on control of asthma and when to seek health interventions. Hospitalization is required in emergency settings, but APNs assist in the community setting to maintain stable asthma status by promoting education and preventing exacerbations. Usually, asthma is not a fatal condition. It rarely warrants hospitalization. Therefore, APNs and other providers in the primary care setting are the best caregivers to aid in managing the disease (White & Brown, 2011).

Implementation of Asthma Management Strategies in Health Systems

Asthma has remained a serious health condition in the U.S. and the rest of the world, resulting to an increase in the volume of research publications on asthma. Therefore, it had called for syntheses to guide in evidence-based management and control of asthma. The Global Initiative for Asthma had played a significant part in dispersing information about the management of asthmatic patients built on constant review of published studies (Bateman et al., 2008). In addition, the *Global Strategy for Asthma Management and Prevention*, a resourceful document help health care professionals to come up with noteworthy asthma treatment goals and facilitate high standards of care in asthma (Reddel et al., 2015).

Bateman et al., (2008), concluded that the initiative that is approved for implementation should consider the resources and the nature of the local health systems. Resources include the available treatments, infrastructure and human resource factors. Implementation strategies will not be the same in all regions. These vary from country to country based on aspects such as culture, economic aspects, and the social environment. Implementation guidelines also need to start with mapped-out goals and strategies among communion of professional groups such as; primary care providers, public health officials, patients, caregivers, asthma advocate groups, and the general public. These stakeholders are required to go through specific steps before the recommendations are included in clinical practice. These will then become the standards of care for asthma management.

Moreover, sociocultural and socioeconomic conditions need to be taken into consideration when coming up with these guidelines. Also, the cost effectiveness of the

programs to be implemented need to be assessed so that an appropriate decision is arrived at in terms of pursuing or modifying them (Bateman et al., 2008).

Barriers to Asthma Control

There are many barriers according to the Global Initiative for Asthma (GINA, 2015), that impair the smooth implementation of recommendations made by the stakeholders. These relate to the systems of care and the attitudes of asthma patients. Healthcare providers may have insufficient knowledge of the recommendations or they may have a resistant attitude to change. Other system barriers include medico-legal issues, insufficient resources, as well as barriers such as health policies and financial constraints. Patient barriers include low health literacy, insufficient knowledge on asthma, peer influence, cultural and economic barriers and unfortunate attitudes, beliefs and misconceptions. These barriers need to be surmounted in order for the implementations to be successful (GINA, 2015).

The evaluation of the implementation process needs to be done to gauge the effectiveness of the program and identify improvements that need to be made. The Cochrane Effective Practice and Organization of Care Group (EPOC) outlined some ways that can be put in place to assess the effectiveness of the interventions. According to Parkes et al. (2009), evaluation of the effectiveness of the interventions typically involves an assessment of parameters such as mortality and morbidity which cannot be identical in all countries.

In the 2015 updated report, GINA continues to assist organizations and stakeholders in the adaptation and implementation of asthma care recommendations. These recommendations are included in the Global Strategy for Asthma Management and

Prevention (GSAMP) report, and can be accessed through the GINA website (www.ginasthma.org). This report is released annually and it offers a summary of evidence concerning asthma diagnosis, management and prevention. This information is useful in the creation of local guidelines, especially in setups that have less evidence.

Theoretical Models

Evidence-based practice (EBP) model approach to asthma management in the primary care setting is used to evaluate and diagnose asthma. Acute and chronic conditions can be differentiated and confirmed through symptom observation. Therefore, these help providers to find ways to manage the problem, assess the possible risk to the patient and treatment of the patient's disease (Bradshaw, 2010).

The Theory of Planned Behavior (TPB) is used here in an attempt to devise a theoretical framework that explains the modalities of primary care practice as it relates to the management of asthma. It was derived from the theory of reasoned action (Ajzen, & Fishbein, 1980). It is a conceptual outline for understanding human social actions and inactions (Ajzen, 2002). The TPB states that one vital determinant of behavior is an intention to perform it.

The intention (the inner drive to exhibit a certain conduct) and perceived behavioral control (PBC) directly determines the targeted behavior. Attitude, social norms, and PBC can be influenced by behavioral, normative, and control beliefs (Ajzen, 2002). Thus one's personal beliefs about the behavior in question, perceptions of the behavior by one's social group, and one's beliefs about being able to carry out the behavior facilitates the actual behavior. External factors and environmental variables also affect actualizing the conduct or behavior.

The TPB attempts to predict deliberately planned action in humans. TPB suggests that our actions are predicated by intentions, a function of specific attitudes, the belief to which we hold those attitudes and perceived control we have over that behavior. In effect, an action based on a particular intention is more likely if we believe that we have a stronger control over the behavior, if our attitude toward that behavior is more favorable and if the subjective norms favor the particular behavior in question (Ajzen, 2002). In using the TPB to explain non-adherence to practice guideline in primary care management of asthma, the use of the guidelines is influenced by three variables: attitude, subjective norm (apparent societal pressure about the guidelines), and perceived behavioral control (PBC; perceived capacity to adhere to the guideline; see Figure 2).

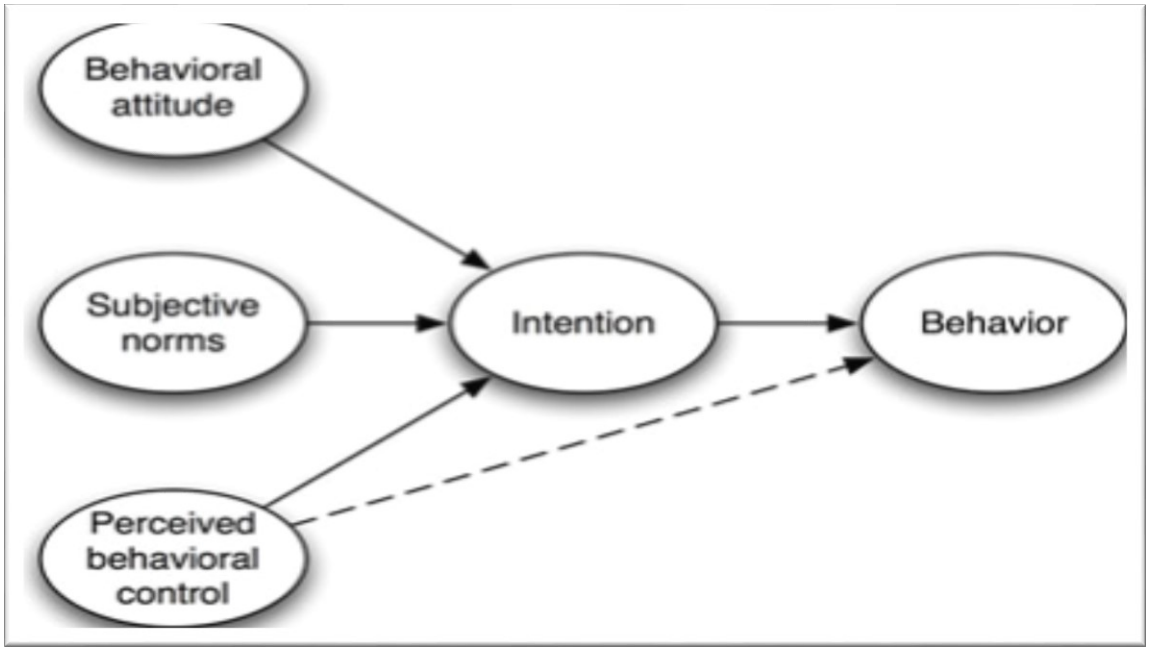

*Figure 2***.** A theoretical model of the theory of planned behavior. From *Understanding Attitudes and Predicting Social Behavior* (117-134), by I. Ajzen and M. Fishbein, 1980, Englewood Cliffs, NJ: Prentice-Hall. Copyright 1980 by I. Ajzen, 2002.

It may also be difficult to implement guidelines based on the following factors; our attitudes towards centralization of guidelines, emerging technology, belief that a particular behavior leads to a certain outcome, availability of resources, practice policy, time, and infrastructure, reimbursement for services rendered, compliance by patient, other patient-population characteristics, outcome-reference belief, and influence of exigency circumstance as illustrated in Figure 3.

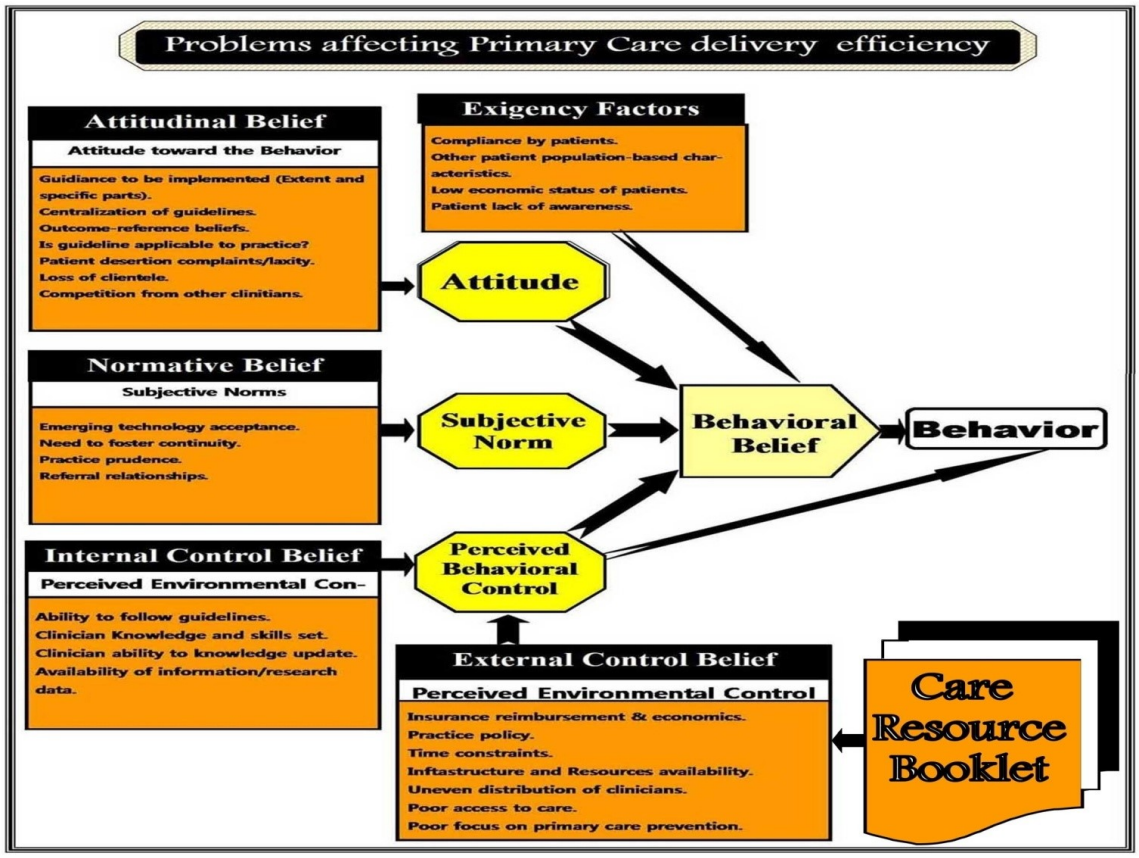

Figure 3. Problems affecting primary care delivery efficiency: A conceptual model. From "Adopting Health Behavior Change Theory Throughout the Clinical Practice Guideline Process," by N. E. Ceccato, L. E. Ferris, D. Manuel, and J. M. Grinshaw, 2007, *Journal of Continuing Education in the Health Professions*, *27*(4), 201-207 Copyright 2009 by Ceccato, Ferris, Manuel and Grinshaw.

Regardless of how good a guideline is, if providers fail to identify with it as applicable to their individual, communal, and practice sphere, there is a very likely that

the guideline will not be used (Ceccato, Ferris, Manuel & Grinshaw, 2007; Mottur-Pilson, Snow & Bartlett, 2001). Therefore, it is important to note that for behavioral intention to be manifest as behavior there has to be some element of self-control.

It is not all human behaviors that individuals have total control over. According to Pugh and Larme (2001), determinants of control factors are internal factors such as skill set, knowledge, abilities, information, emotions, and external factors such as contextual or environmental factors such as practice economics, time constraints, low reimbursement, and the need to sustain referral relations. Other external factors include uneven distribution of clinicians, low social status of the patients, poor awareness by the patients, poor access to care, and insufficient focus on primary prevention. Pugh and Larme (2001) stated that background factors such as time constraint and insurance reimbursement pose further impediments to best possible care for asthma patients than internal factors such as physician knowledge and attitudes. Recommendations to address barriers to guideline use should include those external determinants of self-control built into the planned behavior theory.

Chapter Summary

A holistic approach is used in asthma management. Evidence from many countries and different professional health care groups show that asthma is best controlled when there is a partnership between health care experts and the patient/caregiver/parent. The role of this partnership is to aid in self-management and identification of symptoms. Management of asthma is aimed at avoiding acute exacerbations and frequency of symptoms. Asthma care has four main components which include: 1) developing patient/provider partnerships, 2) identifying and reducing

exposure to risk factors, 3) assessing and treating asthma, and 3) managing asthma exacerbations.

Pharmacological interventions are the mainstay of asthma management and treatment. The role of these agents is to reduce airway inflammation and hyperactivity. Non–pharmacological interventions also play a role in disease management through avoiding the triggers and matters like weight loss that aid in controlling the condition. There are many pharmacological interventions, but for mild non-complicated asthma, the first-line is the use of inhaled corticosteroids. Second line medications include therapies like beta agonists and leukotriene antagonists. If the control is achieved, the treatment dosage is reduced gradually up to a level that is low, but which will still achieve control. For non-controlled case over time, the dosage is increased and another regimen may also be used.

However, abandoning any treatment regimen for another requires a close assessment to the adherence to medication, use of inhaler devices and the avoidance of risk factors. The role of health care givers like Advanced Practice Nurses (APNs) has played a noteworthy role in health promotion and patient partnership with resultant decrease in the frequency and acuity of asthma exacerbation. Once asthma is diagnosed, it is all about management.

Section 3: Methodology

Introduction

For the research aim and objectives highlighted in Chapter 1 to be fully met, an appropriate research methodology had to be adopted. According to Sayers (2007), the type of methodology adopted in a given research study plays an instrumental role in the attainment of the intended purpose, as well as in determining the accuracy and validity of the data collected and the findings made. This chapter highlights the study design and the methods for carrying out the systematic review. Issues such as study design, databases used, search terms, data collection, data analysis, ethical considerations, quality assessment, and inclusion and exclusion criteria are discussed.

Study Design

The research was completed using the qualitative systematic review method of examining available evidence on the use of practice guidelines in the management of asthma patients in primary care settings. The systematic review approach was used in this study because the framework encompasses the use of transparent procedures to find, evaluate, and synthesize results of relevant research studies previously carried out. According to Sayers (2007), the procedures are explicitly defined in advance in order to ensure that the entire exercise is transparent and can further be replicated. Additionally, the practice is designed in such a way that it minimizes bias. All the studies included in this review have been screened for methodological quality.

Systematic review is a well-recognized, valuable, and methodical research approach that has gained much popularity in the recent past (Dunne, 2010). Policy makers, health care personnel, and researchers receive much information in their day-to-

day practice. Systematic reviews can cover an entire topic under discussion and synthesize all the data into a more manageable unit for decision making. A systematic review identifies the possible existing similarities and differences between the current study and other studies carried out in the same field (Marchant et al., 2006). It also justifies the existence of the issue one wishes to study and the need for identification of a solution.

Qualitative metasynthesis technique has been used in this study. According to Sandelowski and Barroso (2005), the purpose of qualitative metasynthesis is to clarify, refine, and develop new analysis and interpretations in order to synthesize qualitative findings. Qualitative data collection and analysis are based on meanings expressed through words. Through this system, the emphasis is on explanation. Introducing qualitative data collection and analysis into a study increases the researcher's understanding of the data (Tewksbury, 2009). Qualitative metasynthesis has been used to explain asthma management levels in the primary care setting. The qualitative method is also advantageous in data collection as it has the ability to probe deeply into the data being investigated (DiCicco-Bloom & Crabtree, 2006). In the current study, qualitative analysis was used to determine the reasons for the lack of full utilization of these guidelines.

Literature Search Procedures and Databases

A literature search was carried out with an objective of reviewing the existing evidence on the use of practice guidelines in the management of asthmatic conditions in a primary care setting. The main literature sources used in carrying out the systematic review were peer-reviewed journal articles. Moher et al. (2009) recommended the use of

journal articles and described peer-reviewed journals as authentic sources of information because most of them base their conclusions on primary studies. Similar suggestions have been made by researchers such as Cronin, Ryan, and Coughlan (2008), who maintained that journals are better sources of up-to-date information compared to books.

The literature search involved 11 main databases: PsycINFO, Health Services Technology Assessment Texts (HSTAT), EMBASE, U.S. National Library of Medicine, EMERLAD, the Cochrane Library, Google Scholar, CINAHL (Nursing and Allied Health Professions), PubMed, and Campbell Collaboration database. The main reason for selecting these databases was that they contain a huge volume of peer-reviewed papers.

According to Solomon (2007), the peer review process enhances the reliability, quality, and impartiality of a reviewed article due to the strenuous procedures that are usually employed in the review process. A researcher should also choose a number of databases so as to minimize any form of publication bias or reviewer prejudices. This approach has been supported by Cronin, Ryan, and Coughlan (2008), who argued that some reviewers might refuse to publish primary studies that report findings that do not conform to their expectations.

Databases such as Health Management Information Consortium, Health Services Technology Assessment Texts (HSTAT), and Google Scholar were also included because they include grey literature and unpublished studies (Higgins, 2008). Their inclusion was aimed at identifying even those studies that were not published in peer-reviewed journals, thus reducing publication bias.

First, a systematic computer-assisted literature search through the various databases was conducted. This process was supplemented by the use of hand search of

relevant journals on primary care guidelines. Cronin, Ryan, and Coughlan (2008) asserted that hand searching is an appropriate approach in modern evidence-based research because it facilitates the comprehensive analysis of journal issues, comprising conferences, articles, and case studies that might not be published by the major databases.

Footnote chasing (citation searching) was also used to identify relevant studies that were not captured during the database search (Higgins, 2008). A word processing package and Microsoft Access were used to document the bibliography list in a systematic manner. According to Egger, Smith, and Altman (2008), this approach is useful in processing, streamlining, and producing a reference list of journal articles in an easier way. In addition, duplicated references can be isolated and erased with ease (Egger, Smith, & Altman, 2008).

Studies that did not meet the inclusion criteria were discarded immediately. Studies with duplicate samples were not reviewed as distinct studies in the systematic review. According to Majid et al. (2013), a journal article may be published more than once for reasons such as translation into different languages or outcomes obtained in different follow-up periods. Majid et al. added that duplicate publications usually range between 2% and 28%, with some studies having more than five duplicate reports.

Search Terms

The key terms used in carrying out the literature search were *asthma management*, *primary care*, *qualitative study*, *guidelines use*, *adherence*, and *barriers*, either singly or in combination. Boolean operators were also used in the literature search procedure so as to narrow the research by combining the various search terms in the database. Robb and Shellenbarger (2014) supported the use of Boolean operators in the

search procedure and described it as an approach used within the evidence based search procedures. The approach proved to be valuable in saving time by filtering trivial sources that would have consumed a lot of time before being reviewed and eventually discarded.

Another approach used in carrying out the literature search was the use of truncation and wild card searching techniques. The Boolean and wild card literature search methods were used in line with the guidelines provided by each database searched. According to Robb and Shellenbarger (2014), wild card and truncation techniques offer extra flexibility in the literature search process, thereby making it easy to obtain search results for the search terms. Different forms of words and alternative words were used so as to build a comprehensive search process.

Use of Medical Subject Heading (MeSH) Terms

MeSH descriptive terms, including *primary care*, *guideline adherence*, and *clinical guidelines*, among other terms, were used in the literature search procedure. According to Egger, Smith, and Altman (2008), MeSH term subheadings are useful in establishing comprehensive and focused search strategies. The titles and abstracts of all papers were screened prior to their retrieval so as to avoid reviewing irrelevant journal articles (Furlan et al., 2009). Only studies available in English and those published from 2005 to 2016 regarding guidelines use in primary care for asthma patients were reviewed.

Inclusion and Exclusion Criteria

Primary studies that used a qualitative approach (i.e., grounded theory, qualitative descriptive case study, phenomenology, focus group, interview, and narrative) were included. Mixed method studies were only included if the qualitative data were analyzed independently from the quantitative data. The data analysis also needed to have been

related to asthma management; the analysis needed to have addressed guideline use in primary care settings and/or provided insights on what hinders effective adherence to asthma management guideline recommendations. The participants needed to have been asthmatic patients or primary care providers (APNs, general practitioners, family physicians) who managed asthmatic patients and parents or caregivers for asthmatic children. In addition, only studies available in full text and in the English language were included (due to lack of translation services).

The exclusion criteria included specialist settings such as pulmonology, as well as the presence of comorbidities such as another pulmonary disorder. Studies that included participants with other forms of disease involving specialist care, or a combination of specialist care and nonprimary care, were excluded. Additionally, studies dealing with comparative quality of care and studies not specifying types of participants, including age, were not included.

Studies involving nonprescription drug use were excluded, as were studies of psychiatric illness and institutionalization, and studies aimed at quality improvement. Other studies excluded were those involving computerizing/manipulating guidelines in order to improve them, letters, essays, review studies and commentaries aimed at prevention of asthma, and studies that included guidelines for other disease processes.

Quality Assessment and the Scales Used

Brereton et al. (2007) posited that epidemiological studies are important resources that influence decisions regarding patient management of various health conditions. Moher et al. (2009) asserted that evaluating the quality of the techniques or methods used in carrying out research is a crucial step in the process of acquiring the most reliable

evidence in healthcare. This claim has been echoed by other researchers, such as Van Spall et al. (2007) and Thomas and Harden (2008), who maintained that the features of the methods employed in carrying out the primary research can demonstrate the level of reliability and validity of a study. Van Spall et al. added that evaluating the methodology of a study is crucial because differences in methodology quality can considerably impact the conclusions made about existing guidelines or evidence.

After carrying out an analysis of various systematic reviews, Moher et al. (2009) established that studies that had not reported specific details such as how the blinding procedures were carried out had a tendency of presenting embroidered positive effects in comparison to studies with clearly stated methodology. Evaluating the quality of qualitative studies has attracted much debate in the recent past, and there is little unanimity on how quality may be evaluated in qualitative studies (Thomas & Harden, 2008). My point of view is that the quality of qualitative studies should be evaluated so as to make credible conclusions.

The Critical Appraisal Skills Program (CASP) for qualitative studies was used to evaluate the credibility of the studies included in this review. CASP is a tool that was designed with the objective of assessing the credibility and validity of studies to evaluate the results presented, and it determines their applicability in contemporary health care practices (LoBiondo-Wood & Haber, 2014). The tool contains 10 main questions that can be used to determine the relevance and credibility of qualitative research. I evaluated the quality of the included studies together with a qualified colleague. Disputes were resolved through negotiations after rereading and discussing the included studies with regard to the CASP criteria. No study was excluded due to low methodological quality.

The quality assessment process is discussed in detail in the results and discussion chapters.

Data Collection

Data were extracted by two reviewers and are presented in a tabular layout. In case of any differences with the colleague (which were rare), the disagreement was resolved through a discussion. Levac, Colquhoun, and O'Brien (2010) pointed out that the data extraction process in a systematic review should be free from bias and as reliable as possible. To achieve this, Cronin, Ryan & Coughlan (2008) recommended that the data extraction process be carried out with the help of knowledgeable colleague(s). Cronin, Ryan & Coughlan (2008) added that this approach not only minimizes errors, but also ensures that minimal time is consumed during the research process.

Thomas and Harden (2008) postulated that deciding what type of qualitative study is relevant and should be included in a qualitative systematic review may present a daunting challenge. The authors added that finding the main concepts of qualitative research may be a challenge due to different methods of reporting study findings. For this qualitative review, I aimed at overcoming those challenges by identifying the quotations presented in the included studies with the help of a knowledgeable colleague.

I performed the initial screening of the journal titles, screened the abstracts, and then reviewed the content of the articles in line with the inclusion criteria. I extracted the data; while my colleague examined the data extraction forms for consistency, accuracy, and inclusiveness. All of the relevant study features (e.g., titles, type of intervention, authors, summary of the outcomes, types of participants, and demographic details such as gender, ethnicity and age) were recorded, along with the study design. These data were

presented in the form of a table (Table 1). The studies were then scrutinized in order to identify any possible confounding elements that might introduce bias and irregularities (Table 2).

Table 1

Table of Evidence: Features of the Included Studies

Goeman et al. (2005)	Australia	To evaluate physicians' priorities in realizing optimal outcomes in asthmatic patients and the barriers they encounter in the health care provision process.	49 general practitioners—15 from rural and 34 from urban settings	Qualitative—case study	6 focus groups with physicians	Priorities included asthma education to patients and improvement in professional education among physicians Barriers to optimal health care included: -Patient's compliance -Medication safety -Time constraints -Cost barriers	Guidelines were not completely followed
Wahabi & Alziedan (2012)	Saudi Arabia	To evaluate PCPs' compliance with pediatrics asthma management guidelines in pediatric asthma management centers in Saudi Arabia	20 PCPs—10 nurses and 10 general practitioners	Qualitative—case study	Chart audit (657 chart reviews) focus group Interview (practice staff) Education/training (staff)	1. Health care professionals are not following the pediatrics asthma management guidelines— 5 out of 8 guideline recommendations were not adhered to. 2. Barriers to adherence were	Criteria not met Pediatric Asthma Management Protocol (PAMP) guidelines and standards were not adequately adhered to. (*table continues*)

						patient, physician, and health care related	
Klok et al. (2014)	Netherlands	To evaluate the reasons for nonadherence to guideline recommendations among children receiving guideline-based asthma care	20 parents with asthmatic children	Qualitative—phenomenological study	In-depth interviews Focus group	Reasons for nonadherence to guidelines included: 1. Nonadherence to medication 2. Lack of patient's drive to self-management 3. Ineffective parental problem behaviors (for pediatric patients) 4. Unawareness about nonadherence by PCP	Criteria not met Disparities between practice and guideline recommendations noted
Foster et al. (2005)	UK	To establish how nurse practitioners impact primary care and asthma self-management practices in East London	NPs (6), specialist nurses (5), GPs (8), asthmatic adult patients (38-47 years) and parents/caregivers (6) (n = 25)	Mixed method—case study for qualitative part	Face-to-face and focus group interviews were used for the qualitative part	GPs appreciated the nurses' expertise and acted on their advice, though poor communication between the NPs and GPs hampered optimal asthma management	Unclear implementation, was used inadequately

(*table continues*)

Walters (2015)	UK	To investigate the barriers to diagnosing occupational asthma by PCPs	10 PCPs	Mixed method (Qualitative—phenomenological study)	Interviews	PCPs did not inquire about occupation Inadequate knowledge about symptom management	Guidelines not adhered to
Newcomb et al. (2010)	USA	To assess barriers to patient-physician collaboration in asthma care	104 adult patients with persistent asthma	Qualitative—case study	Semistructured interviews	Five themes including social constraints, personal constraints, health care system, time, and communication barriers emerged Only 30% of physicians assisted patients in making asthma management guidelines 67% of physicians did not tailor the treatment regimens to the patient's needs	Gap between asthma management guidelines and prevailing clinical practice

(*table continues*)

Wiener-Ogilvie et al. (2007)	UK	To assess PCPs' guidelines to British Asthma Guidelines	15 practice centers—367 patients	Mixed method—qualitative case study	Chart review, interview, and patient's hospital records	Barriers to asthma care included poor teamwork, inadequate time, inadequate knowledge	Criteria not met. Patchy implementation of the laid-down guidelines—particularly asthma management plans
Moffat et al. (2007)	UK	To explore PCPs' views with regard to asthma management guidelines	GPs, NPs, and hospital consultants (54 PCPs) with interest in asthma	Qualitative—grounded theory	Semistructured interviews Focus group	PCPs generally had positive attitudes toward asthma management guidelines, though they hardly used them. Reasons for nonadherence included apply to a certain context, communication barriers, inadequate training and knowledge.	Criteria not met. Gap exists between asthma guidelines and actual practice
Meng & McConnell (2005)	USA	To explore how asthmatic children and their parents/caregivers make asthma-management-related decisions	Asthmatic children aged 7 to 12 years (28) and parents (21)	Qualitative—case study	Semistructured interviews Focus group	Asthmatic children and their parents made nonadherence decisions with regard to preventive aspects of asthma management plans	Guideline not followed

(*table continues*)

George, Campbell, & Rand (2009)	USA	To establish the extent to which low-income adults receive training and adhere to self-management guidelines	25 adults—92% females, 76% African American, mean age 39 years	Qualitative—case study	Interview	Only one participant (4%) had received training on asthma management No single participant had an asthma action plan No participant had a peak flow meter	Gap between asthma management guidelines and prevailing clinical practice
Scheidt-Nave et al. (2012)	Germany	To assess adherence to national asthma management guidelines in Germany	1,096 patients diagnosed in the past 1 year	Mixed method—qualitative case study	Review Patient records	38% of participants were on inhaled corticosteroid therapy Low coverage for inhaler techniques (35%) Inadequate provision of asthma management plan—only 27%	Guidelines partially implemented
Ring et al. (2015)	Scotland	To assess the level of adherence to personal asthma action plans and to create insights about guideline recommendations	7 General practitioners (GPs), 10 practice nurse (PNs), 1 respiratory nurse, 1 adult patient	Qualitative—case study	Interviews	Patients and physicians did not value the guidelines 6 patients were using an outdated personal asthma action plan (PAAP) 15 physicians had	Guidelines partially implemented (*table continues*)

						issued PAAPs to patients, but only 1 had reviewed it	
Hussein & Partridge (2005)	UK	To examine health beliefs, views, attitudes, and knowledge from asthmatic patients of South Asian origin residing in the UK	Teenagers aged between 16 and 17, adults from 18 to 65 years, and community participants (60)	Qualitative—case study	Semistructured interviews Focus group	All participants had inadequate knowledge about the concept of self-management and the use of written action plans	Poor use of written asthma action plans
Rydström & Englund (2014)	Sweden	To gain an in-depth understanding of immigrant parent experiences of the Swedish health care system with regard to asthma management	12 immigrant parents	Qualitative—phenomenological study	Interviews	1 There were both negative and positive experiences of Swedish health care system with regard to asthma management. The immigrants benefited from quality care; however, there were barriers to asthma management of the children, including poor physician-patient communication, discrimination, and lack of confidence	Gap exists between asthma guidelines and actual practice
Shaw & Siriwardena (2014)	UK	To explore PCPs' beliefs and perceptions, and the barriers that affect adherence to guidelines	17 PCPs	Qualitative—case study	Three group interviews Focus group	Guidelines were not adhered to Barriers included limited applicability due to complexity of	Gap exists between asthma guidelines and actual practice (*table continues*)

						ambulance services, inadequate knowledge, and poor communication	
Laster et al. (2009)	USA	To assess barriers to asthma care among low-income and urban families in Atlanta, USA	28 participants—caregivers and parents	Qualitative—case study	Interviews Focus group	Barriers included cost constraints, psychological distress, and perceptions about asthma	Gap between recommended guidelines and clinical practice
McLaughlin et al. (2016)	Australia	To investigate the role of midwives in providing antenatal asthma management	13 midwives	Qualitative—case study	Semistructured interviews	Participants lacked confidence in the role of asthma management in expectant women	Gap between recommended guidelines and clinical practice
George et al. (2016)	USA	To investigate if PCPs discussed patient's perceptions and beliefs about integrative medicine practices and inhaled corticosteroids	33 adult patients	Qualitative—case study	Semistructured face-to-face interviews	The study emphasized the importance of effective communication in overcoming patient's physician barriers	Gap between recommended guidelines and clinical practice

(*table continues*)

Goeman et al. (2007)	Australia	To explore perceptions, views, and knowledge of aged asthmatic patients that may prevent optimal asthma management	55 asthmatic patients aged over 55 years (16 males and 39 females)	Mixed method design—qualitative case study	For qualitative part, in-depth interviews were conducted	Participants with a more recent asthma onset had inadequate knowledge about available asthma treatments and had little past experience that could help them in management of asthma attacks. Participants underestimated the severity of their asthma Some participants did not acknowledge the need for seeking urgent health care during severe asthma episodes	Guideline not followed
Dean et al. (2008)	New Zealand	To assess PCPs' and patients' perceptions about asthma education and management	5 adult patients and 5 physicians	Qualitative—descriptive case study.	PCP interviews Patient interviews	Lack of consistency in beliefs and priorities between PCPs and patients	

(*table continues*)

Tan et al.(2009)	Singapore	To evaluate family physicians' views about the implementation of Written Asthma Action Plan (WAAP) in primary care settings	29 family physicians working with asthmatic patients and aged between 27 and 54	Qualitative—grounded theory	Focus group interviews	Barriers related to physicians, patients and health care system were identified Practice organization differed between physicians	Implementation of guidelines partly met
Jan, Lee, & Cheng (2014)	Taiwan	To investigate the patients' barriers and facilitators to taking long-term inhaled corticosteroids	24 adult asthmatic patients and parents of asthmatic children	Qualitative—case study	Interview	Guidelines were not followed fully; 2 patients had no regular follow up Barriers identified include patient (preferences, social support, socioeconomic status) related factors, health care system barriers, and poor physician-patient interaction	Variance between practice and recommended guidelines
Melton et al. (2014)	USA	To investigate the relationship between health literacy and health outcome among asthmatic patients	Four participants	Qualitative—phenomenological	In-depth face-to-face interviews	Patient's literacy and health care system constraints were the main barriers	Gap between clinical practice and guideline

(*table continues*)

Grover et al. (2013)	Australia	To evaluate parents'/caregivers' views and insights on asthma medication	52 (26 parents/caregivers and 26 children)	Qualitative—case study	Semistructured interviews	Barriers to asthma management, including inadequate knowledge, cost constraints, incorrect beliefs and views about medication, resistance to medication use	Guidelines not followed
Donald, Browning, & McBurney (2005)	Australia	To examine beliefs, views, behaviors, and attitudes of adult asthmatic patients seeking asthma treatment in primary care settings	5 asthmatic adult patients	Qualitative—case study	Semistructured interviews	Participants only sought asthma care when the symptoms became severe in spite of having written asthma management plans and ownership of a peak expiratory flow meter	Guidelines not adhered to
Poureslami et al. (2011)	Canada	To investigate how new immigrant groups are educated about asthma management and to identify the barriers to knowledge transfer	29 adult asthmatic patients	Qualitative—case study	Semistructured interviews Focus group	Language barriers, cultural beliefs, and patient's perceptions were the main barriers to effective asthma care	Not clear

(*table continues*)

Andrews, Jones, & Mullan (2012)	Australia	To investigate attitudes, opinions, and knowledge regarding asthma self-management practices among asthmatic adult patients	22 asthmatic adults living in metropolitan New South Wales	Qualitative—case study	Semistructured interviews Focus group	Low self-efficacy and nontailored asthma management guidelines hindered effective care. Self-management can be improved by tailoring guidelines to social and environmental conditions	Guidelines not adhered to
Valerio (2007)	USA	To examine caregiver/parental perspectives and insights about asthma care barriers in the Medicaid system	36 parents/caregivers with asthmatic children	Qualitative—case study	Semistructured interviews Focus group	Parents/caregivers had limited self-efficacy and self-confidence in their role of monitoring their child's asthma and controlling exposure to asthma triggers	Poor asthma outcomes
Peláez et al. (2015)	Canada	To explore patient's insights into barriers to taking long-term inhaled corticosteroids	24 parents, caregivers with asthmatic children	Qualitative—case study	Interviews	Barriers to adherence included patient-related factors (cognition, motivation, and attitudes), health-care-related barriers (resources and inadequate services), and physician-related factors	No optimal use of asthma management guidelines

Data Analysis

According to Ritchie et al. (2013), the main purpose of the data analysis section in a qualitative study is to allow the true meaning of the data to emerge. The main difference between quantitative and qualitative studies is that quantitative studies yield numerical or quantified data while qualitative studies produce non-numerical data. Quantitative data are commonly analyzed using statistical software such as SPSS; qualitative data are examined using thematic analysis.

In this study, data were analyzed using thematic approach. According to Thomas and Harden (2008), a thematic approach can be used to employ a wide range of themes and divergent views so as to create an enhanced comprehension of the situation or the phenomenon under investigation. In this systematic review, guidelines for thematic analysis provided by Thomas and Harden were adopted and consistently followed. The thematic synthesis integrates the grounded theory and meta-ethnography methods of data analysis for qualitative systematic reviews.

The first step was to read the qualitative studies to acquire an inclusive impression of asthma management in primary care settings in line with the research objectives. In the second step, descriptive themes were developed by recording key points using a computer. In the third stage, using an inductive approach, descriptive themes were used in interpreting new themes (analytical themes) that emerged. The secondary reviewer independently reviewed findings. Both reviewers comprehensively discussed each theme, in a bid to ensure that the themes emanated from the included studies.

The study screening process has been presented in the form of a literature search chart (Figure 4: The literature search flow diagram). The chart indicates the number of

papers that remained in various phases while highlighting the reasons behind the rejection of the excluded papers. This is in line with Quality of Reporting of Meta-Analyses (QUOROM) group guidelines for reporting the study selection process for systematic reviews and meta-analysis studies (Adie et al., 2015).

Ethical Considerations

This study can be considered to be of minimal risk, considering that it involved the use of secondary sources and had no human subjects, hence ethical issues such as confidentiality are likely to be minimal. The researcher obtained data from various databases highlighted in the previous section through literature search procedures. This means that no human participants were recruited or a direct patient's record was used in the study, a situation that renders no need to seek an informed consent.

However, LoBiondo-Wood and Haber (2014) maintained that all researchers should identify all possible ethical issues prior to carrying out a study. Although there is less risk associated with studies using secondary data; ethical issues may arise in some study designs such as case studies where demographic details of patients such as name, religion or location may be provided. As a result, in case of personal patient details such as names, privacy and confidentiality guidelines for handling patient data as underlined by the Health Insurance Portability and Accountability Act of 1996 (HIPAA) were followed. Details such as patient names or patient's hospital number were not included in this review. The study was approved by the Walden University Institutional Review Board (IRB).

Chapter Summary

This section discussed the main research design that the researcher employed in conducting the systematic review. In summary, the study was conducted through a systematic review method where the researcher reviewed qualitative studies investigating the use of asthma management guidelines in primary care settings. The study involved analysis of findings reported in secondary sources such as previously conducted studies published in peer reviewed journals; hence information does not need to be secured or its confidentiality maintained. As a result, no approvals were required.

Section 4: Findings, Discussion, and Implications

Introduction

The previous chapter provided a description and justification of the methodology used to search for relevant literature and provide answers to the research questions. This chapter provides the findings made with regard to the research objectives. The purpose of this chapter is to provide a summary of the themes that emerged from the review in order to address the research questions. The chapter has been structured into three main sections. The first section provides an overview of the results obtained from the literature search processes; the second section provides a critical appraisal of the primary studies included; the third section presents the themes that emerged from the review and a discussion of the findings and their implications for practice and policy.

Literature Search Outcomes

Two thousand two hundred (2,200) unique records were identified through the literature search process, of which 310 were reviewed in full text. Twenty-nine studies published between 2005 and 2016 were included in this review on the basis of the inclusion criteria. Figure 4 describes the literature search and screening procedures. This systematic review involved 29 studies with a prime focus on the use of and adherence to asthma management guidelines in primary care settings.

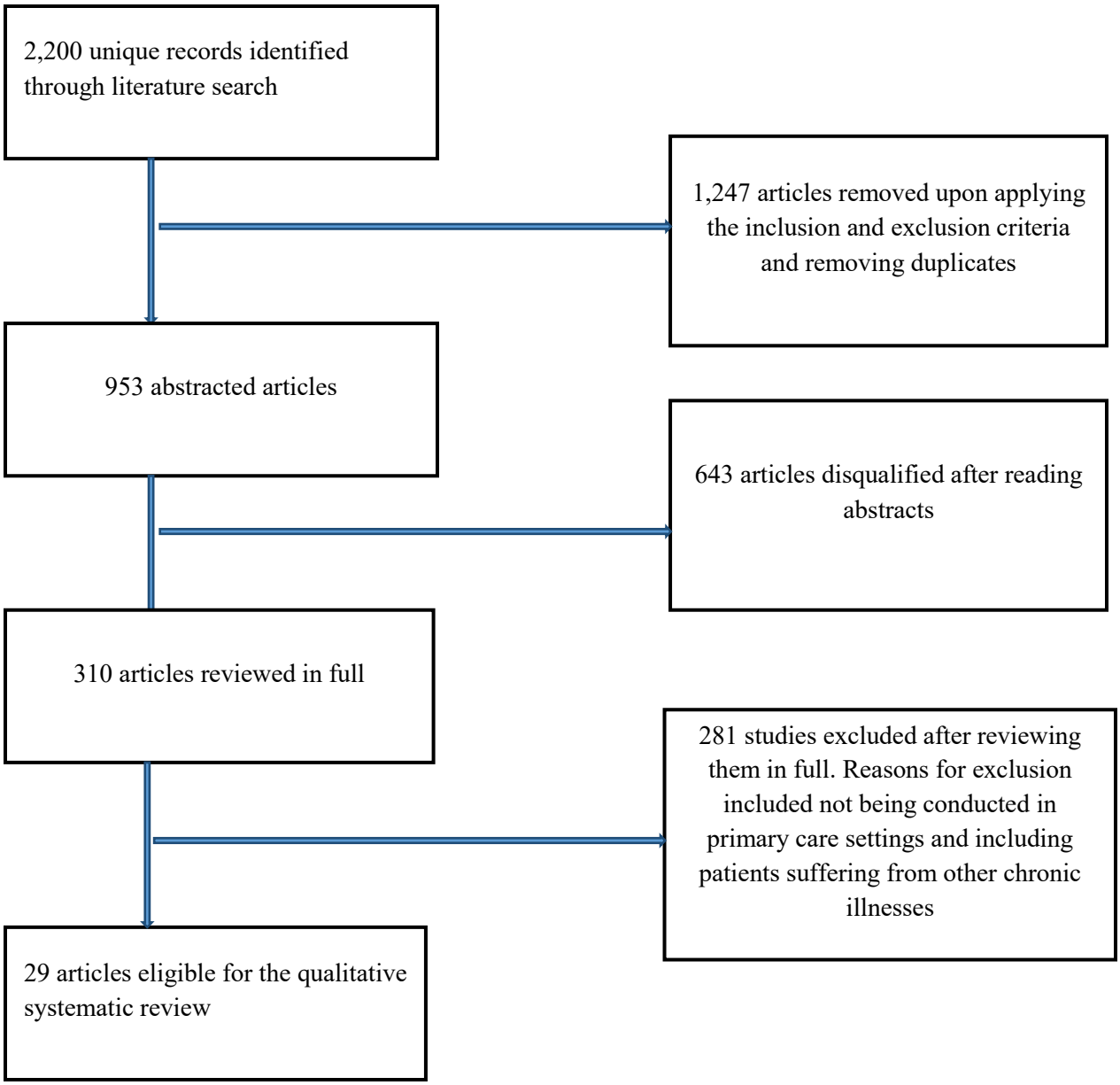

Figure 4. The literature search flow diagram.

Studies and Characteristics of Participants

Twenty-nine qualitative studies involving adult asthmatic patients, children (younger than 18 years), guardians/parents of asthmatic children, and health care practitioners (total participants = 1,846) working with asthmatic patients were included. The studies focused on various concepts, including understandings about asthma,

perceptions and knowledge about the use of preventive medications, time issues, and issues related to asthma experiences, among others. Some studies focused on patient-related factors, others focused on physician- and institution-related factors, and others evaluated all factors.

With the exception of four studies (Foster et al., 2005; Goeman et al., 2007; Walters, 2015; Wiener-Ogilvie et al., 2007), all of the studies used a qualitative research design—phenomenological (4), case study (19), or grounded theory (2). The four studies excepted employed a mixed method research design. Most of the studies used unstructured or semistructured face-to-face interviews (11) and focus groups (15) to collect data. However, there were a few studies that relied on observational techniques (1) in data collection, while others used documentary analysis (2).

The studies were carried out in a broad range of countries. Some were carried out in low- and middle-income countries of Asia, while others were conducted in high-income countries. Most of the studies were carried out in high-income countries, including the United States (7), United Kingdom (6), Canada (2), Australia (6), Netherlands (1), Sweden (1), Scotland (1), Germany (1), Saudi Arabia (1), Taiwan (1), and New Zealand (1). Only one study was conducted in a middle-income country (Singapore). Most of the articles included in this review were recent; 17 of the 29 studies were published between 2010 and 2016.

The sample size ranged between 4 and 50 participants for those studies involving face-to-face interviews, though rarely, the sample size was more than 50 for observational studies and narrative studies using medical records, for a total of 1,582 participants in this review. The participants in these studies were adult asthmatic patients,

family and general physicians, nurses, parents and caregivers representing asthmatic children, or a mixed sample consisting of both PCPs and the patients or parents. All of the included studies were of reasonably high quality, though the role of the researchers and the techniques for data analysis were inadequately described.

Quality Assessment

This section is aimed at providing a critical appraisal of the methodological quality of the research papers included to establish their credibility. Extant literature on quality assessment highlights that both qualitative and quantitative approaches are essential when it comes to developing policies in the health care sector (Moher et al., 2009). The Critical Appraisal Skills Programme tool (CASP; http://www.casp-uk.net) was used to analyze the methodological quality of the studies and determine the applicability of the findings reported.

Critical Appraisal of the Articles

The CASP tool highlights the significance of determining the validity of a study. Extant literature on the appraisal of qualitative studies highlights that even though a study may have high methodological rigor, it is of limited use unless it addresses an essential topic and contributes to the existing body of research (Thomas & Harden, 2008). The tool also highlights the importance of a suitable research design, an appropriate recruitment strategy, data collection processes, the role of the researcher, ethical issue, and a clear data analysis process.

However, it is imperative to note that the CASP items used are not meant to award the primary studies reviewed a numerical score or to exclude any of them. According to Verboom, Montgomery, and Bennett (2016), the CASP items were

developed to guide scholars in critical reading and appraisal of primary studies. There is no universal agreement on the relative weight that ought to be credited to any individual characteristic of a qualitative study; thus, the use of numerical scores to include or exclude qualitative studies would be misleading (Verboom et al., 2016). As a result, no single study was excluded on the basis of methodological quality.

One of the selected studies was the Goeman et al. (2005) study, a qualitative study carried out between 2002 and 2003. The main objective of this study was clearly stated: asthma education to patients and improvement in professional education among providers. It was therefore recommended as high-quality qualitative research (Creswell, 2012). In addition, a qualitative research design using focus group interviews was used and deemed applicable. According to Creswell (2012), qualitative research aims at creating an in-depth understanding of an existing phenomenon in its real-life setting. The researchers aimed at creating an enhanced understanding of the physicians' priorities and barriers for realizing ideal outcomes among asthmatic patients. Therefore, a qualitative research design using focus group interviews was the most appropriate strategy to address the research objectives.

A purposive sampling technique was used to recruit the participants, and the researchers demonstrated a high level of transparency in qualitative research by explicitly describing the data collection and the participant sampling process (Jirojwong, Johnson, & Welch, 2014). However, the study did not specify the role of the researchers in the data collection process. It is not clear whether the researchers intended to remain passive during the interviews and play their role in the analysis phase, or whether they influenced

the responses provided through active listening or prompting to allow emergence of new topics or further disclosure (Polit & Beck, 2013).

Nevertheless, the findings obtained were compared with those reported in previous studies to minimize bias. Ethical issues were taken into account, and written informed consent was obtained from each respondent before participation in the study. Data were analyzed through content analysis, and relevant quotes were extracted from transcripts made from the focus group interviews to ensure the accuracy of the data collected. In essence, the study was of high quality and displayed an acceptable level of credibility.

The next qualitative research reviewed was carried out by Tan et al. (2009). The overarching aim of the research was explicitly stated, and it was relevant to this review (Polit & Beck, 2008). The researchers aimed at obtaining an in-depth understanding of the various factors that impact PCPs' adherence to the use of written asthma management plans in Singapore. Grounded theory research design, which is an appropriate design for this form of study, was used to address the research questions. Details pertaining to the sampling procedure and sampling techniques, as well as ethical considerations, were clearly described as recommended by Heyvaert et al. (2013).

However, similar to the previous study, the role of the researchers in the study was not made clear. The researchers claimed that data were collected until saturation was achieved, but the data saturation process was not discussed. Silverman (2015) claimed that there is a possibility in qualitative research that the subsequent interview may be the one producing confounding evidence; thus, it is essential for researchers to acknowledge limits to the representational nature of their data. Additionally, the role of the researchers

in the data analysis phase was not made clear, and it was not clear whether there was a possibility of introducing analyst bias in the data analysis phase. There was a clear statement of the findings, and the study contributed to the field of asthma management by identifying barriers to the use of asthma management guideline recommendations.

Another study that was included in this review was carried out by Moffat et al. (2007). A clear and measurable objective was stated, and a grounded theory research design was used to address the research objectives. The study aimed at examining the reasons for inadequate adherence to asthma management guidelines in UK primary care centers; thus, the research design was appropriate. A purposive sampling technique, a nonrandom sampling technique, was used, and the technique was deemed appropriate because the researchers aimed toward obtaining data from key informants (Speziale et al., 2011).

Ethical issues pertaining to this research were addressed; however, there were potential conflicts of interest, given that the researchers had received a travel grant to present pilot results, though it is stated that the pharmaceutical company that had sponsored the event had no competing interest in the researchers' work. This makes the findings obtained from the research questionable (Holloway & Wheeler, 2013). In addition, the researchers neither clarified their relationship with the participants nor shed light on their role in the data analysis phase. Data analysis methods were discussed explicitly, and the findings obtained indicated that PCPs generally had positive views toward asthma management guidelines, though they only used them in specific circumstances.

Likewise, a study carried out by Dean et al. (2008) was included in this review. The research objective was clearly stated, and the qualitative research approach was the most suitable approach for the objectives of the research. The study provided a detailed description of the participant sampling procedures, and exclusion and inclusion criteria were made clear. Data collection procedures, including use of face-to-face interviews and use of audio tapes to record the interviews, were described. Nevertheless, the researchers did not provide details on how and where the interviews were performed, and the role of the researchers in data collection as well as the data analysis phase was not made clear.

Ethical issues were addressed in the research, and there was a clear discussion highlighting how ethical standards were maintained in the course of the research. However, though the findings of the study were clearly described, the data analysis method used was not discussed. The CASP tool requires that the data analysis procedures used in qualitative research be rigorous, indicating that researchers carrying out qualitative studies should be clear on how the themes emanated from the data collected, an aspect that was missing in this study (Wakefield, 2014). The findings obtained in the research were clear, and the study contributed to the field of asthma management by identifying barriers related to PCPs and patients.

A study by Wahabi and Alziedan (2012) was included in this review. The objectives of the study were stated clearly. Focus group interviews were used to collect data, and the findings obtained were supplemented through data collected from patient chart reviews. A qualitative research design was appropriate, and a purposive sampling technique, which was a suitable approach, was used to select the participants. The data collection process was made clear, and the analysis processes was discussed in detail.

Nevertheless, the study suffered from various methodological limitations, such as failing to shed light on the role of the researchers in the data collection and analysis phase; thus, there might be potential bias in the findings (LoBiondo-Wood & Haber, 2014). In addition, it was not clear how ethical principles were maintained.

An additional qualitative study by Scheidt-Nave et al. (2012) was included in this review. The objectives of the study were clearly stated—assessment of adherence to national asthma management guidelines in Germany—and a mixed method research approach was used. The qualitative research design was essential, though the sampling techniques for the qualitative part were not made clear. Ethical issues were addressed in the context of this study. The study suffered from various methodological limitations, including inadequate description of data analysis for the qualitative part and failure to clarify the role of the researcher.

Research by Klok et al. (2014) was also included in this review. The study had explicit and measurable objectives, and the qualitative methodology was the most appropriate approach, given that the study was aimed at providing an in-depth understanding of the barriers to effective asthma management among asthmatic patients. Details of the sampling techniques used and characteristics of participants were provided, in addition to a clear description of ethical principles adhered to in conducting the research.

The role of the researcher was made clear in the data collection and analysis phase; researchers probed for more information and used active listening skills to encourage more explanations. Data were presented in categories, though the data analysis process was not explicit; the researchers did not discuss how data saturation was reached.

The findings from the research were made clear, and the study identified modifiable barriers to asthma management guideline use.

Ring et al. (2015) aimed at providing insights on barriers that impede the use of PAAP in primary care settings. Therefore, a qualitative approach, as opposed to a quantitative approach, was appropriate (Speziale, Streubert, & Carpenter, 2011). The data collection procedures were discussed, though the type of data collection technique used was not clear. The researchers provided details of how and where the interviews were carried out, although they did not shed light on the relationship between the investigator and the participants.

This would be of importance, given that one of the coauthors was the head of the Supported Self-Management asthma group in the UK. There were efforts to ensure confidentiality as well as anonymity of the respondents, though it was not clear why each patient respondent received a shopping voucher at the end of the interview. The data analysis process was rigorous, and all of the themes emerged from the data collected. Nevertheless, the findings presented supported the previous results obtained. The researchers discussed institution-, patient-, and physician-related barriers, providing a broad range of factors hindering meaningful use of asthma management guidelines.

Shaw and Siriwardena (2014) clearly stated their research objectives. The qualitative research design was appropriate, and a suitable participant recruitment strategy was used. Ethical issues, including obtaining informed consent and obtaining ethical approval from a relevant ethical review board, were taken into consideration. Data were analyzed rigorously through thematic analysis; the researchers described in detail the data analysis process and the emergence of themes. The study provided insights on

why PCPs may not adhere to asthma management guidelines in primary care settings and provided a list of recommendations that can be used to address the barriers. Nevertheless, the role of the researchers and the data collection process were not clear.

Another study included was by McLaughlin et al. (2016). The qualitative design was appropriate, and the study had clear research objectives. However, the data collection process and the sampling techniques were not clear, and the role of the researchers in the data collection phase was not explained. All ethical considerations were taken into account, and data were analyzed rigorously through Morse and Field's four-stage data analysis process. The findings were made clear and were valuable, in that they provided insights on nonadherence to antenatal asthma management guidelines.

George et al. (2016) had clear objectives and adopted the most appropriate research design. The recruitment strategies were discussed, though the data collection process was not discussed in detail; it was not clear how and where the interviews were conducted. As in previous studies, the role of the researchers was not made clear. Data analysis processes were explained, and the conventional content analysis technique was used. Ethical measures, including obtaining approval from a relevant health body and maintaining anonymity, were taken. The findings added value by identifying inadequate communication and training as the main barriers to effective asthma care.

Jan, Lee, and Cheng (2014) had clear research objectives, and the qualitative methodological research design used was appropriate. Nevertheless, the sampling process was not discussed in detail, and the data collection procedures, including how the interviews were conducted and the role of the researchers, were not clear. Data were analyzed through content analysis, and the investigators clearly described the process

through which relevant themes emerged. Ethical issues were taken into account, and the study provided new insights on barriers to effective self-management for asthmatic children.

Walters (2015) provides insights on the barriers to identification of occupational asthma in primary care settings. The research approach was mixed method, and the qualitative methodology was essential. A purposive sampling technique was used, and probing questions were asked during the data collection process. Ethical issues, including voluntary participation and confidentiality were taken into account, though the role of the researcher is not clear. Data analysis was rigorous, and the study contributed significantly in the field of asthma management by identifying barriers behind non-adherence to occupational asthma management guidelines.

A further study by Peláez et al. (2015) was involved in this review. The research objectives were clearly stated, appropriate research design had been adopted, and the data collection process, including transcription and sample selection were made clear. However, the role of the researcher during the face to face interviews is not made clear. Data were analyzed through thematic analysis, and all ethical considerations were taken into account. The findings are valuable and they provide insights on health care system related barriers, as well as patients and physicians related barriers, though similar to those reported in previous studies.

Melton et al. (2014) interpretative phenomenological study had clear objectives and a suitable research design. The sample selection and data collection processes were not explained in detail. Ethical issues were taken into account and data were analyzed through interpretive phenomenological process, though they did not explain the step by

step process. The study provided insights into barriers to effective asthma care, and attributed inadequate health education as the main barriers behind the nonadherence to asthma guidelines among African-American participants.

Newcomb et al. (2010) had explicit and a suitable qualitative research design. Sample selection including characteristics of participants and recruitment procedures were made clear. Data analysis was a rigorous process and ethical considerations were taken into account. George, Campbell, and Rand (2009) qualitative study was also included in this review. The study had clear and specific research objectives and the research design was suitable. Details on participant recruitment and data collection processes were made clear. Ethical approval was obtained from the relevant authorities, though the data analysis process, including how themes emerged was not made clear. Laster et al. (2009) study has also been reviewed, the study satisfied all the CASP elements, but did not specify the role of the research, failed to describe the data analysis process, and did not shed light on the relationship between the researcher and the participants.

Valerio et al. (2006) qualitative study had clear objectives. The participant recruitment process and the data collection process, including the scheduling of interviews and development of interview guide questions were discussed. Unlike other studies, the role of the researcher in the data collection process was stated, and all ethical standards in conducting qualitative research were maintained. Data analysis process was rigorous, and descriptive thematic analysis technique was used. The study presented valuable findings by identifying asthma management barriers related to Medicaid.

Grover et al. (2013) qualitative study had clear objectives, and the recruitment process was discussed in details. A suitable research design had been used, and all ethical issues were addressed. Data collection process, including the process of conducting interviews and recording were discussed, though the role of the researcher was not clear. While the findings have been presented in the form of categories, the data analysis process was not discussed in details, and some aspects such as how the themes emerged are missing.

Rydström and Englund (2014) aimed at gaining insights on the experiences of immigrant asthmatic patients in Sweden. The recruitment process was made clear, but the data collection process was not explained in detail. The data analysis process was not explicit, and it was not clear how data saturation was reached. Ethical issues, including anonymity and confidentiality were addressed, and the findings contribute in the field of asthma management by identifying barriers to effective health care among immigrants. Nevertheless, the role of the researcher was not clear.

Likewise, Poureslami et al. (2011) had clear and relevant objectives. The researchers aimed at obtaining insights about the participants' knowledge, practices, and beliefs regarding asthma management education programs, thus a qualitative research design was appropriate. The participant selection process, including the inclusion and exclusion criteria was discussed.

In addition, the data collection processes, including the use of topic guides in the interviews were justified, though the role of the researcher was not made clear. There was an in-depth description of how the data were analyzed and it is clear that the themes emanated from the responses provided. The findings were made clear, though the

credibility of the findings was not addressed. In addition, it is not clear how ethical standards were maintained during the research. The findings from the research are valuable their implications on asthma management had been made clear.

Other studies involved in this review include, Andrews, Jones, and Mullan (2012); Donald, Browning, and McBurney (2005); Foster et al. (2005; Goeman et al. (2007); Hussein and Partridge (2005); and Rydström, and Englund (2014). All the studies had relevant objectives as far as asthma management guidelines are concerned. Qualitative research design was appropriate since all the studies aimed at shedding light on the subjective experiences of the participants.

The recruitment process, including discussions on how some participants were recruited and not others was made clear in all the above studies with an exception of Goeman et al. (2007). In this study, it was not clear how the participants for the qualitative part were selected. The data collection techniques including the use of semi-structured or focus group interviews were made clear in all the studies. However, only Goeman et al. (2007); Hussein and Partridge (2005); and Valerio et al. (2006) discussed how the interviews were carried out.

The relationship between the researcher and the participants had not been made clear in any of these studies. Moreover, the role of the researcher in the data collection phase is not clear. Thus, there is a possibility that investigators' potential bias might have impacted on the development of the interview questions and the responses obtained from the respondents (LoBiondo-Wood & Haber, 2014). Ethical standards, including obtaining approval from a relevant body and maintaining confidentiality and anonymity were maintained in all studies. There was a rigorous and an in-depth description of the data

analysis process in Donald, Browning, and McBurney (2005); Foster et al. (2005); Rydström, and Englund (2014); and Goeman et al. (2007) studies.

Nevertheless, the role of the researcher in the data analysis process was not made clear in any of these studies. The credibility of the findings, including validation of the themes developed and triangulation were only discussed by Donald, Browning, and McBurney (2005); Valerio et al. (2006); and Goeman et al. (2007). Donald, Browning, and McBurney validated their findings by sending a copy of their transcripts and the themes to the participants, though most of the participants, for unexplained reasons, did not provide their feedback. The other two studies (Valerio et al., 2006; Goeman et al. 2007) relied on more than one analyst to establish the credibility of the findings.

The quality assessment process in this review indicates that most of the studies included in this review are of high or moderate quality with regards to CASP tool. All the studies had clear and relevant objectives, as recommended by CASP tool. A suitable research design had been used, though the recruitment and data collection processes had not been made clear in a number of studies.

Most of the studies included in this review utilized semi-structured face to face, and focus group interview methods as the main technique of data collection. The main reason for the use of interviews was to allow the participants to express themselves in their own words, an aspect that is essential in qualitative research (Creswell, 2012). Nevertheless, only few studies described in details how the interviews were designed, and where and how they were conducted.

Dean et al. (2008); Tan et al. (2009); and Poureslami et al. (2011) among other included studies highlight that prompt questions were asked to allow more discussions

and more disclosure, but none of the study gave examples of prompt questions used to solicit more discussions. Meyrick (2006) highlights that minimal probes should be used and the effect of the interviewer in the process of data collection should be monitored and the participant should be awarded a strong role in the interview process. Goeman et al. (2007) described their interviews as open ended, and provided a summary of the interview at the end to enable the participants to add new concepts.

With regards to data analysis, most of the papers included in this review explicitly state that they used the thematic content analysis method for data analysis. The CASP tool requires the data analysis process to be rigorous and explicit, though this was not the case in most papers reviewed. The process of developing themes and role of the researcher in the data analysis process should be clear considering that data analysis in qualitative research necessitates a close relation between the analyst and the text (Speziale, Streubert, & Carpenter, 2011). An overview of the results of the quality assessment process using CASP tool can be found in the table below
(Table 2: Results of quality assessments based on Critical Appraisal Skills Program checklist for qualitative studies).

Table 2

Results of Quality Assessments Based on Critical Appraisal Skills Program Checklist for Qualitative Studies

Author	1 Was there a clear statement of aims of the research?	2 Was a qualitative methodology appropriate?	3 Was the research design appropriate to address the aims of the research?	4 Was the recruitment strategy appropriate to the aim of the research?	5 Were the data collected in a way that addressed the research issue?	6 Was the relationship between researcher and participant adequately considered?	7 Were ethical issues been taken into consideration?	8 Was the data analysis sufficiently rigorous?	9 Was there a clear statement of findings?	10 How valuable is the research ?	Assessment
Goeman et al. (2005)	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	High
Tan et al. (2009)	Y	Y	Y	Y	Y	N	Y	U	Y	Y	High
Moffat et al. (2007)	Y	Y	Y	Y	Y	N	U	U	Y	U	Moderate
Dean et al. (2008)	Y	Y	Y	Y	Y	N	Y	N	Y	Y	Moderate
Wahabi & Alziedan (2012)	Y	Y	Y	Y	Y	N	U	Y	Y	U	High
Scheidt-Nave et al. (2012)	Y	Y	Y	U	U	N	Y	U	Y	U	Low
Klok et al. (2014)	Y	Y	Y	Y	Y	Y	Y	U	Y	Y	High
Ring et al. (2015)	Y	Y	Y	U	U	N	Y	U	Y	Y	Moderate
Shaw & Siriwardena (2014)	Y	Y	Y	U	Y	N	Y	Y	Y	Y	High
McLaughlin et al. (2016).	Y	Y	U	U	U	N	Y	Y	Y	U	Moderate
George et al. (2016)	Y	Y	Y	U	U	N	Y	Y	Y	Y	Moderate
Jan, Lee, & Cheng (2014)	Y	Y	Y	N	U	N	Y	Y	Y	Y	High
Walters (2015)	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	High

(*table continues*)

Author	1 Was there a clear statement of aims of the research?	2 Was a qualitative methodology appropriate?	3 Was the research design appropriate to address the aims of the research?	4 Was the recruitment strategy appropriate to the aim of the research?	5 Were the data collected in a way that addressed the research issue?	6 Was the relationship between researcher and participant adequately considered?	7 Were ethical issues been taken into consideration?	8 Was the data analysis sufficiently rigorous?	9 Was there a clear statement of findings?	10 How valuable is the research?	Assessment
Peláez et al. (2015)	Y	Y	Y	Y	Y	U	Y	Y	Y	Y	High
Laster et al. (2009)	Y	Y	Y	Y	U	N	Y	Y	U	Y	Moderate
Melton et al. (2014)	Y	Y	Y	U	Y	N	Y	U	Y	Y	Moderate
Newcomb et al. (2010)	Y	Y	Y	Y	Y	N	Y	U	Y	Y	High
Meng & McConnell (2005)	Y	Y	Y	U	U	N	Y	N	Y	Y	Moderate
George, Campbell, & Rand (2009)	Y	Y	Y	Y	U	N	Y	U	Y	Y	Moderate
Wiener-Ogilvie et al. (2007)	Y	Y	U	Y	U	N	Y	Y	Y	U	Moderate
Poureslami et al. (2011)	Y	Y	Y	Y	Y	N	N	Y	U	Y	Moderate
Donald, Browning, & McBurney (2005)	Y	Y	Y	Y	Y	N	Y	Y	Y	U	Moderate
Hussein & Partridge (2005)	Y	Y	Y	Y	Y	N	Y	U	Y	Y	High
Rydström & Englund (2014)	Y	Y	Y	Y	N	N	Y	Y	Y	U	Moderate
Andrews, Jones, & Mullan (2012)	Y	Y	Y	Y	U	N	Y	U	Y	Y	Moderate

(*table continues*)

Author	1 Was there a clear statement of aims of the research?	2 Was a qualitative methodology appropriate?	3 Was the research design appropriate to address the aims of the research?	4 Was the recruitment strategy appropriate to the aim of the research?	5 Were the data collected in a way that addressed the research issue?	6 Was the relationship between researcher and participant adequately considered?	7 Were ethical issues been taken into consideration?	8 Was the data analysis sufficiently rigorous?	9 Was there a clear statement of findings?	10 How valuable is the research?	Assessment
Valerio et al. (2006)	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	High
Goeman et al. (2007)	Y	Y	Y	N	Y	N	Y	Y	Y	Y	High
Foster et al. (2005)	Y	Y	Y	Y	U	N	Y	Y	Y	Y	High
Grover et al. (2013)	Y	Y	Y	Y	U	N	Y	U	Y	Y	High

Note. Y = yes, N = no, U = unclear. Numbers 1-10 represent the 10 CASP questions in chronological order.

Thematic Analysis of Participants' Views

Two categories emerged from the data. The first category involves those studies that directly evaluated the barriers to adhere to asthma guidelines recommendations. The second category represents those studies that did not directly evaluate the level of guideline adoption and implementation, but indicated deficient asthma management and ascribed it to inadequate treatment intensification.

Analysis of the Research Issues

Question 1: To what extent do PCPs follow the stated asthma control guidelines? The responses to the question of the extent to which PCPs follow the stated asthma management guidelines varied significantly. The study by Goeman et al. (2005) reports that less than 60% of the recommended asthma management guidelines were met by PCPs involved. Walters (2015) assessed adherence to the UK national guidelines in the diagnosis of occupational asthma. The researcher reported that there was poor inquiry regarding occupational asthma as only 14% of the participants had been questioned by PCPs in the diagnosis of asthma. The UK occupational asthma management guidelines for primary care settings require PCPs to take a thorough occupational history so as to establish a positive relationship between the asthmatic symptoms and occupational related exposure (Aasen et al., 2013).

All the general practitioners who took part in Tan et al. (2009) had never developed an asthma management action plan for their asthmatic patients. The Global Initiative for Asthma (GINA) recommends the use of written action plans in the management of asthma. As a result, the Singapore Ministry of Health now recommends that primary care centers dealing with asthmatic patients should implement the guidelines.

Likewise, Hussein and Partridge (2005) found that South Asian adults living with asthma in the UK were dissatisfied with delays in asthma diagnosis and the lack of written asthma management plans. In addition, Wiener-Ogilvie et al. (2007) found that most of the general practitioners in their study did not follow the key asthma management guidelines. Data extracted from patient medical records indicated that only 23% (58/254) of asthmatic patients had received an asthma action plan.

Ring et al. (2015) evaluated the use of personal asthma action plan (PAAPs) in Scotland and found that the guidelines were inconsistently used by both the patients and PCPs. Out of the 11 adult patients interviewed, only six patients had PAAPs, though all of them were obsolete thus they could not be used. Both the patients and PCPs expressed less interest in using the PAAP, though they could identify circumstances in which the guidelines could be useful. Out of the 18 health care professionals who took part in this study, only 15 had ever issued a PAAP, and only 8 of them had ever reviewed a PAAP.

Wahabi, and Alziedan's (2012) observational and focus group study found that PCPs working in a pediatric emergency department in Saudi Arabia did not adhere to the Saudi Arabia pediatric asthma management guidelines. It was found that five of the eight recommendations provided were hardly adhered to, while the remaining three were not fully implemented.

The above studies, among others included in this review report that there is lack of progress as far as guideline adoption and implementation is concerned. Some studies indicated there is a gap between the recommended practices and the actual practice in primary care; others indicated that the guidelines were not adhered to at all while others reported partial implementation of asthma management guidelines.

Generally, the findings from these 8 studies indicate that there was minimal use or inappropriate use of asthma management guidelines in primary care settings.

Table 3

Synthesis of Answers to Question 1: To What Extent Do PCPs use Asthma Management Guidelines?

Goeman et al. (2005)	Walters (2015)	Klok et al. (2014)
Partial implementation of guidelines	An existing gap between primary care practice and guidelines for diagnoses and management of occupational asthma	Poor adherence to guidelines
Wiener-Ogilvie et al. (2007)	Ring et al. (2015)	Goeman et al. (2007)
Partial implementation of recommended guidelines-particularly asthma management plans	6 patients were using an outdated personal asthma action plan (PAAP) 15 physicians had issued PAAPs to patients, but only 1 had reviewed it	There is a wide gap between guidelines and current clinical practice
Hussein & Partridge (2005)	Wahabi & Alziedan (2012)	
Partial implementation –there was inadequate use of PAAP	Partial implementation of guidelines	

Question 2: What are the barriers to guideline use? Three main sets of themes shedding light on what hinders effective use of asthma management guidelines were identified. The three categories of the themes that emerged from the data analysis process include physician related barriers, patient related barriers and institutional/health care delivery system barriers.

Physician-related barriers.

Inadequate knowledge/training. A number of studies explored knowledge with regards to the published asthma management guidelines. Twelve studies (Foster et al., 2005; George, Campbell, & Rand, 2009; George et al., 2016; Goeman et al., 2005; Jan, Lee, & Cheng. 2014; Moffat et al.,2007; McLaughlin et al., 2016; Poureslami et al., 2011; Ring et al., 2015; Shaw & Siriwardena; 2014; Tan et al., 2009; Wahabi, & Alziedan, 2012) reported inadequate knowledge among physicians dealing with asthmatic patients in primary care settings as a major barrier to effective asthma

management. The studies reported that physicians' familiarity with the published guidelines was generally inadequate. For example, Goeman et al. (2005) reported that about 80% of the physicians involved in their study had inadequate knowledge about asthma management guidelines. The inadequate knowledge about the asthma management guidelines was ascribed to the vast number of published asthma management guidelines and difficulties in keeping up with updated asthma management guidelines.

In other studies, PCPs accepted that they were not even aware of the presence of asthma management guidelines in primary care settings (Poureslami et al., 2011; Tan et al., 2009) while others thought the guidelines did not bring change in their clinical practice (Wahabi, & Alziedan, 2012; Moffat et al., 2007; Shaw & Siriwardena; 2014; Goeman et al., 2005). However, one study by George et al. (2016) and McLaughlin et al. (2016) did not highlight the reasons for inadequate knowledge.

In other studies, newer graduates had greater awareness about asthma management guidelines in comparison to the older graduates, indicating that failure to keep up with the literature and advances in asthma management may be the reason for inadequate knowledge among health care providers (Tan et al., 2009). Assuming that PCPs may be the main source of information for the patients as well as their relatives, it can be argued that inadequate physician knowledge about asthma management translates to poor patient knowledge (George et al., 2016).

Physician perceptions about the guidelines.

1. Perceived limited credibility of the guidelines

Seven studies have highlighted concerns about the acceptability of the guidelines in the primary care context (Dean et al., 2008; Laster et al., 2009; Moffat et al., 2007; Shaw & Siriwardena, 2014; Wahabi, & Alziedan, 2012; Wiener-Ogilvie et

al., 2007). Physicians in the Moffat et al. (2007), Wiener-Ogilvie et al. (2007) and Shaw and Siriwardena (2014) studies highlighted that their views about the poor validity of the asthma management guidelines were rooted in the credence that most of the guidelines did not emerge from reliable or evidence based sources.

The credibility of the guideline authors was cited to be a major factor that determined the level of guideline adherence by physicians. In some cases, physicians claimed that they had less confidence with the new and updated guidelines raising concerns with the author's credibility due to limited or no clinical experience in management of asthma in primary care settings (Dean et al., 2008; Moffat et al., 2007; Wahabi, & Alziedan, 2012; Wiener-Ogilvie et al., 2007).

2. Limited applicability

A substantial number of studies highlighted physicians' concerns about the applicability of the asthma management guidelines in certain situations. Twelve papers included in this review reinforced this theme (Dean et al., 2008; Foster et al. ,2005; Goeman et al., 2005; Klok et al., 2014; Moffat et al., 2007; Newcomb et al., 2010; Peláez et al., 2015; Shaw & Siriwardena, 2014; Tan et al., 2009; Ring et al., 2015; Wahabi, & Alziedan, 2012; Wiener-Ogilvie et al., 2007). Generally, the asthma management guidelines, particularly those targeting the use of action plans were viewed as less useful or relevant to some particular patient populations.

In Moffat et al. (2007) study, general practitioners rejected the guidelines and termed them as unsuitable and impractical and only suitable for certain population settings such as the educated and those from higher social economic backgrounds. In the Shaw and Siriwardena (2014) study, PCPs expressed challenges in applying nonspecific guidelines to particular patient populations, especially, the aged, children and patients with other health complications.

Similarly, Wahabi, and Alziedan, (2012) observed that the pediatric asthma management guidelines in Saudi Arabia were not applicable to all pediatric patients. The researchers observed that physicians hardly followed the guidelines due to their applicability to specific patients. The guidelines did not provide recommendations for diagnoses and grading of asthma in children under three years and they had to use their clinical experience. However, non-adherence to the asthma management guidelines of nurses and physicians was also apparent in children aged more than three years. Likewise, Tan et al (2009) reported that GPs perceived WAAP as only appropriate for those patients who could understand it.

3. Prior experiences; clinical inertia

Clinical inertia can be described as the PCPs reluctance to diverge from the established code of practice, and is usually entrenched in over-estimation of the quality of the prevailing clinical practices, personal disagreement with the recommended changes or PCPs ignorance. Tan et al. (2009) and Wahabi, and Alziedan, (2012) studies indicated that introducing changes in health care organizations with well-established clinical practices can be a daunting task. Physicians expressed concerns that some patients would never adhere to asthma guidelines, resulting in frustration for the GPs which deterred them from making further prescriptions. The findings indicate that physician's personal experiences with the management of asthmatic patients in primary care settings, also impacted on their adherence to the guideline recommendations.

4. Medical heuristics/asthma decision making process

Medical heuristics, commonly described as the "rules of thumb" are used in a clinical setting to guide the decision making process when there are no established guidelines. Medical heuristics were prevalent in various studies and PCPs claimed

that they derived them from clinical experiences, personal opinions and physician's examinations. In most cases, the embracing of a heuristic contributed to a deviation from the established asthma management guidelines (Foster et al., 2005; George et al., 2016)

5. Lack of agreement

In some cases, health care professionals disagreed with the published recommendations and believed that their clinical experiences should surpass the recommendations in particular situations. The themes emerged in five studies which highlighted disagreements with the published guidelines (Dean et al., 2008; Almutawa et al., 2014; Moffat et al., 2007; Wahabi, & Alziedan; 2012; Wiener-Ogilvie et al., 2007). Some PCPs claimed that the perceived benefits from the barriers were not worth patient discomfort or risk; others claimed that they were not applicable in some settings while others claimed that the guidelines were simply "cookbooks". However, some studies such as Wahabi, and Alziedan (2012), failed to specify the reasons for the physician's disagreements with the guidelines.

Communication barriers. This theme emerged from 11 studies (Foster et al., 2005; Grover et al., 2013; Moffat et al., 2007; Newcomb et al., 2010; Peláez et al., 2015; Shaw & Siriwardena, 2014; Rydström, & Englund, 2014; Tan et al.,2009; Wahabi, and Alziedan, 2012). Wahabi, and Alziedan, (2012) observed that language was a major barrier that impeded effective communication between pediatric nurses and parents in Saudi Arabia. This is because most of the patients were Arabic speakers while most of the nurses and physicians were non-Arabic speakers, making it hard to effectively communicate the guidelines to the parents. Language barrier also hindered PCPs in Singapore from effectively educating their multiethnic asthmatic patients (Tan et al., 2009). Poor inter-professional communication also acted as a

barrier (Foster et al., 2005; Grover et al., 2013; Peláez et al., 2015; Rydström, & Englund, 2014; Shaw & Siriwardena, 2014).

Time constraints. Inadequate time has been highlighted as a major barrier impeding effective development and adoption of an asthma action plan (Dean et al., 2008; Goeman et al., 2005; Moffat et al., 2007; Newcomb et al., 2010; Ring et al., 2015). Inadequate time hinders meaningful physician and patient asthma management education. Health care professionals had inadequate time to discuss patient's medication, use of WAAP and management of asthma symptoms with their patients.

Lack of outcome expectancy. Outcome expectancy can be described as the anticipation that certain behavior will result in a given outcome. If a general practitioner believes that a recommendation will not result in improvement of a particular outcome, there is less likelihood that the practitioner will follow the guideline recommendation. An important reason for the general practitioners non-adherence to the laid down asthma management guidelines is the belief that they will not be effective. Participants in Tan et al. (2009) and Wiener-Ogilvie et al. (2007) studies expressed concerns over the possibility of the guideline recommendations improving asthma management outcomes. The concerns were attributed to inadequate training on how to use WAAP in primary care settings.

Lack of self-efficacy. Self-efficacy determines whether a certain behavior will be initiated and maintained in spite of poor results. Inadequate self-efficacy as a result of low confidence may result in non-adherence to the established asthma management guidelines. Four studies included in this review highlighted that this barrier impacted on preventative health education indicating that lack of self-efficacy can be a significant barrier to the adoption and implementation of the asthma management

guidelines (McLaughlin et al., 2016; Shaw & Siriwardena, 2014; Tan et al., 2009; Wiener-Ogilvie et al., 2007).

Institutional factors/health care system barriers.

Lack of clear development and dissemination plan for the guidelines. This theme emerged from a qualitative study carried out by Wahabi, and Alziedan (2012) among health care practitioners in Saudi Arabia. The study reported that health care professionals working in the pediatric department were not directly involved in the development of pediatric asthma management protocols. In addition, there was no reference to the initial guidelines consequently leading to their rejection by health care professionals.

The participants claimed that the guidelines were introduced in the course of a periodic departmental meeting, which was mostly attended by health care professionals not dealing with asthmatic patients. As a result, most of the health care professionals were neither aware of the presence nor the content of the new asthma management guidelines. In addition, the nurse practitioners and physicians were not aware of their role following the introduction of new guidelines.

Lack of a clear implementation strategy. This theme emerged from six studies included in this review (Chiang et al., 2015; Goeman et al., 2005; McLaughlin et al., 2016; Scheidt-Nave et al., 2012; Tan et al., 2009; Wahabi, & Alziedan, 2012). In the Wahabi, and Alziedan (2012) study, the pediatric asthma management guidelines were not accompanied by a clear implementation plan including printed instructions for parents on the discharge of their children from the pediatric center (action plan) or a friendly question sheet for easier documentation of asthma severity.

The researchers observed that parental education was provided and asthma grading was regularly carried out; however, there was no documentation of such

procedures. Some participants in Tan et al. (2009) reported that they were inadequately trained on how to use the newly introduced asthma management guidelines. The participants were only invited to a meeting where they were trained in less than an hour on how to use WAAP in primary care settings. Similar findings were reported in Chiang et al. (2015), Goeman et al. (2005), and McLaughlin et al. (2016) studies.

Staff shortage. Wahabi and Alziedan (2012) study highlighted that the high number of patients and staff shortage during winter seasons was a major reason for non-adherence to the laid down asthma management guidelines. In addition, the participants claimed that inadequate patient education was due to the busy nature of nurses and PCPs shortage including absence of health educators. For instance, pediatric asthma management guidelines require Salbutamol to be administered through an inhaler, however, due to staff shortage, Salbutamol was administered through a nebulizer since one nurse could handle more than one patient at a time, unlike the use of inhalers that necessitated individualized care. Another institution related factor identified was a bed shortage in asthma management departments. For instance, Wahabi and Alziedan (2012) observed that Ipratropium was commonly used in mild asthma against the guidelines for the sake of a faster response and discharge of patients to give room for the waiting patients.

Cost and availability of certain devices. This theme emerged in seven studies (Chiang et al., 2015; Donald, McBurney, Browning, 2005; Dean et al., 2008; Goeman et al., 2005; Goeman et al., 2007; Melton et al., 2014; Tan et al., 2009; Wahabi and Alziedan, 2012). The cost and availability of some particular devices impact on the patient's and physician's adherence to the laid down asthma management guidelines. Wahabi and Alziedan (2012) observed that cost and availability of devices such as

spacers impacted negatively on the adherence to the recommendation of using a metered dose inhaler, instead of a nebulizer to administer medication.

The physicians who took part in the study claimed that spacers cost about 18 times more than nebulizers, and it was a daunting task to justify the cost differences when one asks for inhalers as required by the pediatric asthma management guidelines. Cost and access to certain asthma management devices also emerged as a significant barrier to patient's optimum adherence to medication in Chiang et al. (2015), Goeman et al. (2007), Goeman et al., (2005), McBurney, Browning, (2005), and Tan et al. (2009) studies.

Patient-related factors.

Communication barriers. Communication involves various elements, including the source, the receiver, the message and the language used. Six studies acknowledged language barrier as a major challenge that impedes patient's adherence to asthma management guidelines (Hussein & Partridge, 2005; Laster et al., 2009; Moffat et al., 2007; Rydström, & Englund, 2014; Poureslami et al., 2011; Shaw and Siriwardena, 2014). Language barriers can significantly impact on the ability of the patient or parent to report asthmatic symptoms accurately. Most of the patients were not willing to ask specific questions regarding asthma management for the fear of consuming too much of the GP's time (Laster et al., 2009; Moffat et al., 2007).

Nonadherence to medication. Non-adherence to asthma therapy has been acknowledged as a major barrier to effective asthma management in the past (Dean et al., 2008; Hussein and Partridge, 2005; Klok et al., 2014). Hussein and Partridge (2005) reported that Asian parents had less chances of providing inhaled corticosteroids for their asthmatic children, in comparison to the white parents. The participants claimed that the medicines were addictive while others were concerned

over the safety of the regimens. Non-adherence to medication was also a barrier in Dean et al. (2008) and Klok et al. (2014) studies.

Complementary and alternative medicines. The use of complementary medicines has emerged as a significant barrier to the use of the established asthma management guidelines in primary care settings (George, Campbell, & Rand, 2009; Hussein & Partridge, 2005). Complementary medicine is widely practiced in South Asian and African countries. In George, Campbell, and Rand (2009) study, 52% of the participants used traditional medicine to manage asthma in their children in spite of the availability of Short-Acting Beta Agonists (SABA). Participants using complementary and alternative medicine (CAM) used 19 different types of CAMs for management of acute asthma including prayer (38%), idiosyncratic breathing practices (50%), unstructured relaxation procedures water (67%), water (67%) and fresh air (71%).

Though complementary and alternative medicines have emerged as a barrier to asthma guideline adherence, it is not explicit whether the patient uses them in combination with the western medications or as an alternate to them. Again, few studies have shed light on why patients may prefer complementary therapies to the western medications. There is a possibility that such incidences occur due to the apparent gaps in western medicines as well as cost (George, Campbell, & Rand, 2009).

Variable support for asthma management guidelines. This theme emerged from all the studies included. Some of the responses provided by patients/caregivers indicated that they view the asthma management guidelines as only suitable to certain patient populations, particularly those with severe asthma and youngsters being taken care of in schools (Andrews, Jones, & Mullan, 2012; Hussein & Partridge, 2005;

Meng, & McConnell, 2005). Parents/caregivers viewed asthma management plans as inappropriate or unnecessary since they had adequate knowledge on what they could do if their child's asthma became worse (Ring et al., 2015; Wahabi, & Alziedan, 2012). For instance, 11 participants in Ring et al. (2015) study claimed that PAAP were of limited use since they knew what they could do to manage their asthma.

Asthma management practices. This theme emerged in 15 studies (Andrews, Jones, & Mullan, 2012; Donald, Browning, & McBurney, 2005; Goeman et al., 2005; Goeman et al., 2007; George, Campbell, & Rand, 2009; Hussein & Partridge, 2005; Jan, Lee, & Cheng, 2014; Klok et al., 2014; Melton et al., 2014; Meng, & McConnell., 2005; Newcomb et al., 2010; Ring et al.2015; Shaw & Siriwardena, 2014; Scheidt-Nave et al., 2012; Valerio et al., 2006). It emerged that for most of the patients/caregivers, asthma management was aimed at treating the asthma acute episodes, particularly through the use of SABA instead of focusing on preventing future attacks. Through their own experiences and understanding of asthma, some patients had discovered their own means of minimizing asthma related effects. These practices were reinforced by previous asthma experiences, personal experimentations, professional advice, and a broad range of lifestyle related factors. For instance, in George, Campbell, and Rand (2009) participants concerned about the possibility of becoming addicted to SABAs had experimented different forms of home remedies for asthma management including seeking cold air or using water.

Asthma perceptions. This theme emerged in 14 papers (Dean et al., 2008; Donald, Browning, & McBurney., 2005; Foster et al., 2005; Goeman et al., 2007; George, Campbell, & Rand, 2009; George et al., 2016; Hussein & Partridge, 2005; Jan, Lee, & Cheng, 2014; Melton et al., 2014; Meng, & McConnell, 2005; Newcomb et al., 2010; Poureslami et al.,2011; Ring et al., 2015; Shaw & Siriwardena, 2014;

Valerio et al., 2006). The reports indicated that there were significant differences in how patients/parents/caregivers and PCPs viewed asthma as a health condition. PCPs viewed asthma as a long term condition requiring long term plans prevention plans while patients viewed asthma as an acute sporadic condition needing periodic treatment.

Some of the responses provided by the participants indicate that patients and PCPs had different goals when it comes to asthma management guidelines; PCPs wanted the patients to be free of asthma symptoms, while some patients/caregivers accepted “tolerable” symptoms, restricted activities and rejected some asthma management practices such as the use of inhalers so that their children could be viewed as “normal” (Hussein & Partridge, 2005; Jan, Lee, & Cheng, 2014; Ring et al., 2015).

Table 4

Synthesis of Answers to Question 2: What Are the Barriers to Guideline Use?

Wiener-Ogilvie et al. (2007)	Shaw & Siriwardena, (2014)	Andrews, Jones, & Mullan, 2012
1. Perceived credibility of the guidelines 2. Applicability in primary care settings 3. Inadequate knowledge and skills 4. Clinical inertia 5. Misconceptions 6. Time constraints 7. Inadequate resources 8. Poor health care team work	1. Credibility of the guidelines 2. Patient's language barrier and diversity 3. Challenges in diagnosing asthma 4. Complex hospital care processes 5. Inadequate patient and PCPs education 6. Poor inter-professional communication 7. Limited applicability of the guidelines	1. Physicians unfamiliarity with the guideline 2. Physicians/patients perceptions about asthma 3. Low self-efficacy 4. Non-tailored asthma management guidelines 5. Limited number of asthma educators 6. Poor communication
Goeman et al. (2007)	**Foster et al. (2005)**	**Donald, Browning, & McBurney (2005)**
1. Asthma management practices 2. Inadequate resources 3. Cost of asthma drugs 4. Patients understanding and knowledge of the guidelines	1. Poor knowledge 2. Poor communication 3. Heavy workload	1. Cost constraints 2. Inadequate knowledge 3. Patient's perceptions about asthma
Klok et al., (2014)	**Ring et al., (2015)**	**Valerio et al. (2006)**
1. Reluctance to use clinical guidelines 2. Non-adherence to medication 3. Lack of patient's drive to self-management 4. Ineffective parental problem behaviors (for pediatric patients)	1. Patient's did not value the guidelines 2. PCPs perceptions to the guidelines 3. Guidelines not reflecting patients' needs and social economic status 4. Lack of awareness 5. Inadequate knowledge 6. Organizational barriers	1. Health care system issues 2. Barriers to asthma assessment 3. Conflicts between patients and physicians' expectations 4. Limited self-efficacy
McLaughlin et al., (2016)	**Scheidt-Nave et al. (2012)**	**George et al., (2016)**
1.Inadequate nurse practitioners knowledge 2. Perceptions about NPs role 3. Lack of confidence 4. Inadequate resources	1. Patient's level of education 2. Poor dissemination 3. Inadequate patient's co-operation	1. Negative medication beliefs 2. Inadequate training 3. Poor communication
Jan, Lee, & Cheng (2014)	**Walters (2015)**	**Peláez et al., (2015)**
1. Inadequate knowledge 2. Self-care in daily life	1. Low awareness of the guidelines 2. Cost constraints	Patient related factors 1.Motivation, preferences, attitudes, and social support Poor physician-patient communication and relationship Health care system factors: 1.Lack of resources 2.Inadequate services
Melton et al., (2014)	**Newcomb et al., (2010)**	**Rydström & Englund (2014)**
1.Patient's literacy 2. Health care system constraints 3.Patient's asthma perceptions	1.Patients related factor: Social factors Communication barriers 2.Health care system related barriers 3.Physicians knowledge and attitudes 4.Limited applicability	1.Communication barriers 2. Discrimination 3. Lack of confidence

(*table continues*)

George, Campbell, & Rand (2009)	Laster et al., (2009)	Grover et al., (2013)
1.Social-economic status 2. Inadequate training 3. Use of complementary medicines 4. Patient's perceptions and attitudes	1.PCPs level of knowledge and attitudes 2. Financial constraints 3.Guidelines not individualized	1. Resistance to medication use 2. Inadequate knowledge 3. Cost constraints

5. Inadequate knowledge		4. Patient's beliefs about asthma medication 5. Poor communication
Goeman et al. (2005) 1.Inadequate training 2.Patient's poor adherence 3.High cost of medication and devices 4.Time constraints 5. Uncertainties (confusing guidelines) 6. Lack of relevant education to general practitioners 7. Patient's perceptions and asthma management practices	Dean et al. (2008) 1. PCPs perceptions and beliefs 2. Time constraints leading to inadequate patient's and PCPs consultations 3. Inadequate funding 4. Lack of outcome expectancy by patients 5. Patients frustrations by treatment regimens 6. Non-adherence to medication by patients 7. Patients perceptions and knowledge	Poureslami et al. (2011) 1. Lack of knowledge of available recommendations 2. Language barrier 3. Poor health literacy by patients 4. Patients beliefs and attitudes
Moffat et al. (2007)	Wahabi, & Alziedan (2012)	Laster et al. (2009)
1. Poor communication 2. Guidelines applicable to certain patient populations 3. Time constraints 4. Asthma management practices 5. Concerns about the credibility of the guidelines 6. Perceptions and attitudes towards self-management by patients 7. Inadequate patient knowledge 8. Non-compliance by patients	Factors related to health care facilities 1. Staff and bed shortage 2. Obsolete patient referral system 3. Cost and accessibility of certain devices Patient's related factors 1. Heavy patient loads 2. Patient's non-compliance/ variable support 3. Patient's perceptions/ beliefs PCP's related issues 1. Inadequate knowledge of the guideline recommendations 2. Language barrier between PCPs and patients 3. Lack of awareness about the guidelines 4. Disagreements with the guidelines 5. Clinical inertia Factors related to guidelines 1. Lack of a clear implementation plan 2. Not applicable to certain contexts	1. Patients' attitudes and views about asthma management 2. Financial constraints 3.Perceived relevance

Inadequate knowledge was one of the main reasons for non-compliance with asthma management guidelines (Dean et al., 2008; Goeman et al.,2005; Klok et al., 2011; Melton et al., 2014; Poureslami et al., 2011; Ring et al., 2015; Scheidt-Nave et al., 2012). Patients with inadequate comprehension of the role of medication were less likely to comply with the treatment regimens. Unwillingness to stop risky behaviors such as smoking has been associated with inadequate knowledge.

Question 3: What are the recommendations to improve adherence to guideline use?

Provision of education/training. Different studies have recommended various ways that adherence to asthma management guidelines can be improved (Table 4). One of the most common recommendations is provision of asthma education to both patients and PCPs. Education provided by PCPs is crucial in maximizing patient compliance, thus improving the effectiveness of asthma treatment. There is a need to re-orient practice nurses and physicians to guideline based practices. It has been recommended that there should be workshops and seminars for training PCPs about guideline use (Goeman et al., 2005; McLaughlin et al., 2016; Peláez et al., 2015; Tan et al., 2009).

Patient related education was ranked as the highest priority among GPs who took part in the Goeman et al. (2005) study. The participants in this study highlighted that patients should be educated about asthma device use, identification of asthma symptoms, self-management practices as well as when and how to seek emergency asthma care. It has also been hypothesized that improved patient education would lead to improved adherence to asthma management guidelines by the patients. This is because if the patients could understand the disease symptoms, then there is a likelihood that patients would adhere to PCPs advice since they understood their

health condition. The study also highlighted the need for heightened GPs asthma educational programs with regards to new asthma guidelines, complications related to asthma management, stages of asthma treatment, and management of severe asthma.

***Tailoring asthma management guidelines to patients' needs*.** This theme emerged from all the studies that provided recommendations for addressing the barriers (see Table 4). It has been recommended that asthma management guidelines can be tailored to the specific patient's needs by addressing their concerns about asthma management guidelines. This can be achieved through involvement of asthmatic patients in the decision making process. For instance, Goeman et al. (2005) and Ring et al. (2015) recommend that asthma action plans should be developed in conjunction with the patients. There is a need to take patients' experiences and level of knowledge into consideration when developing asthma management guidelines (Tan et al., 2009; Hussein & Partridge, 2005; Ring et al., 2015; Moffat et al., 2007; Rydström, & Englund, 2014).

***Effective communication*.** Effective communication (negotiation, persuasion) between the PCPs and the patients was recommended in 11 studies (George et al., 2016; Grover et al., 2013; Hussein & Partridge, 2005; Klok et al., 2014; Laster et al., 2009; Moffat et al., 2007; Peláez et al., 2015; Poureslami et al., 2011; Ring et al., 2015; Rydström, & Englund, 2014;Shaw & Siriwardena, 2014). There is a need for effective communication between patients and physicians. In addition, there is a need for effective inter-professional communication between nurse practitioners and GPs. PCPs can be trained on effective communication skills during the implementation of educational programs.

***Continuous audit programs*.** There should continuous audit programs to offer feedback on the progress and the status of guideline implementation in primary care

settings. Audit and feedback (A&F) is a continuous improvement initiative that can be used to evaluate performance and present reports that reflect on the status of guideline use. It was suggested that this process can result improved asthma care by modifying clinical practice behavior in primary care settings (Goeman et al., 2005; Moffat et al., 2007; Shaw & Siriwardena, 2014; Ring et al., 2015; Wahabi, & Alziedan, 2012).

Remuneration for quality improvement initiatives. It was recommended that PCPs should be remunerated fairly to encourage them to spend more time and have more conversations with their patients. GPs and NPs are always time-pressured and Pay for Performance programs might improve PCPs adherence to asthma management guidelines (Goeman et al., 2005). However, there is a need for demonstration projects in various countries to ascertain the right compensation and effectiveness of this approach.

Institutional changes. Five studies included recommendation related to organizational changes (Goeman et al., 2005; Grover et al., 2013; Moffat et al., 2007; Wahabi, & Alziedan, 2012; Wiener-Ogilvie et al., 2007). Wahabi, and Alziedan (2012) recommend that health care organizations should address issues related to PCPs shortage, bed shortage and shortage of resources. Grover et al. (2013), Moffat et al. (2007) and Wiener-Ogilvie et al., 2007 recommend increasing the number of nurse educators as a part of organizational change intervention. Leadership support in primary care settings is also essential when it comes to adherence to guideline use. The management can integrate guideline use in the organization day to day asthma management practices (Goeman et al., 2005; Grover et al., 2013; Wahabi, & Alziedan, 2012).

Involvement of physicians in guideline development. To enhance GPs adherence to guideline recommendations, it was recommended that GPs should be

involved in the guideline development and evaluation process (Goeman et al., 2005; Wahabi, & Alziedan, 2012; Wiener-Ogilvie et al., 2007). In addition, guidelines should not be lengthy and should be written in non-complex language. Lengthy and complex guidelines can be challenging to use in primary care settings (Wiener-Ogilvie et al., 2007). Such challenges can be limited by involving providers in the guideline development process. PCPs may feel powerless if they do not have input in the development of new policies, and there should be strategies in place to involve them in the guideline development and implementation process (Goeman et al., 2005; Wahabi, & Alziedan, 2012).

Technological systems. The use of computers, particularly the adoption and implementation of electronic health records (EHRs) can facilitate adherence to the use of asthma management guidelines (Dean et al., 2008; Goeman et al., 2005; Moffat et al., 2007; Poureslami et al., 2011; Ring et al., 2015; Rydström, & Englund, 2014; Walters, 2015; Wahabi, & Alziedan, 2012). The technological system can be used to remind physicians when certain patients' require asthma care. The system can be used in the development of asthma management plans and management of asthma prescription and medication activities. Technological systems can also be used to promote patient's education by distributing educational materials electronically (Rydström, & Englund, 2014; Walters, 2015).

Multifaceted interventions. Multi-component interventions are required so as to improve adherence with guideline use in primary care settings. A combination of educational interventions, feedback and audit process, organizational change, tailored guidelines and quality improvement initiatives can be effective in primary care centers affected by a set of barriers (Goeman et al., 2005; Poureslami et al., 2011; Wahabi, & Alziedan, 2012; Walters, 2015). Asthma management guidelines should

be accompanied by clear implementation strategies, such as physician and patient education programs. PCPs should be involved in the advancement and dissemination of asthma management guidelines.

Table 5

Synthesis of Answers to Question 3: Recommendations to Improve Adherence to Guidelines

Goeman et al. (2005)	Dean et al. (2008)	Poureslami et al. (2011)
1. Improved patient education on self-management, device use, symptoms and knowing when to seek emergency care 2. Effective dissemination of the guideline recommendations 3. Continued medical education to PCPs 4. Improving medication adherence 5. Interventions to introduce the changes 6. Continued review and monitoring 7. Developing an asthma management plan with the patient 8. Incentives or better pay to encourage PCPS to implement the guidelines 9. Time- a patient educator to be available to take the task of time pressured PCPs 10. Health promotion	1. Patient education 2. Guidelines reflecting on patient's social economic status 3. Need for interventions, including a decision support system with incidental reminders to improve adherence 4. Patient cantered care	1.Cultural practices and beliefs should be taken into considerations when developing guidelines 2. Eradicating health care system barriers 3. Technological interventions
Moffat et al. (2007)	**Wahabi, & Alziedan (2012)**	**Grover et al. (2013)**
1. Education to patients 2. Effective communication 3. Patient centered care	1.Design of an implementation strategy 2. Improved patient education 3. Frequent audit and redesign of the strategies of guideline implementation 4.Improving guideline dissemination 5. Use of guideline specific to patient's context 6. Patient's focused intervention 7. Involvement of PCPs in guideline development and dissemination 8.Technological solutions	1. Effective communication 2. Proper dissemination of the guidelines 3. Patient focused interventions 4. Education to patients
George, Campbell, & Rand (2009)	**Rydström, & Englund (2014)**	**Walters (2015)**
1. Intensify training 2. Streamlining of the guidelines 3. Educating patient's on correct usage of medication	1. Guidelines tailored to patient's needs 2. Technological systems	1.Technological solutions e.g. introducing electronic screening tools in primary care
Moffat et al. (2007)	**Wiener-Ogilvie et al. (2007)**	**Ring et al. (2015)**
1. New techniques for training practice nurses and general practitioners 2. Improving accessibility of the guidelines 3. Simple process of translating guidelines into primary care context 4. Improve patient-physician communication	1. Patient's specific guidelines 2. Patient's education 3. Closer monitoring of medication 4. Involvement of PCPs in guideline's development 5. Technological solutions	1. Guidelines should reflect patients' needs 2. Effective communication 3. Improving accessibility of the guidelines

Discussion of the Findings and Implications for Policy and Practice

The overarching aim of this systematic review was to synthesize qualitative studies investigating adherence to asthma management guidelines in primary care settings. The specific objectives were to examine the extent to which PCPs adhere to asthma management guidelines in primary care settings, the second objective was to examine barriers to the use of asthma management guidelines in primary care settings and the third objective was to explore the various ways adherence to asthma management guidelines can be improved. No other English language systematic review synthesizing qualitative studies examining barriers to the use of asthma management guidelines in primary care settings was found.

The gap between the endorsed and the actual asthma management practices has been recognized in the entire world (Almutawa et al., 2014; Ring et al. 2007). The studies included in this review indicate that there is inadequate adherence to asthma management guidelines in primary care settings. In addition, this qualitative systematic review provides insights into barriers contributing to the gap between the actual clinical practice and the guideline stipulations.

Three main sets of barriers to the use of asthma management guidelines were identified. Barriers to guideline use have been classified into physician, patient and institutional related factors. Though PCPs are the main targets of asthma management guidelines, it is evident that some of the PCPs working in primary care settings may be unaware of asthma management guidelines. In addition, it has been revealed that some of the GPs and NPs have negative attitudes towards the use of asthma management guidelines. Some of the PCPs view them as too intricate and complex, thus challenging to integrate in primary care settings, while others question their credibility and applicability in clinical practice.

Moreover, GPs and PNs willing to integrate asthma management guideline recommendations in their daily practice always find themselves having inadequate time and resources to do so. For example, shortage of asthma educators has been identified as a barrier, while in some cases it is not clear whether providing patient education is the role of GPs or nurses (Dean et al., 2008; Foster et al., 2005; Goeman et al., 2007). Other physician related barriers identified in this review include lack of agreement with the guidelines, communication barriers and clinical inertia (Moffat et al., 2007; Wahabi, & Alziedan; 2012).

Patient related barriers identified in this review included; patients' attitudes and perceptions, asthma management practices, communication barriers, poor adherence to medication, use of complementary medicines, and non-adherence to medication. Other patient related barriers included inadequate/inaccurate knowledge (some of the patients underestimated their symptoms, and thought that their asthma was in control) and variable support to asthma management guidelines. In addition, institutional/ health care system related barriers, including staff shortage, cost and availability of certain devices, lack of clear development and dissemination plan for the guidelines, and lack of a clear implementation strategy were also identified.

The most commonly reported barriers included inadequate knowledge/training, poor communication and physicians/patients perceptions about the guidelines. Of special importance is how patients and physicians view asthma as a health condition and their role in asthma management. Patients generally viewed asthma as a variable health condition characterized with sporadic episodes of exacerbations that warranted treatment. Most of the patients only sought asthma care when symptoms became severe, and they were focused on managing asthma symptoms in the short term rather than long term prevention of future attacks

(Donald, Browning, & McBurney, 2005; Goeman et al., 2007; Ring et al.2015; Shaw & Siriwardena, 2014; Valerio et al., 2006).

Moreover, it is evident that patients aim at managing their asthma within their real life settings. This means that asthma management guidelines, particularly PAAPs and WAAPs should be tailored to the patient's need and the wider social elements. On the other hand, PCPs view asthma as a chronic condition necessitating constant management and their understanding of asthma management is centered on "compliance to medication instructions" (Goeman et al., 2005, pp.9; Tan et al., 2009, pp.163-164; Wiener-Ogilvie et al., 2007, pp.372). PCPs perceptions towards asthma management guidelines seem to be basically influenced by their past experiences in provision of asthma care.

The fundamental mismatch between PCPs and patient's views regarding what patients should be doing to manage their health condition has been previously identified (Ring et al., 2007). This current study uses a new approach to aggregate distinct findings from 29 studies conducted in 12 countries over a 10 year period. The findings made from this study suggest that there is a mismatch between what is needed by patients/caregivers and what is currently provided by PCPs in primary care settings.

There are various interventions for improving adherence to asthma management guidelines. One of the main recommendations is to tailor asthma management guidelines to the patient's needs. Unless the guidelines reflect patients' specific needs and the wider social issues, there is a less likelihood that adherence to asthma management guidelines will improve (Andrews, Jones, & Mullan, 2012; Ring et al., 2015). Asthma management guidelines should address environmental issues

such as the social-economic status among other issues related to living with a chronic condition (Wahabi, & Alziedan, 2012).

To tailor asthma management guidelines more applicably to the necessities of those they are meant for, patient/parents should be involved in the decision making process (Hope, Garside, & Prescott, 2011). Provision of patient centered care requires that implementation of some guidelines such as the use of WAAP and PAAPs to be jointly negotiated between the physician and the patient. Involving patients in the development and implementation of such guidelines would ensure that their social-economic as well as cultural issues are taken into account. There is a need for the asthma management guidelines to be revised and refined to facilitate provision of patient centered care in primary care settings (Hudon et al., 2011).

Mutual agreements and negotiations are elements of good asthma care and PCPs should involve patients in the decision making process. Patient's personal experiences and knowledge regarding asthma should be taken into account in the decision making process, particularly when developing PAAPs. This requires effective communication, and effective partnership between the PCPs and patient (Harper et al., 2015).

However, some of the barriers hindering effective adherence to asthma management guidelines can also impact on the process of involving patients in the decision making process regarding their asthma. It is clear that there is ineffective communication between patients and PCPs, and this indicates that PCPs may have inadequate knowledge about patient's asthma expertise.

Communications should be improved during PCPs/patient's meetings so as to encourage participation. In addition, patients' experiences and knowledge should be taken into account, particularly when developing written asthma management plans

(Dean et al., 2008; Grover et al., 2013). Involving patients in the decision making process, particularly when developing individualized asthma management plans, is likely to have a positive impact due to improved patient knowledge and understanding (Elwyn et al., 2014).

Tailoring asthma management guidelines and involving asthmatic patients' calls for a "paradigm shift" in the current primary care practices. Involving patients in activities such as the development of self-management practices, setting asthma management goals among other activities in primary care settings can be a daunting task, considering the busy nature of PCPs. This means that there is a need for education as well as institutional support to address the challenges that may arise in the process (Elwyn et al., 2014).

Other recommendations for improving guideline use in primary care settings include addressing organizational related challenges by heightening leadership support to guideline use. Institutional changes, for instance, addressing staff shortage would reduce barriers related to inadequate time. In addition, increasing management commitment to guideline use can be a solution to institutionally related barriers. The management can integrate the use of asthma management guidelines in day to day clinical practices.

Another way adherence to guideline use can be improved is involving clinicians in the development of asthma management guidelines. PCPs may feel powerless when not involved in the development of new policies, and there should be strategies in place to involve them in the guideline development process. Moreover, adherence to guideline use can be improved by adopting technological solutions such as EHRs (Moffat et al., 2007; Ring et al., 2015). In addition, regular audit and feedback interventions, and compensating PCPs for their participation in quality

improvement programs related to asthma management are among other strategies that can be used to address barriers to guideline use. There is less likelihood that a single intervention strategy can work in primary care settings affected by a multitude of barriers, thus multi-component interventions can be used in such settings (Pronovost, 2013).

Implications for Practice and Policy

Limited applicability to certain settings, asthma management practices, cost of certain devices, patients' perceptions and non-adherence to medication have been identified as the main patient related barriers to adequate asthma management. These barriers can be addressed by tailoring asthma management guidelines to patient's needs and social economic status. Patients/caregivers intend at managing asthma in the context of their own lives; thus asthma guidelines should address their needs for them to be useful. Unless tailored to patient's needs/ circumstances, the current problem regarding non-adherence to recommended practice will still persist in the future.

Patients' level of knowledge and understanding should be taken into account when developing and implementing self-management plans. Jointly developed and tailored guidelines can support patients and their caregivers in the process of asthma management. To be specific, PAAPs and WAAPs should be adapted and refined by taking the patient's knowledge and experiences into consideration. Though asthma has known symptoms and complications, asthma management journey can be different from patient to patient (Ring et al., 2007). Such an approach would be valuable in addressing the disparities between PCP's and patient's asthma management views.

The main physician related barriers were perceptions and attitudes to guideline use in primary care settings. These barriers can be addressed by involving physicians in the guideline development and dissemination process. Issues related to language barriers can be solved by providing the guidelines in various languages. Issues related to availability or access to guidelines can be resolved by publication of the evidence based practices and their effectiveness (Matthew-Maich, Dobbins, & Jack, 2013).

Institutional related barriers, including cost, guideline dissemination and health care system barriers have been identified. Organizational commitment to asthma evidence based practices is needed. Primary care centers can adopt modern technology, including the use of electronic medical records to promote guideline adherence. In addition, it should be noted that health care is a fundamental human right thus they should explore various options to promote buy in and dissemination of essential resources to support guideline use (Gené-Badia et al., 2016).

However, to facilitate effective adoption of the guidelines, the choice of the strategy to address the barriers to asthma management should be appropriate to the context in which the guidelines are used. It should be noted that the barriers or issues might change with time; thus the strategies used to address them should be reviewed regularly to make sure they are relevant. In some cases, a single intervention like provision of education or tailoring asthma guidelines to individual needs can be effective, while in some cases only a combination of the various interventions can work.

Implications for Education

Inadequate knowledge and education are among the most prevalent barrier hindering effective use of asthma management guidelines in primary care settings.

Though nursing and medicine's curricula have embraced evidence based practices, the findings presented in this review indicate that some PCPs were not aware about the presence of the asthma management guidelines, while others experienced significant challenges while applying them in day to day health care practices.

Provision of both PCPs and patient education has been recommended as a viable solution. There is a need to re-orient NPs and GPs on guideline use in primary care settings at both graduate and undergraduate levels. Provision of education to PCPs and patients can improve their self-efficacy and self-confidence leading to optimal asthma management outcomes. This approach will help PCPs to acquire an enhanced understanding with regards to guideline use and thus improving their chances of delivering asthma care in line with recommended practices to enhance patient outcomes (Boulet et al., 2006; Reeves et al., 2013).

Implications for Research

This qualitative systematic review shows that PCPs partially adhere to guidelines recommended in asthma management. In addition, it has emerged that there are various types of barriers that impede effective use of asthma management guidelines. There is a need for a systematic review evaluating the effectiveness of the intervention strategies recommended in this review. The review should focus on interventions tailored to specific barriers. In addition, future studies should explore the effectiveness of each strategy (or a combination of strategies) for improving guideline use in primary care settings. The studies should provide essential details such as the cost-effectiveness and the applicability of the interventions in primary care settings.

Strengths and Limitations of the Review

Strengths of the Study

The main strength of this qualitative systematic review is contributing knowledge to the existing body of literature on primary care for asthma patients. Higgins (2008) maintains that systematic studies provide a high level of evidence, which is a key element of evidence based care. Thematic data analysis technique has been used to analyze data collected from 29 studies investigating adherence to asthma management guidelines. The approach proved to be valuable; unlike quantitative method which focuses on pre-determined responses, the approach provided rich insights on how the barriers impacted on asthma care guidelines.

Although the study involved a diverse population from different countries, common themes were identified. By including qualitative primary studies with a wide range of patient samples, this systematic review accomplished one of the main objectives of qualitative research; it was able to detect trends across a variety of respondents in order to have a broad-spectrum understanding of the phenomenon of interest (adherence to guideline use) (Yin, 2015).

The qualitative systematic review was carried out in an orderly and transparent approach and all the steps involved in the literature search process have been highlighted and justified. In addition to that, necessary measures have been put into place to prevent any form of bias from the research. There was no financial support by a third party, hence no conflict of interest. Also, there is no form of personal relationship with any health agency that may influence the evidence presented in this review.

Limitations of the Review

There are various limitations of this qualitative systematic review that should be recognized. Firstly, this review was limited to studies published in the English language. This means that there is a possibility that some high quality studies were

missed due to language restriction in the search process. However, the review included studies from different countries, thus there is less possibility that exclusion of non-English studies would have impacted the conclusions drawn from this review. Moreover, studies published through other means other than research journals may have been missed since the emphasis was focused on published articles in peer reviewed journals. However, the use of peer reviewed publications increased the validity of the review.

Another limitation to this study is the quality of the studies included. Though most of the studies included in this review were of high and moderate methodological quality, most of the papers included had a number of limitations, including the failure to discuss the relationship between the respondents and the researcher, the failure to shed light on the role of the researcher, and the failure to provide an in-depth discussion on how the data were analyzed. Other weaknesses of the included studies include failure to provide a discussion on how ethical standards were maintained and the data collection procedures used, including how the interviews were developed and conducted.

Sample size and sample determination is another factor that may present as weakness in this review. Such as, using different sample sizes might introduce inconsistency which might impact the evidence obtained in this study. Besides sample size, other issues related to study design may become an issue in the systematic analysis. Though there may not be a “right sample size” for qualitative research, it is essential for researchers to acknowledge limits to the representational nature of their data (Baker, Edwards, & Doidge 2012).

Findings in the Context of What Is Already Known

This review focused on adherence to asthma management guidelines in primary care settings. There are a number of systematic reviews evaluating barriers to guideline use, effective asthma management in different settings, regions and different patient populations. Lakhanpaul et al. (2014) conducted a systematic review about asthma management practices among South Asian children (from Bangladesh, India and Pakistan). Similar to the findings presented in this study, the researchers identified barriers related to inadequate caregiver/parent knowledge, non-adherence to medication, communication barriers, and use of traditional medicines.

Likewise, though not focusing on asthma, Slade et al. (2015) qualitative systematic review reported that poor guideline dissemination and implementation strategies, PCPs/patients' perceptions, poor clinician/patient relationship, inadequate knowledge and prevailing clinical practices as the main barriers to guideline for the management of low back pain in primary care settings. Similar to this review, the researchers recommended that addressing patient's concerns and beliefs, promoting education and improving clinician-patient relationships as the solutions to guideline adherence problems. These findings indicate that the barriers identified in this review are widespread, and the solutions recommended should be adopted to address the barriers.

Section 5: Dissemination Plan

This section illustrates my self-reflection upon conducting the research and presents critical scrutiny of the development of my personal and professional skills, along with a brief description of the plan to disseminate this work. The contents of this section have been categorized into three major themes: my development as a scholar, as a nurse practitioner, and as a project developer.

Development as a Scholar

This research has proven to be a crucial platform for apprenticeship and development in my academic career. The process of conducting this research attracted my attention to my weak points, including paraphrasing and note-taking techniques, and helped me to improve on them, as well as appreciate the importance of a work plan for each project. Moreover, the research gave me an opportunity to improve on my referencing skills. It is important for scholars to be aware of correct referencing; otherwise, they will be accused of stealing another person's work (Greenwood et al., 2014).

As a result of carrying out this research, I managed to improve on my literature search techniques. I learned how to use Boolean, truncation, and MeSH descriptive terms to broaden or limit the search—skills that I believe I could have not found a better opportunity to improve upon. Using the above literature search strategies proved to be invaluable in the process of carrying out this systematic review; I managed to filter thousands of irrelevant articles that would have cost me a great deal of my time before reading them and eventually discarding them.

Moreover, I managed to improve and apply my academic skills as an independent learner. Carrying out this research gave me an invaluable moment to develop critical analysis skills. Before carrying out this research, I made the

assumption that if a person or an organization had published a journal article or a book, that person or organization must be an expert in that field. Therefore, I was prone to accept the viewpoints presented in books and journals as facts on the assumption that the authors had deep expertise. I have to acknowledge that carrying out this research made me change my viewpoint; I learned that as a scholar, one has to consider different opinions, and there is a need to appraise the quality of studies and identify the shortcomings associated with published works.

I also have to acknowledge that I gained competency in prioritizing secondary data. According to Schneider and Whitehead (2013), there are numerous sources of information in the nursing profession, including journal articles, books, and governmental reports, among others. My experience while conducting the background reading made me realize that it may not be possible to include all sources, particularly when presenting a research project.

Accordingly, I learned that one has to decide on the type of literature sources to review on the basis of the research objective, date of publication, and type of study design—hence the need for exclusion and inclusion criteria, as discussed in this paper. As a result of prioritizing secondary sources of data, I managed to identify articles that gave substantial answers to my research questions. Prioritizing qualitative studies on the basis of the inclusion criteria stated in this study offered an extensive range of benefits. It not only proved to be time saving, but also gave me an opportunity to improve the credibility of the findings discussed in this review.

Development as a Practitioner

Before deciding to focus on asthma management, I conducted some background reading on the topic. I was worried by the fact that the prevalence of uncontrolled asthma is extremely high and that there was evident gap between

recommended practice and actual practice in the field. Chronic health conditions are a major source of morbidity and mortality across the globe, and the financial burden imposed by these conditions runs in the billions of dollars (Bloom et al., 2012). Individuals living with asthma may not achieve full recovery, but as a nurse practitioner, I believe in doing all that I can to improve the quality of life and the prognosis of asthmatic patients. Doing the best I can to help patients realize their optimal health and improve their quality of life is what made me desire to become a nurse practitioner—and this has been, and will forever be, my nursing philosophy.

Statistics on poorly managed asthma are disturbing, despite the fact that there are numerous guideline recommendations that have been developed. As a nurse practitioner, I believe in evidence-based practice and patient-centered care, however; I was worried that the quality of care provided to asthmatic patients is below the recommended standards. Asthma management guidelines, just like other clinical guidelines, are developed by taking evidence-based practices into consideration (Hefner et al., 2015). However, the quality of care provided to asthma patients is substandard; thus, I felt that it was important to conduct an in-depth analysis of adherence to asthma management guidelines and eventually evaluate various interventions that can be used to address the problem.

While conducting the background reading, I noted that there were both quantitative (surveys) and qualitative studies evaluating the use of asthma management guidelines in primary care settings. After reading several surveys, I observed that most of them just named the barriers, offering little or no explanation of how the barriers affected guideline use. In addition, most of them did not shed light on how adherence to asthma management guidelines could be improved. As a result, I decided to carry out a qualitative systematic review on the use of asthma management

guidelines in primary care settings. Qualitative studies were invaluable in helping me realize my research objective; I acquired an enhanced understanding of how barriers impacted on asthma care, and I learned how to develop and combine related themes.

Carrying out this research immensely improved my skills as a nurse practitioner. After conducting the thematic data analysis, I noted that there was an evident disconnect between how PCPs view asthma as a chronic illness and how patients view the condition. I realized that the evident disconnect can be addressed through effective health promotion strategies. Since then, in my practice as an advanced nurse, I have always taken the patient's asthma perspective as well as my personal perspective into account before giving prescriptions and developing personalized asthma management action plans.

I always manage to achieve this by seeking an in-depth understanding of the patient's asthma perspective through effective communication and involvement of the patient in the decision-making process. This has proven indispensable, as there has been an indication of improved adherence to medication and use of PAAP among some of the patients. Experience has taught me that unless one involves asthmatic patients in decision making regarding a PAAP, there is less likelihood that one will succeed in convincing them that the recommended practices are the best for managing their condition. I have appreciated the importance of patient involvement in the health care sector, particularly for those suffering from chronic illnesses.

This practice is integrated into my transformational leadership style, and as a nurse practitioner with my own clinic and clinical experience of more than 10 years, I believe that transformational leadership can improve adherence to guideline use in primary care settings, as it is responsive in nature. The leadership style has been endorsed by key authorities in the nursing field because it facilitates improvement in

patient safety, empowerment, and satisfaction with the quality of care provided (Govier & Nash, 2009). Therefore, there is a need for advanced practice nurses to be transformative leaders and work toward improving adherence to evidence-based practices.

Development as a Project Developer

Aside from developing my research and practitioner skills, this project gave me a treasurable opportunity to develop project management skills. Although effective time management has always been one of my strengths, carrying out this research proved to me that there is space for improvement. Specifically, the systematic review demanded exhaustive groundwork and planning for each section and had to be carried out in a systematic and timely manner. At the beginning, I faced significant challenges with time management—I had underestimated the time required to carry out the systematic review. I was always behind the time plan with regard to the number of studies I had reviewed. I had to readjust the schedule a little bit while improving my level of personal discipline in following a set schedule.

To be precise, I had to avoid all unnecessary and time-wasting activities while carrying out the research. I managed to achieve this by developing daily and weekly activity plans based on the SMART (specific, measurable, attainable, realistic, and timely) model. However, I included some provisions for intermittent days off from the project to avoid being pressured and stressed by it. In summary, the research experience gave me an opportunity to improve time management skills, which are essential in any project.

Moreover, I managed to improve my teamwork skills. I appraised studies included in this review with a colleague, and though this occurred rarely, at times we disagreed. I found an excellent opportunity to improve my negotiation skills through

effective listening, questioning, and sharing ideas. This helped me in improving my self-confidence as a potential project manager.

Writing this report made me appreciate the importance of assessment by an independent evaluator. Feedback received from my supervisor was instrumental to the process of completing and improving the quality of this systematic review. As McCormack, Manley, and Titchen (2013) put it, evaluation is an important part of project completion and allows project managers to improve on their project management skills. Evaluation can be performed by oneself or by others. Self-evaluation is in most cases subjective and can be biased, whereas assessment by an independent person is in most cases objective (McCormack et al., 2013). Receiving feedback from my supervisor not only gave me an opportunity to improve on my weak areas and know my strengths, but also helped in improving my self-confidence and keenness. In all sincerity, I could not have found a better opportunity to improve my skills in all these areas than through this research project.

What the Project Means for Future Development

It is beyond doubt that I will greatly benefit from improved project management, leadership, professional, and academic skills in the future. As a researcher, I will benefit from improved critical reading and analysis skills; I will be able to assess and appraise primary and secondary sources of data and determine their strengths and weaknesses. As a nurse practitioner, I will be a champion of health promotion and evidence-based practices to support patient-centered care in primary care settings.

I have developed and improved my leadership skills as a nurse practitioner, and I have benefited from enhanced self-confidence through self-evaluation as well as assessment by my supervisor. In the contemporary health care industry, one cannot

survive without well-founded and effective leadership skills. This is because as a DNP-prepared nurse, one will always find oneself leading various initiatives such as health information technological projects. There are numerous challenges associated with such projects, ranging from time to logistical challenges. Conducting this research helped me to improve my time management, communication, teamwork, leadership, and scholarly inquiry skills, which are essential project management skills.

Dissemination Plan

Effective dissemination is indispensable in nursing practice because it enables nurses to share essential information on how to improve patient safety and quality of care (Bradley, McSherry, & McSherry, 2009). My dissemination plan will be used in an effort to ensure that this research has an impact on prevailing asthma management practices. The key audience, or the end users in this case, are PCPs (general practitioners and practice nurses), asthmatic patients, parents/caregivers, and members of the public in general.

I will attend seminars and workshops on asthma management and guideline development in primary care settings to disseminate my findings. In addition, I will use electronic means such as email and Twitter to disseminate the findings. Further, I will submit a publication of the findings, either in full or in brief, to a peer-reviewed journal. Posters (printed and soft copy PowerPoint slides) will also be developed and will be presented at future professional meetings and conferences on asthma management in primary care settings.

The findings will be disseminated within a 1-year period, and the emphasis will be on the barriers hindering adherence to guideline use in primary care settings, as well as the interventions that can be used to improve the use of asthma management guidelines in primary care settings. To be specific, emphasis will be

placed on patient- and physician-related barriers, and recommendations will be centered on the provision of patient-centered care, such as tailoring guidelines to the patient's needs. It is hoped that adherence to the use of asthma management guidelines in primary care settings will improve.

Summary and Conclusions

Asthma is an airway inflammatory disorder characterized by variable and reversible airway obstruction due to hyper-responsiveness of the tracheobronchial tree. Physiologic manifestations of asthma involve airway narrowing that is relieved spontaneously or with bronchodilators. The prevalence of the disease keeps rising, and there are reports indicating that about 39.5 million U.S., citizens have been diagnosed with asthma at some point in their lifespan (Cohen & Martinez, 2012). Being younger than 10 years of age and being female seem to have a correlation with high asthma prevalence. Millions of children and young people miss school and work due to asthma. This is frustrating for those involved and leads to work-related deficiencies.

It has been proven that mild and moderate asthma are both manageable conditions. Even in cases of severe asthma, pharmacological therapy has been found to be effective. Moreover, self-management has been recommended in recent guidelines because the condition is a lifelong disorder that does not need to be managed in a health facility. Given that the condition usually relapses in the home/work/school setting, recent guidelines recommend that the affected need to be told about all aspects of asthma for self-management.

Asthma management is aimed at improving patient outcomes by reducing symptoms and relapses. The aim is also to reduce complications so that there is no limitation to normal activities and other forms of physical exertion. The asthma

management principles are the same, but the dosages and approaches are not identical. With recent guidelines in place, clinicians are able to know what approach to use when faced with patients who differ in age and type (Lang, 2008).

However, there are reports indicating that asthma care is below the set standards. Asthma management guidelines have been recommended for the provision of high-quality asthma care in primary care settings but are persistently underused and under promoted for reasons that have not been well understood. In this study, through the analysis of evidence-based guidelines and using a systematic review approach, I examined extant literature on the use of asthma management guidelines in primary care settings and developed recommendations for patient-centered care. The study also addresses challenges faced by clinicians and relevant stakeholders in the management of asthma in the primary care setting.

A qualitative systematic research design was used to address the research objectives. The approach proved to be valuable; unlike a quantitative approach that focuses on predetermined responses, the approach provided rich insights into how the barriers impacted asthma care guidelines. A literature search was carried out across 11 databases with an objective of finding existing evidence on the use of practice guidelines in the management of asthmatic conditions in a primary care setting. The main literature sources used in carrying out the systematic review were peer-reviewed journal articles. Boolean, MeSH descriptive terms, and wild card literature search methods were used in line with the guidelines provided by each database searched.

Only qualitative studies providing insights on adherence to asthma management guidelines in primary care settings were included. The participants needed to have been primary care providers, or parents or caregivers for asthmatic children. The studies needed to have been available in English language and

published between 2005 and 2016. The methodological rigor of the studies was appraised using the CASP tool for qualitative studies. Data were collected by a primary and secondary reviewer and presented in a tabular layout. The data were analyzed through a thematic data analysis technique in line with the guidelines provided by Thomas and Harden (2008) for thematic analysis in qualitative systematic reviews.

Through the literature search process, 29 qualitative studies published between 2005 and 2016 were included in this review upon satisfying the set inclusion criteria. Most of the studies included were of high and moderate quality, however; the studies had common weaknesses, such as the failure to explain the relationship between the investigator and the participants or the role of the investigator in the data collection and analysis processes. Generally, the findings from the included studies indicated that there was minimal use or inappropriate use of asthma management guidelines in primary care settings.

This systematic review also identified barriers to guideline use in the management of asthma in primary care settings and provided recommendations on how adherence to guideline use can be improved. Physician-, organization-, and patient-related barriers that hinder effective use of asthma management guidelines in primary care settings were examined. The findings presented indicate that physician and patient's/caregiver's views, attitudes, knowledge, and insights are among the main factors affecting adherence to guideline use.

Some physicians and patients view the guidelines as irrelevant, only applicable to certain settings/patients, challenging to use, and of low credibility. Of importance are the differences in physicians' and patients' asthma management views. Generally, physicians view asthma as a chronic condition warranting constant

care and prevention, whereas patients view asthma as a variable condition warranting health care under certain circumstances. In addition, institutional and health-care-system-related barriers, including lack of clear guideline development and dissemination plans, staff shortage, and cost of certain devices, were identified.

There are various strategies that can be used to address the nonadherence to asthma management guidelines in primary care settings. Barriers related to physicians and institution can be addressed by involving physicians in the guideline development process, providing education to PCPs, introducing continuous audit programs, providing leadership support, and adopting new technologies such as EMRs. Patient's related barriers can be addressed by tailoring asthma management guidelines to their needs, and social-economic conditions, and improving physician-patient relationship and communication. However; tailoring asthma management guidelines, particularly asthma self-management and asthma action plans to patient's needs calls for a high level of understanding, and cooperation between the physicians, and the patients.

Future systematic reviews should focus on the intervention strategies highlighted in this review. The studies should focus on interventions tailored to specific barriers. In addition, future studies should explore the effectiveness of each strategy (or a combination of strategies) for improving guideline use in primary care settings. The studies should provide essential details such as the cost-effectiveness and the applicability of the interventions in primary care settings.

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Appendix A: CASP Tool

Critical Appraisal Skills Programme

10 questions to help you make sense of qualitative research

1. Was there a clear statement of the aims of the research? **□Yes □Can't tell □No**

HINT: Consider

- What was the goal of the research?
- Why it was thought important
- Its relevance

2. Is a qualitative methodology appropriate? **□Yes □Can't tell □No**

HINT: Consider

- If the research seeks to interpret or illuminate the actions and/or subjective experiences of research participants
- Is qualitative research the right methodology for addressing the research goal?

3. Was the research design appropriate to address the aims of the research? **□Yes □Can't tell □No**

HINT: Consider

- If the researcher has justified the research design (e.g. have they discussed how they decided which method to use)?

4. Was the recruitment strategy appropriate to the aims of the research? **□Yes □Can't tell □No**

HINT: Consider

- If the researcher has explained how the participants were selected
- If they explained why the participants they selected were the most appropriate to provide access to the type of knowledge sought by the study

5. Was the data collected in a way that addressed the research issue? □**Yes** □**Can't tell** □ **No**

HINT: Consider

- If the setting for data collection was justified
- If it is clear how data were collected (e.g. focus group, semi-structured interview etc.)
- If the researcher has justified the methods chosen
- If the researcher has made the methods explicit (e.g. for interview method, is there an indication of how interviews were conducted, or did they use a topic guide)?
- If methods were modified during the study. If so, has the researcher explained how and why?
- If the form of data is clear (e.g. tape recordings, video material, notes etc.)

If the researcher has discussed saturation of data

6. Has the relationship between researcher and participants been adequately considered? □**Yes** □**Can't tell** □**No**

HINT: Consider

- If the researcher critically examined their own role, potential bias and influence during

(a) Formulation of the research questions

(b) Data collection, including sample recruitment and choice of location

- How the researcher responded to events during the study

and whether they considered the implications of any changes in the research design

7. Have ethical issues been taken into consideration? □**Yes** □**Can't tell** □**No**

HINT: Consider

- If there are sufficient details of how the research was explained

to participants for the reader to assess whether ethical standards were maintained

- If the researcher has discussed issues raised by the study (e.g. issues around informed consent or confidentiality or how they have handled the effects of the study on the participants during and after the study)

- If approval has been sought from the ethics committee

8. Was the data analysis sufficiently rigorous? **□Yes** **□Can't tell** **□No**

HINT: Consider

- If there is an in-depth description of the analysis process

- If thematic analysis is used. If so, is it clear how the categories/themes were derived from the data?

- Whether the researcher explains how the data presented were selected from the original sample to demonstrate the analysis process

- If sufficient data are presented to support the findings

- To what extent contradictory data are taken into account

- Whether the researcher critically examined their own role, potential bias and influence during analysis and selection

of data for presentation

9. Is there a clear statement of findings? **□Yes** **□Can't tell** **□No**

HINT: Consider

- If the findings are explicit
- If there is adequate discussion of the evidence both for and against the researchers arguments
- If the researcher has discussed the credibility of their findings (e.g. triangulation, respondent validation, more than one analyst)
- If the findings are discussed in relation to the original research question

10. How valuable is the research?

HINT: Consider

- If the researcher discusses the contribution the study makes to existing knowledge or understanding e.g.do they consider the findings in relation to current practice or policy?, or relevant research-based literature?
- If they identify new areas where research is necessary
- If the researchers have discussed whether or how the findings can be transferred to other populations or considered other ways the research may be used

How to use your Asthma Diary

Symptoms

Write your symptoms

1 = mild

2 = moderate

3 = severe

Medications

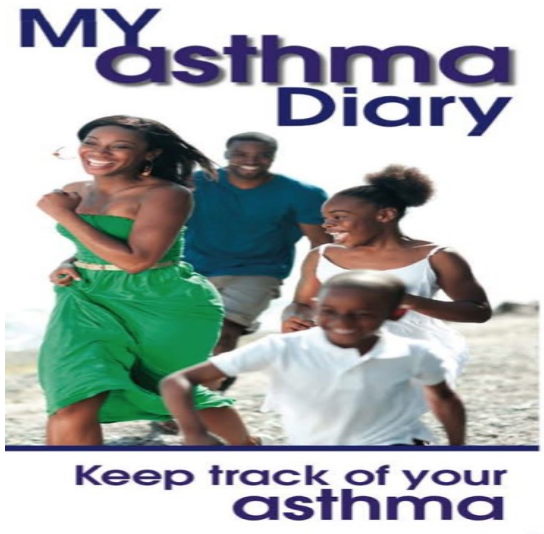
- List medications you are on
- Mark every time you take medication

Peak Flow Meter

- Write the best of three readings every morning and night

Asthma Triggers

- List your known and suspected asthma triggers
- Place a check mark whenever you are in contact with triggers



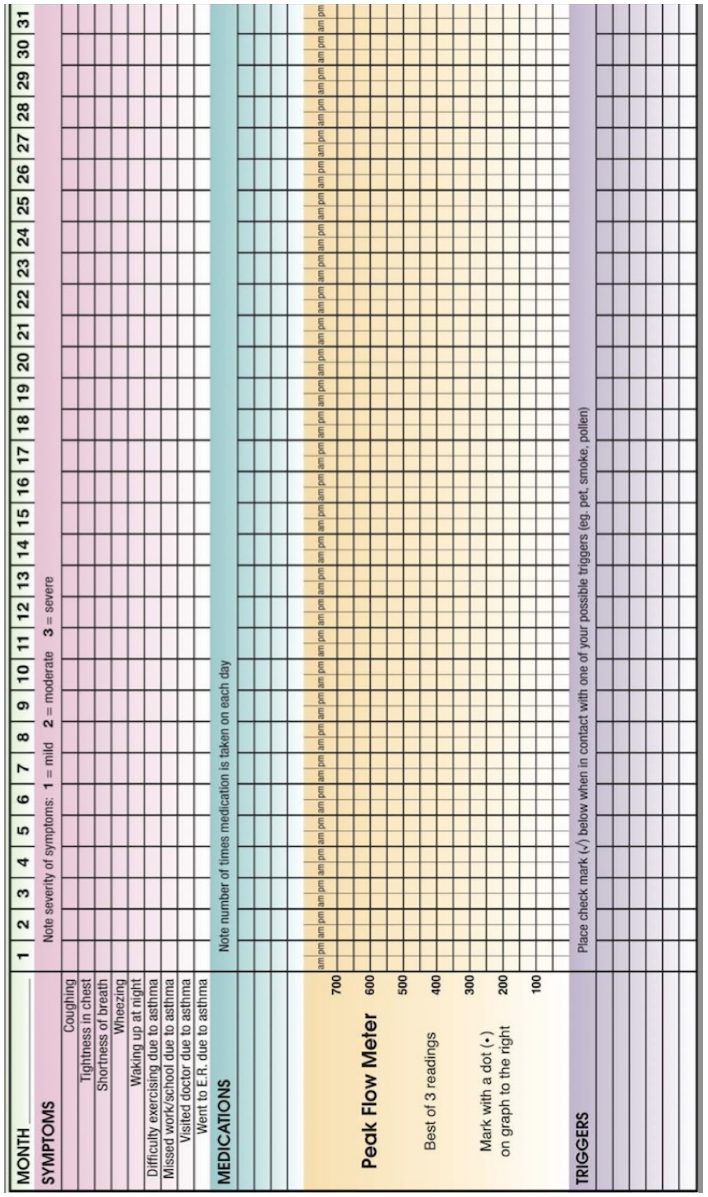
What is an asthma diary?

An asthma diary is a form that allows you to track:

- Asthma symptoms

Benefits of using an asthma diary

- Healthcare provider and you can have a clear picture of your asthma control
- It will help you determine if treatment plan is effective
- Tracking triggers will help you



Asthma Calendar

(Ontario Lung Association, 2015)

Asthma Action Plan

Step 1	What to look for	Controlled Asthma	Uncontrolled Asthma	Dangerously Uncontrolled Asthma
	Physical activity	Normal	Some interruption	Difficulty talking
	Reliever use	Less than 4x/wk		Reliever doesn't work as usual or relief lasts less than 2 hours
	Daytime symptoms	Less than 4days/wk	4 or more days/wk	All the time
	Nighttime symptoms	Less than 1 night/wk	4 or more nights/wk	Every night
	Peak flow rates	Greater than ___	Between ___ and___	Less than ____
Step 2	What is my level of asthma control?	If all symptoms are in green zone = well controlled	If some symptoms are in yellow zone and none in green zone	If you have any symptoms in red column, your asthma is dangerously controlled
Step 3		Follow your current plan • ---------- • ----------	Make an appointment to see your primary healthcare provider	Seek Immediate Medical