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A CAUSAL MODEL OF ASTHMA CONTROL IN ADULTS WITH ASTHMA

PATCHANOK WITHEETHAMMASAK

Burapha University

2022

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A CAUSAL MODEL OF ASTHMA CONTROL IN ADULTS WITH ASTHMA

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Asthma control is the goal of asthma management to prevent exacerbations and minimize morbidity. Currently was reported poor control and not achieved asthma management goal. The purpose of this study was to develop and test a causal model of asthma control among adults with asthma. A sample of 336 participants was recruited from asthma and COPD clinics in tertiary hospitals in eastern Thailand. Data were collected by self-administered questionnaires including the Demographic data form, the Brief illness perception questionnaire, the Depression subscale of Hospital Anxiety and depression Scale, the Job Stress Scale, the Functional, Communicative, and Critical Health Literacy Scale, the Self-efficacy subscale of the Knowledge, Attitude, and Self-efficacy Asthma Questionnaire, the multidimensional scale of perceived social support, the Asthma Self-Management Behavior Instrument, and The asthma control questionnaire. AMOS software program was used to test the model of asthma control.

The results showed that the final model of asthma control consisted of illness perception, depression, job stress, health literacy, asthma self-efficacy, social support, and asthma self-management behaviors, which explained 54% of the total variance for asthma control (R^2=.54). Asthma self-management behaviors and job stress had a direct effect on asthma control, whereas asthma self-efficacy, social support, and asthma self-management behaviors were a moderator between illness perception, depression, job stress, health literacy, and asthma control. These findings suggest that nurses should develop nursing interventions to improve asthma control by reducing depression and job stress and promoting illness perception, health literacy, asthma self-efficacy, social support, and asthma self-management behaviors.

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Patchanok Witheethammasak

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CHAPTER 1
INTRODUCTION

Statement and significance of the problems

Asthma is an important chronic non-communicable disease [NCD] that contributes negatively impacts to individual, family, and health care system. It was estimated that approximately 262 million people currently diagnosed with asthma and resulting death of 461,000 cases in 2019 (World Health Organization [WHO], 2021). The prevalence of asthma is on the increase worldwide. Asthma affects between 1-18% of a country's populaction (Global Initiative for Asthma [GINA], 2021). If immediate action is not taken, the number of asthma deaths will increase in the next decade (WHO, 2017). In Thailand, asthma is a significant public health problem and trending upward (Thai Asthma Council, Thoracic Society of Thailand Under Royal Patronage, The Allergy, Asthma, and Immunology Association of Thailand, The Royal College of Family Physicians of Thailand [TAC], 2019). From 2017 to 2018, the incidence of asthma grew from 190.17 to 206.54 per 100,000 population, respectively (Bureau of Policy and Strategy, Ministry of Public Health, 2018). Asthma accounts for 7.8% of Thai people between 18-60 years of age (TAC, 2019).

Asthma usually develops during childhood and continue into adulthood; it can also begin in adulthood (Sood et al., 2013; Tan et al., 2016). Adults with asthma often have severe disease and high mortality (Centers for Disease Control and Prevention [CDC], 2018; Trivedi & Denton, 2019). Although asthma affects people of all ages, the severity of asthma in adults is greater than in younger people and progresses more rapidly because of impaired lung functioning and more fixed airflow obstruction (Trivedi & Denton, 2019). Adults with asthma have reduced anti-inflammatory agents, causing severe inflammation of the bronchi (Kuruvilla, Lee, & Lee, 2019; Tan et al., 2016). As people age, their lungs and chest walls stiffen, and the muscles supporting deep breathing weaken (Tan et al., 2016; Trivedi & Denton, 2019). Adults with asthma rarely go into remission, and the disease is frequently more severe and progressive, contrasting with childhood asthma that is common and usually mild (Maestrelli, 2004; Trivedi & Denton, 2019). Symptoms in adults with

asthma are typically persistent, complex, and often occur in clusters, such as difficulty breathing, coughing, and chest pain (GINA, 2021; Holgate & Polosa, 2006). This contrasts with children who usually have only one symptom. The vast majority of deaths from asthma occurs in adults (Greener, 2010). Adults die from asthma nearly four times than children (CDC, 2018).

Asthma is a chronic airway disorder characterized by varied and recurring airway inflammation and hyperresponsiveness. As a result, bronchoconstriction, airway-wall edema, and excessive mucus secretion contribute to airway obstruction and symptoms, such as wheezing, shortness of breath, cough, and chest tightness, particularly at night or in the early morning (Bernstein & Levy, 2014; Fuhlbrigge et al., 2012; GINA, 2021). Both symptoms and airflow limitation may resolve spontaneously or in response to medication, and they may be absent for weeks or months at a time (GINA, 2021). A progressive increase in asthma symptoms that signifies a departure from a person's usual condition is known as an asthma exacerbation event (GINA, 2021). Exacerbation appears most frequently in reaction to a trigger agent and inadequate adherence to controller medication. A significantly higher risk of asthma exacerbation is associated with poor asthma control (GINA, 2021; Meltzer et al., 2011; Schatz et al., 2012). Asthma exacerbation may contribute to heart failure and mortality. Those who have experienced an asthma exacerbation and received care at an emergency department or during a hospitalization must be closely supervised by health care providers (Jackson, Sykes, Mallia, & Johnston, 2011; TAC, 2019). While asthma cannot be cured, controlling asthma can enable adults with asthma to live a normal life and have a better quality of life (WHO, 2021). Therefore, asthma control is essential in adults with asthma.

Asthma control is the goal of asthma management to prevent exacerbations and minimize morbidity (GINA, 2021; Peters, Ferguson, Deniz, & Reisner, 2006; Quirt, Hildebrand, Mazza, Noya, & Kim, 2018). Asthma control is the extent to which the various manifestations of asthma have been reduced or removed by treatment (GINA, 2021). It includes controlling asthma symptoms and preventing the future risk of adverse outcomes, such as exacerbations (Reddel et al., 2009; GINA, 2021). People with well-controlled asthma can contribute to a reduction in their suffering caused by the symptoms, by decreasing the risk of exacerbation, hospitalization, and mortality

(Fernandes et al, 2014; Peters et al., 2006). Poor asthma control with asthma symptoms may be so severe that people must limit their activities and decide to use reliever medications (GINA, 2021; Meltzer et al., 2011). Over time, poor asthma control can lead to irreversible injury to the respiratory system that cannot be reversed; this is referred to as airway remodeling (Bernstein & Levy, 2014; CDC, 2018). Numerous studies have demonstrated that the burden of illness is not always related to asthma but rather to an inability to control the disease (Demoly et al., 2009).

Poor asthma control has a negative impact on an adult's physical, psychological, economic, and social well-being. Poorly controlled asthma with increased airway limitation causes hypoxia, which causes the cells to receive less oxygen that results in reduced daily activities (Ferreira, Brito, & Ferreira, 2010). Restrictions on activities that occur in adults with asthma, who are of working age, may require them to take leave or stop working for hospitalization, especially during exacerbations (Boonsawat et al., 2004). Working-age asthma patients have more recognition of the impacts of poor asthma control (Reddel et al., 2015). Activity limitations may also cause them to change their social and family roles by becoming more dependent. Adults with asthma often experience mood changes when they are short of breath, resulting in anxiety, feeling bored, disheartened, discouraged, depress, and becoming more dependent on others (Kumar, Bhat, & Kumar, 2013). There is a negative impact on their quality of life due to poor asthma control (Boussoffara, Keskes, Loukil, Touil, & Knani, 2017; Çoban & Ediger, 2018). The impact of poor asthma control is felt not only by adult patients but also by their families, healthcare systems, and society (Reddel et al., 2015). Moreover, asthma exacerbations in adults may be the cause of a social and economic burden that relates to the direct costs of family and health care utilization (Bahadori et al., 2009; Jackson et al., 2011).

According to the literature, most adults with asthma have poor asthma control and many have exacerbations requiring hospitalization (Boonsawat et al., 2015; Price et al., 2015; Rabe et al., 2004). Different levels of asthma control are not linked to geographic characteristics (Bellamkonda & Casale, 2014). In many countries, reported prevalence rates of ineffective asthma control levels in adult patients ranged from 51.0% (Çoban & Ediger, 2018) to 65.6% (Heinrichs et al., 2019). In Thailand, only 8% of the adults with asthma would be classified as having

effective controlled asthma, even if they have received treatment according to the guidelines. Uncontrolled asthma caused 44% of Thai adults with asthma to miss work (Boonsawat et al., 2015). Most Thai adults with asthma develop severe exacerbation that require an emergency room visit at least once per year. Each year, more than 100,000 Thai persons with asthma are hospitalized with exacerbations (Bureau of Policy and Strategy, Ministry of Public Health, 2018). In addition, 5% of all adults with asthma die from recurrent asthma symptoms (TAC, 2019) because of uncontrol asthma. Moreover, adults with asthma may become exhausted and discouraged from constantly trying to control their asthma. However, the complexity of managing asthma in adult patients requires individual efforts to achieve the goals for asthma control.

According to international guidelines, the current level of asthma control in adults worldwide has not achieved the long-term management goals (Viswanathan & Busse, 2019). In controlled research settings, the guideline for asthma control can be achieved and maintained among adults with asthma. However, current evidence indicates that a substantial number of those cannot achieve adequate asthma control in real clinical practice (Braido, 2013; Peters et al., 2007). In real life, most people with asthma still have poor asthma control (Boonsawat et al., 2015; Rabe et al., 2004). Little evidence showed the results of programs for managing asthma control such as educational programs or goal setting programs, only short-term outcomes were more likely arrived whereas unable of asthma control in long-term were reported (Aaron et al., 2017; Bäuerle, Feicke, Scherer, Spörhase, & Bitzer, 2017; Griffiths et al., 2016). It was question that the influencing factors of asthma control in adults may still need for further studying, especially the significance of self-management behaviors related to asthma control.

Based on a literature review, both internal and external factors influence successfully promoting asthma control in real life. Several cognitive variables were found related to asthma control including, perception of the illness, health literacy (Apter et al., 2013; Smits, Brigis, Pavare, Maurina, & Barengo, 2017), social support, and self-efficacy (Eilayyan, Gogovor, Mayo, Ernst, & Ahmed, 2015; Smyth, Zawadzki, Santuzzi, & Filipkowski, 2014). Adhering to essential self-management behaviors can lead to efficient asthma control (Kotses & Creer, 2010). Depression is

found as common in adults with asthma (Walters, Schofield, Howard, Ashworth, & Tylee et, 2011) and worsens asthma symptoms and treatment (Arpibanwana, Wattanakitkrileart, Pongthavornkamol, & Dejsomritrutai, 2018). Family may influence patient behavior and asthma control by family support (Kroger, 2015). As in adulthood, job may cause time constraints and stress, which aggravate asthma symptoms of persons with asthma (Miyasaka, Dobashi-Okuyama, Takahashi, Takayanagi, & Ohno, 2018).

To control asthma, both internal and external factors of adults with asthma may need to consider. Ryan and Sawin (2009) suggested that family should involve participating in taking care of patients with chronic illnesses. They postulated the individual and family self-management theory [IFSMT] and suggested that family may the life context that can influence behaviors of chronic disease patients. Family members may encourage patients to adhere to regimens, positive cognitive functions, and lifestyle modifications. The IFSMT consists of 3 dimensions, including context, process, and outcomes. The context dimension consists of risk and protective factors of individual and family that affect health status through process factors and proximal outcome. The process dimension is the factor that convinces a person to engage in recommended health behaviors such as self-efficacy and social facilitation. Constructs in the process dimension are linked to constructs in the context dimension, are internally related, and affect the outcome dimension. Proximal outcomes include self-management behaviors that are specific actions taken to manage the condition or improve health status that is a distal outcome of theory. Self-management is a task performed to handle clinical aspects of the disease outside of hospitals (Ryan & Sawin, 2009). Furthermore, self-management has been attributed to be an intervention technique in healthcare that encourages people to share in the responsibility for decision-making and to guarantee that necessary healthcare activities are implemented (Embrey, 2006; Kotses & Creer, 2010). The effective asthma self-management behavior is an important factor for adults with asthma to control over the illness (Ruengkajorn & Kittiwatanapaisan, 2011).

Essential self-management in adults with asthma includes symptom management, including daily symptom assessments; use of asthma action plans; medical management, such as adherence of medication and proper administration of

medication; and environment control, such as aware of indoor allergens (Fitzpatrick & Frey, 1993; GINA, 2019; National Heart, Lung, and Blood Institute [NHLBI], 2007). Appropriate and continuous self-management behavior will assist adults with asthma receive more benefit from treatment, allowing them to control their asthma. Consistent with the study of Jabeen, Zeeshan, Bano, Bari, and Rathore (2018) showed that high adherence to medication in asthma patients was significantly associated with well-controlled asthma ($p < .05$).

Eilayyan et al. (2015) found that self-efficacy was a significant predictor of perceived asthma control in adults ($\beta = 0.29$, $p < .001$). Adults with asthma with higher self-efficacy could be more motivated to adhere to and maintain medication regimens, have an increased level of effort they are willing to devote to their asthmatic management, and be more persistent when encountering difficulties (Holland, 2014; Talreja, Soubani, Sherwin, & Baptist, 2012). High self-efficacy will lead to increase self-management of the disease. For example, Holland (2014) found that the self-efficacy of adults with asthma was associated with self-management behaviors ($r = .49$, $p < .01$). In addition, self-efficacy reduces emotional strain, which contributes to the inflammatory processes in the respiratory tract (Vliagoftis, 2014). Airway inflammation exacerbates asthma symptoms, providing the patient unable to control their asthma. This is consistent with the study of Rhee, Wicks, Dolgoff, Love, and Harrington (2018), who found self-efficacy to predict better asthma control ($\beta = -0.098$, $p = .004$).

Social support has the greatest effect on the recipient's psychological health, especially emotional support (Greenwood, Muir, Packham, & Madeley, 1996). The source of emotional support includes family, friends, and significant others (Zimet, Dahlem, Zimet, & Farley, 1988). Increased perceived social support is associated with a reduction in negative mood and stress severity, which may be the direct factors that trigger asthma symptoms. Smyth et al. (2014) found that symptoms are reported to be fewer when there is a higher perceived social support even though stress is present. Heinrichs et al. (2019) found that low social support at work was associated with significantly poorer asthma control. Also, successful asthma self-management required more ongoing support to help adults with asthma understand and remember the complicated medical change of administrative information (Black et al., 2010).

Sin, Kang, and Weaver (2005) found that social support had significant positive relationships with asthma self-management behaviors ($r = .30$, $p < .05$).

Illness perception tends to correlate with poor asthma control (Kaptein et al., 2008; Smits et al., 2017). Adults with asthma may be unconcern about illness because asthma symptoms are not present all time. (Hagger & Orbell, 2003; Kaptein et al., 2008). Smits et al. (2017) showed that the more people with asthma perceived how their condition and sickness impacted their lives, the greater their chance is of achieving asthma control. Additionally, a person's perceptions of an illness affect their coping behaviors, which in turn influences self-management behavior. If adults believe that self-management is unsuccessful, they will attempt to alter their emotional and cognitive representations of sickness to regain control (Kaptein, Klok, Moss-Morris, & Brand, 2010). Sofianou et al. (2013) found that illness perception is significantly and strongly associated with self-reported adherence to controller medications in the asthmatic population (OR = 0.45, 95% CI = 0.23-0.86). Additionally, adults who believe that their disease is so severe that their treatment cannot improve may lack self-efficacy when fighting the disease symptoms (Magklara & Morrison, 2016). Katz, Yelin, Eisner, and Blanc (2002) showed less perceived control in asthma patients is associated with less asthma self-efficacy. Perceived control is assessed in terms of self-efficacy in social cognitive theory, which is defined as a person's belief or level of confidence in their ability to successfully complete a particular task (Williams & Rhodes, 2016). Personal control over illness perception has been strongly associated with asthma self-efficacy on the illness perception subscale ($r = .47$, $p < .001$; Broadbent, Petrie, Main, & Weinman, 2006).

Depression is more common in adults with asthma and is significantly associated with levels of social support (Adewuya & Adeyeye, 2017). A higher prevalence of depression has also been found in patients with asthma (Opolski & Wilson, 2005; Walters et al., 2011). Slattery and Essex (2011) found a longitudinal association between depression and the onset of asthma. It is possible that when perceived psychological asthma triggers are particularly difficult to control, they lead to worse asthma control (Vazquez, 2016). Arpibanwana et al. (2018) found a statistical relationship between depression and asthma control (OR = 19.13, 95% CI = 2.37-154.64). Also, depression, adherence to inhaled corticosteroids, smoking,

and comorbidity can all predict disease control in patients with asthma to a degree of 21.4% (R^2 = .21, p < .05). Additionally, depression reduces cognitive performance, energy, and motivation that might impair the effectiveness and compliance with asthma self-management (Lehrer, Feldman, Giardino, Song, & Schmaling, 2002; Verma, Thangaraj, & Mahajan, 2015). DiMatteo, Lepper, and Croghan (2000) discovered that adults with a chronic disease and depression are three times more likely than non-depressed adults to be noncompliant with medical management. Depression may also result in isolation from family and friends who may provide the necessary support for treatment adherence (DiMatteo, 1994).

Job stress of adults with asthma is a negative feeling caused by work conditions, which is a feeling of being under constant time pressure and work anxiety (Cooper & Marshall, 2013; Parker & DeCottis, 1983). Job stress may cause an eosinophilic airway inflammation that is strongly associated with poor asthma control (Miyasaka et al., 2018). Heikkilä et al. (2014) discovered that high job stress was related to an elevated incidence of severe asthma exacerbations in age- and sex-adjusted analyses (HR: 1.27, 95% CI: 1.00-1.61). The continuous nature of work with time pressures affects symptom monitoring and symptom management when symptoms occur in employees (Heinrichs, Vu-Eickmann, Hummel, Gholami, & Loerbroks, 2018). Job stress also affects self-management behavior (Shaw et al., 2014). For example, employees with asthma may worry about taking time off from work may result in the use of emergency ambulance services for asthmatic episodes (Heinrichs et al., 2018).

Lower health literacy in adults with asthma may potentially induce dangerous asthma attacks because of their being unaware of the warning signs. They may lack knowledge of how to monitor lung function, use inhalers improperly, and delay seeking early treatment (Mancuso & Rincon, 2006; Rosas-Salazar, Apter, Canino, & Celedón, 2012; Thai & George, 2010). Apter et al. (2013) demonstrated that better health literacy was linked with asthma control among adults with asthma (p < .001) and higher print literacy was linked with improved asthma control (β = -0.52, CI = -0.89 - -0.16). Low health literacy is a barrier to achieve asthma self-management. Low health literacy is related to less accurate metered-dose inhaler technique, decreased use of peak flow meters and asthma action plans, decreased

capacity to calculate peak flow zones, and decreased desire to participate in decision-making (Thai & George, 2010). Moreover, health literacy is correlated with self-efficacy among patients with chronic illness (Lee, lee, & Moon, 2016; Osborn, Paasche-Orlow, Bailey, & Wolf, 2011). Adults with asthma who have a higher degree of health literacy may have better access to resources and the ability to analyze and apply knowledge to their situation, resulting in increased self-management confidence.

At present, Thai adults with asthma receive treatment based on standardized guidelines of the Ministry of public health, but most of them still have poor asthma control. As a result, Eastern Thailand had an increased hospital admission with asthma (Strategy and Planning Division, Ministry of Public Health, 2016; 2018). Most studies have failed to improve asthma control, possibly because each study focused on managing only one aspect of asthma control (Aaron et al., 2017; Bäuerle et al, 2017; Griffiths et al., 2016). Previous studies only examined the relationships between asthma control and some selected factors. It was no evidence of study about simultaneously multiple influencing factors to asthma control. Therefore, the purpose of the study was to develop and test the model of asthma control in Thai adults with asthma. The researchers selected significant factors related to asthma control based on the IFSMT and empirical studies including illness perception, depression, health literacy, job stress, asthma self-efficacy, social support, and asthma self-management behaviors, which may directly or indirectly affect asthma control in adults with asthma.

Research objective

The objective of the study was to develop and test the causal relationships between illness perception, depression, job stress, health literacy, asthma self-efficacy, social support, asthma self-management behaviors, and asthma control among adults with asthma in Thailand.

Research hypotheses

1. Illness perception, depression, job stress, health literacy, asthma self-efficacy, social support, and asthma self-management behaviors have a direct effect on asthma control.

2. Job stress, asthma self-efficacy, and social support have an indirect effect on asthma control through asthma self-management behaviors.

3. Health literacy and illness perception have an indirect effect on asthma control through asthma self-efficacy and asthma self-management behaviors.

4. Depression has an indirect effect on asthma control through social support and asthma self-management behaviors.

Conceptual framework

This study was guided by the individual and family self-management theory [IFSMT] (Ryan & Sawin, 2009; 2014) and incorporated the literature review. The IFSMT focuses on management of complex health regimens in ways that reflect individual and family values and beliefs in personally meaningful ways (Ryan & Sawin, 2009). This theory helps to explain factors that influence individual and family self-management for better outcomes. The IFSMT proposes that self- management is a complex dynamic phenomenon consisting of three dimensions, including context, process, and outcomes (Ryan & Sawin, 2009; 2014).

The context dimension describes three main categories. First, the condition-specific category has subcategories that comprise the complexity of condition and treatment, trajectory and condition stability, and transitions. Second, the physical and social environment category has subcategories that involve physical and social, health care access, transportation, culture, and social capital. Third, the individual and family category has the subcategories of the developmental stage, learning ability, literacy, family functioning, and capacity to self-manage.

The process dimension of IFSMT describes three main categories. The first category is knowledge and beliefs. It has the subcategories of factual information, self-efficacy, outcome expectancy and goal congruence. The second category is self-regulation skills and abilities. Its subcategories are goal setting, self-monitoring and

reflective thinking, decision-making, planning and action, self-evaluation and emotional control. The third category is social facilitation. The subcategories are social influence, support, and negotiated collaboration.

The outcome dimension of IFSMT includes both proximal and distal outcomes. The proximal consequence is the actual participation in self-management behaviors pertaining to a condition, risk, or change. The proximal outcome dimension describes two main categories. These categories are the individual and family self-management behaviors and the cost of health care services. The distal outcomes are partially dependent on the achievement of proximal outcomes. The distal outcomes dimension has three main categories. These are health status, quality of life, and the cost of health.

In this study, asthma control among adults with asthma was influenced by context, process, proximal outcome. The contextual factors include related to illness perception, depression, job stress, and health literacy. These factors can be viewed as directly affecting asthma control, and indirectly through process factors, and proximal outcomes. Asthma has a variety of symptoms that have both rest and relapse phases. Negative illness perception in severity, uncontrol, and lack of understanding of asthma can lead to a lack of self-efficacy in management (Magklara & Morrison, 2016), and lower illness perception or accepting asthma as normal life may reduce self-management behavior (Bahçecioğlu & Çevikakyl, 2014). In addition, emotional perception as a result of illness can trigger asthma symptoms (Smits et al., 2017), that lead to poor asthma control. Depression causes them isolated from social support and reduced self-management (Adewuya & Adeyeye, 2017). High job stress increase induces airway inflammation and increased sensitivity to asthma triggers can induce asthma symptoms more severe and difficult to control (Rhee et al., 2018; Vliagoftis, 2014). Health literacy is also a factor that strengthens a person's confidence in decision-making or activities that may affect self-management behavior and asthma control (Thai & George, 2010).

Asthma self-efficacy and social support are process factors in the IFSMT. They were linked to constructs in the context dimensions and directly affect the proximal and distal outcomes. There are essential mechanisms for the process of self-management to affect a desirable outcome, and directly effect to asthma control.

Self-efficacy in adults with asthma helps to control asthma, so they may perform various activities to reduce emotional pressure that may trigger exacerbation as a sign of poor asthma control. Asthma self-efficacy results in people being aware of their power in managing and controlling asthma symptoms (Eilayyan et al., 2015). Illness perception and health literacy are contextual factors played a role in enhancing self-efficacy. Social support, as an aspect of emotional support, is the perception that family, friends, or significant others assist adults with asthma to practice self-management behaviors and influence asthma control (Heinrichs et al., 2018; Sin et al., 2005). Reduced negative mood, such as depression, has been associated with a decreased perception of social support that becomes a direct psychological factor to trigger asthma symptoms (Smyth et al., 2014).

In addition, the IFSMT displays relationships between proximal and distal outcomes, with the success of proximal outcomes improving distal outcomes. The effective asthma self-management behaviors as a proximal outcome resulted in better asthma control. Achieving self-management behaviors, including adhering to medication, observing asthma symptoms, and avoiding triggers, will receive more benefit from treatment, allowing them to control their asthma (GINA, 2019; Jabeen et al., 2018).

As the limit of direct effects in the IFSMT, the researcher incorporated some direct relationships among variables in the hypothesized model from the literature review. The hypothesized model displayed cause-and-effect relationships as in Figure 1-1. The arrows represent the causal sequence that shows the expected direction of effects between illness perception, depression, job stress, health literacy, asthma self-efficacy, social support, and asthma self-management behaviors leading to asthma control in adults with asthma.

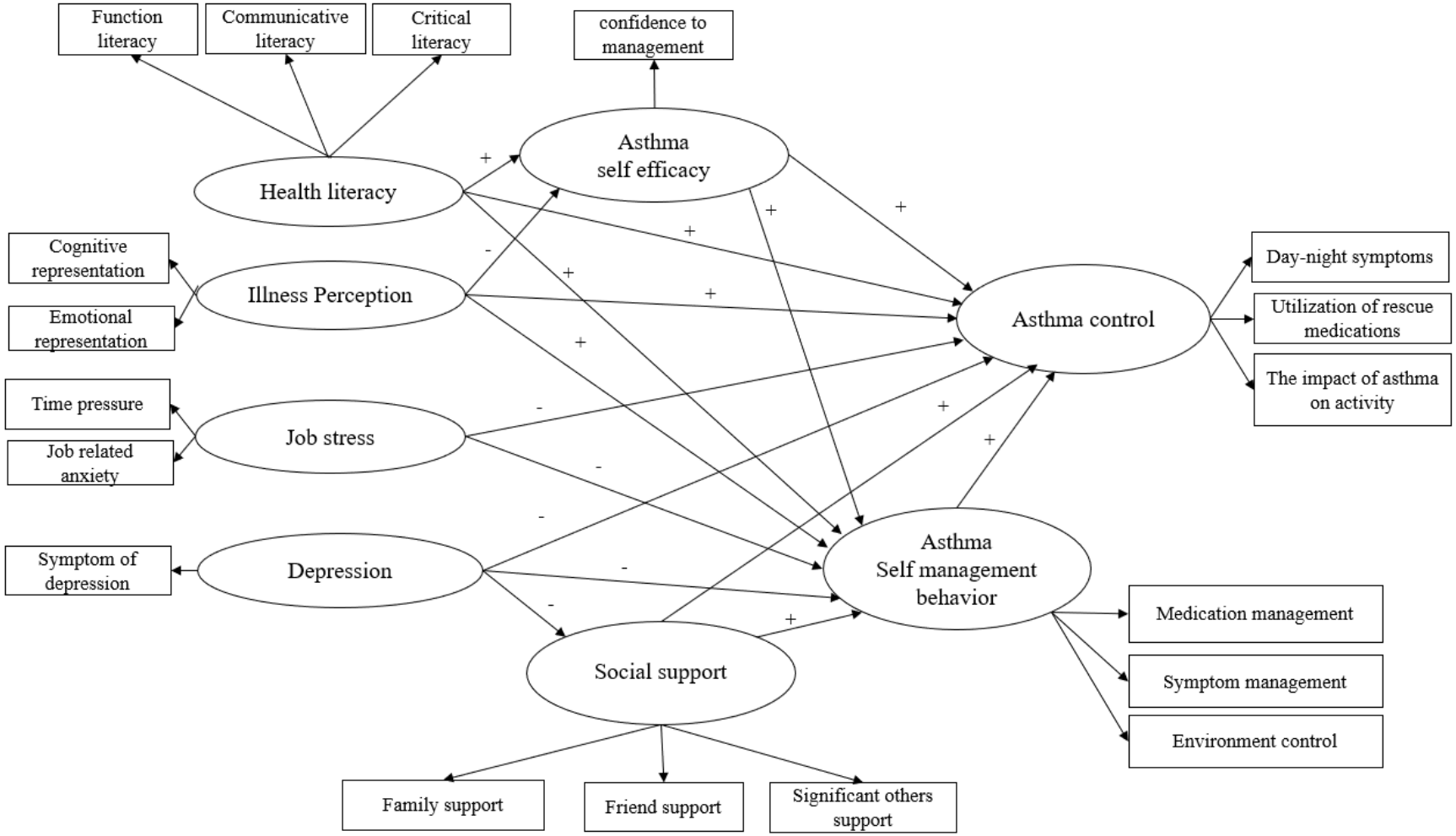


Figure 1-1 The hypothesized model of asthma control in adult persons with asthma

Scope of the study

This study tested the hypothesized model of asthma control in Thai adults with asthma. The population was adults with asthma who received treatments at an asthma and COPD clinic at the outpatient department located in a tertiary hospital in eastern Thailand. The data collection period was from August 2020 to February 2021.

Definition of terms

An adult person with asthma is defined as one aged 20-60 years who has been diagnosed with asthma disease by a physician for at least three months. They received treatments at the asthma and COPD outpatient clinics at a tertiary hospital in eastern Thailand.

Asthma control is defined as the degree to which the characteristics of asthma are visible in adults with asthma or have been decreased or eliminated by self-management behaviors. Asthma control comprises the following: a) asthma symptoms, b) utilization of rescue medications, and c) the impact of asthma on activity. Asthma control was measured by The asthma control questionnaire [ACQ], a six-item version in Thai (Juniper, O'Byrne, Guyatt, Ferrie, & King, 1999).

Illness perception is defined as the extent to which adults with asthma perceive the presence of their disease. It is identified within a) cognitive representation and b) emotional representation. Illness perception was measured using the Thai version of the brief illness perception questionnaire [Brief IPQ] (Sowattanangoon, 2011).

Depression is defined as a specific alteration in experiencing depressive symptoms in asthma patients, such as feelings of loneliness, guilt and worthlessness, helplessness and hopelessness, appetite loss, and sleep disturbance. Depression was measured by using the Thai version of the depression subscale of the hospital anxiety and depression scale [HADS-D] (Nilchaikovit, Lotrakul, & Phisansuthidth, 1996).

Job stress is defined as the negative feeling caused by work conditions that create pressure and anxiety in adults with asthma. Job stress comprises a) time pressure and b) job related anxiety. Job stress was measured using the Thai version of the Job Stress Scale [JSS] (Jampong, 2016).

Health literacy is the ability to receive, process, and comprehend health information to make health and medical care decisions concerning asthma. Health literacy includes a) functional literacy, b) communicative literacy, and c) critical literacy. Health literacy was measured using the Thai version of the functional, communicative, and critical health literacy [FCCHL] scale (Maneesriwongul, 2013).

Asthma self-efficacy is defined as confidence regarding the capacity of adults with asthma to perform healthy activities following recommended guidelines for managing asthma. Asthma self-efficacy was measured using the Thai version of the subscales of self-efficacy in the knowledge, attitude, and self-efficacy asthma questionnaire [KASE-AQ] (Wigal et al., 1993).

Social support is defined as the perception of adults with asthma about the perceived availability of support. Social support contains sources from a) family, b) friends, and c) a significant other. Social support was measured using the revised Thai version of the multidimensional scale of perceived social support [r-T-MSPSS] (Wongpakaran, Wongpakaran, & Ruktrakul, 2011).

Asthma self-management behavior is defined as purposeful, healthy behaviors performed daily by adults with asthma to control asthma. The behaviors comprise the following: a) symptom management, b) medical management, and c) environment control. Self-management behaviors were measured by the Thai version of the asthma self-care practice instrument [AsSCPI] (Preechawong, 2004).

CHAPTER 2
LITERATURE REVIEWS

This chapter reviews evidence on asthma control in adult persons with asthma. The first part describes an overview of asthma, including definitions of asthma, pathophysiology of asthma, asthma in adulthood, asthma phenotypes, asthma severity classification in adulthood, and asthma treatment guidelines. The second part focuses on asthma control, including asthma control definitions, levels of asthma control, impact of poor asthma control, and situation of asthma control in Thailand and worldwide. The third part presents the conceptual framework of this study, which is the individual and family self-management theory. The fourth part presents the factors influencing asthma control such as illness perception, depression, job stress, health literacy, asthma self-efficacy, social support, and asthma self-management behaviors, the empirical findings supporting the relationships between the proposed factors and asthma control. The last part is a summary of the content from the literature review.

Overview of asthma

Definitions of asthma

Asthma is a prevalent chronic respiratory disorder that is complicated and characterized by variable and recurrent symptoms, bronchial hyperresponsiveness, airway obstruction, and an underlying inflammatory process (NHLBI, 2007; Bernstein & Levy, 2014). Chronic inflammation increases airway hyper-responsiveness resulting in recurrent bouts of shortness of breath, wheezing, coughing, and chest tightness that vary over time and intensity, as well as fluctuating expiratory airflow limitation (GINA, 2021; NHLBI, 2007). The pattern of symptoms that can occur can be acute and chronic conditions. These episodes are frequently caused by a widespread airway obstruction, which is usually reversible spontaneously or with treatment (Bernstein & Levy, 2014; Chansakhonporn, Chouychu, Phochanukun, & Kaewomtuang, 2013). The severity and frequency of these

symptoms vary according to individuals and might happen from hour-to-hour and day-to-day in different people (WHO, 2017).

Pathophysiology of asthma

Inflammation has a key role in asthma pathophysiology. As stated in the definition of asthma, airway inflammation is caused by the interaction of multiple cell types and mediators with the airways, which leads to the disease's pathophysiological features of bronchial inflammation and airflow obstruction, which cause recurrent episodes of shortness of breath, wheezing, and coughing. Airflow obstruction occurs frequently in asthma and is caused by a variety of abnormalities in the airways (Bernstein & Levy, 2014; Kudo, Ishigatsubo, & Aoki, 2013; NHLBI, 2007).

1. Bronchoconstriction is the narrowing of the airways and resultant obstruction of airflow. Bronchoconstriction happens rapidly during acute exacerbations of asthma to narrow the airways in response to various stimuli, including irritants or allergens. Acute bronchoconstriction from allergen-induced triggers is caused by mast cells generating and releasing a variety of mediators in response to activation substances such as histamine, leukotrienes, tryptase, and prostaglandins that directly contract the airway smooth muscles.

2. Swelling of the respiratory wall often leads to dyspnea in the later stages. The swelling is caused by the leakage of small blood vessel walls, causing the movement of cells that cause inflammation and secretion of mediators such as eosinophil, neutrophil, mast cells, and T-cells. These include edema, inflammation, increased mucus secretion, and formation of inspissated mucus plugs, as well as structural alterations to the airway smooth muscle, such as hypertrophy and hyperplasia.

3. Bronchial hyperresponsiveness is a term that refers to the smooth muscles of the asthmatic airway constricting in response to various stimuli. The mechanism of this phenomenon is still unknown. It is exacerbated further by excessive mucus production and mucosal edema, which enhance the degree of limitation caused by a given degree of smooth muscle constriction. Bronchospasm can be triggered by a variety of stimuli in different patients.

4. Airway remodeling involves activating many structural cells in the airways, leading to irreversible alterations and making the patient less responsive to

treatment. These structural alterations can include airway smooth muscle cell hypertrophy and hyperplasia, which are increased in mucous goblet cells in the airway epithelium with thickening of the sub-basement membrane, sub-epithelial fibrosis, and blood vessel proliferation and dilation. The repair process and its regulation are often significant events describing the disease's chronic nature and treatment response limitations.

Asthma in adulthood

Adults can develop asthma from an early age, or childhood-onset of the disease, and may occur in adulthood, or adult-onset. Many adult persons with asthma have had the disease since they were children. Numerous risk factors have been identified as predictors of asthma persistence into adulthood, including the degree of childhood illness, the occurrence of bronchial hyperresponsiveness, allergen exposure, atopy, and family history of asthma (Gustafsson & Kjellman, 2000). Recent findings from a research of bronchial biopsies taken from participants who had been suffering from asthma for more than three years indicate that asthma may continue throughout life, with more than half of children with asthma suffering from asthma in adulthood (Gerritsen, 2002). However, longitudinal studies indicate that around half of middle-aged persons with asthma began the condition in adulthood rather than childhood. In addition, the incidence of adult-onset asthma rises with age (Sood et al., 2013).

When an asthma exacerbation develops in adults with asthma, it is difficult to relieve and the disease is often more severe and more progressed than in children (Trivedi & Denton, 2019). Adult-onset asthma is less stable than childhood-onset asthma with more relapses and fewer remissions (Sood et al., 2013). Most asthma-related deaths from occur in adults, and nearly four times more adults have died from asthma than children (CDC, 2018). Adult-onset illness patients are also more likely than childhood-onset patients to experience a deterioration in lung function (Jamrozik, Knuiman, James, Divitini, & Musk, 2009). Adult asthma patients also have more severe symptoms than younger patients, and their condition progresses more rapidly, as evidenced by increased fixed airflow obstruction and decreased lung function (Trivedi & Denton, 2019). This may be caused by the fact that adults with asthma have reduced anti-inflammatory agents, causing severe inflammation of the bronchi

(Kuruvilla et al, 2019; Tan et al., 2016). Furthermore, by the time people reach the age of 20-25, their lungs have matured. After that, it is common for lung function to diminish as people age gradually. Because the muscles that assist deep breathing weaken as the lungs and chest walls stiffen, aging can make breathing slightly more difficult (Kudo et al., 2013; Tan et al., 2016; Trivedi & Denton, 2019). Additional risk factors for death include a history of near-fatal asthma, emergency department visits or hospitalizations for asthma in the past year, non-adherence to inhaled corticosteroids, current or recent oral corticosteroid use, the absence of a written asthma action plan, a history of psychiatric disease, and the presence of comorbid food allergy (D'Amato et al., 2016). Therefore, asthma control is an important goal in asthma treatment to reduce the mortality and morbidity rates of adult patients.

Asthma severity classification in adulthood

Once asthma has been identified, the next step is to classify asthma severity, because asthma treatment is stepped up and down based on severity. The classification of asthma severity is determined by its clinical manifestations prior to treatment. Asthma severity is divided into four categories including intermittent, mild persistent, moderate persistent and severe persistent asthma (NHLBI, 2007; TAC, 2019).

Intermittent asthma is defined by the presence of daytime symptoms occurring less than once a week, nighttime symptoms occurring less than twice a month, exacerbations that are brief and have little effect on activity or sleep, and short-acting 2-agonist [SABA] use that occurs less than twice a week with pulmonary function test results showing forced expiratory volume in one second [FEV_1] or Peak expiratory flow [PEF] no less than 80% of prediction with variability of less than 20%.

Mild persistent asthma is defined by the presence of daytime symptoms occurring more than once a week, but less than once a day, nighttime symptoms occurring more than twice a month, exacerbations that impair activity or sleep, use of SABA twice a week or more, and the pulmonary function test results showing FEV_1 or PEF no less than 80% of the prediction with variability 20-30%.

Moderate persistent asthma is defined by the presence of daily daytime symptoms, night-time symptoms occurring more than once a week, exacerbations that

impair activity or sleep, daily usage of SABA, and pulmonary function test results showing FEV_1 or PEF 60 - 80% of the prediction with variability of more than 30%

Severe persistent asthma is defined by the presence of daily daytime symptoms, frequent night-time symptoms, frequent exacerbations that impair activity or sleep, daily usage of SABA, and pulmonary function test results showing FEV_1 or PEF of no more than 60% of the prediction with variability of more than 30%.

When a patient is already receiving therapy, the severity of the condition is determined by the clinical characteristics present as well as the steps of the patient's existing daily medication regimen. The patient would be classified in the highest severity group possible based on the occurrence of any clinical characteristics. Severity levels might fluctuate in patients as a result of asthma control. Asthma patients with severe persistent asthma should exhibit only minor intermittent symptoms when successfully managed.

Guidelines for treatment of asthma

Based on current knowledge, inflammation is believed to be the main cause of asthma. Therefore, reducing inflammation by using inhaled corticosteroids is the main drug for asthma treatment, because it can reduce inflammation effectively with minimal side effects. Short-acting bronchodilators are used to alleviate and control acute exacerbations of asthma. The goal of treatment is to control asthma, then adjust the treatment in order to use as little medication as possible to control asthma (Chansakhonporn et al., 2013; GINA, 2021; TAC, 2019).

The three primary categories of pharmacological solutions for long-term asthma treatment are as follows:

1. Controller medicines are used to minimize airway inflammation, regulate symptoms, and reduce future hazards such as exacerbations and lung function reduction. In asthma patients with mild persistent asthma, controller treatment may consist of as-needed low-dose ICS-formoterol administered when symptoms arise and prior to exercise.

2. Reliever or rescue medications are used for all patients on an as-needed basis to alleviate breakthrough symptoms, particularly those associated with deteriorating asthma or exacerbations. Patients are also advised regarding short-term prevention of bronchospasms from exercise. Reducing the requirement for reliever

treatment is the main goal in asthma management and effective asthma treatment measurement.

3. Add-on therapy may be used for individuals with severe asthma who continue to have symptoms or exacerbations, despite receiving optimal treatment with high-dose controller medicines, high-dose LABA and ICS, and management of modifiable risk factors.

Asthma treatment guidelines for controlling asthma and reducing future risks begin with assessing the patient, adjusting treatment plans as necessary, and reviewing the patient's response to previous treatment. Medication is adjusted from treatment levels and response evaluations for 3-6 months. However, the factors affecting asthma control need to be considered before adjusting the level of asthma control drugs. For instance, whether the patients use the drug incorrectly, do not use controlled medication regularly, and avoid stimulating factors need to be considered.

Asthma control

Definitions of asthma control

Asthma control is described as the amount to which certain asthmatic signs have been minimized or eliminated by treatment. According to international gridlines, the primary goal of asthma management should be to achieve the best possible asthma control. These two components are the symptom control of asthma, which is determined by factors such as symptoms and the patient's ability to perform daily activities and reach an optimal quality of life. The future risk of adverse outcomes, including risk factors for exacerbations, risk factors for developing the fixed airflow obstruction, and risk factors of medical side-effects (GINA, 2021; Reddel et al., 2009).

Levels of asthma control

The assessment of asthma control levels consists of evaluating two components, asthma symptom control and risk factor assessment (Chansakhonporn et al., 2013; GINA, 2021; Reddel et al., 2009).

1. The assessment of asthma symptom control is as follows: shortness of breath, wheezing, coughing, and chest tightness, all of which are common asthma symptoms that vary in intensity and frequency and add to the patient's asthma burden.

In addition, poor symptom control is closely linked to an increased risk of asthma exacerbations. Therefore, the questions about asthma control should be asked following the preceding four weeks to evaluate symptom control. The assessment can classify patients into three groups, patients who well controlled, partly controlled, and uncontrolled (GINA, 2021) as shown in Table 1 below.

Table 2-1 Assessment of asthma symptom control in adults (GINA, 2021)

In the past 4 weeks, has the patient had:	**Level of asthma symptom control**		
	Well Controlled	**Partly Controlled**	**Uncontrolled**
1. Daytime asthma symptoms more than twice/ week 2. Any night waking due to asthma 3. Reliever needed for symptoms more than twice/ week (Based on SABA reliever) 4. Any activity limitation due to asthma	None of these	1–2 of these	3-4 of these

2. Risk factor assessment: Risk factors for poor asthma outcomes should be evaluated to determine the treatment and management for asthma control. Risk factors are the future risk of adverse outcomes, including risk factors for exacerbations, risk factors for developing fixed airflow obstruction, and risk factors of medical side-effects.

2.1 The main risk factor for exacerbations is having uncontrolled asthma symptoms. Even in patients with limited symptoms, there are additional potentially modifiable risk factors for exacerbations including the following: medications (high dose of SABA use, not prescribed or poor adherence to inhaled corticosteroids), comorbidities (obesity, chronic rhino sinusitis, GERD), exposure to asthma triggers (smoking, air pollution, allergen exposure if sensitized), major psychological or

socioeconomic problems, poor lung function, and additional significant independent risk factors for exacerbations, including previous intubation or admission to an intensive care unit for asthma or severe exacerbation in the previous 12 months.

2.2 The risk factors for establishing persistent airflow limitation in asthma patients may hasten lung function decrease and lead to non-reversible airflow limitation. This is typically associated with more chronic dyspnea. Independent risk factors for persistent airflow limitation have been found to include lack of inhaled corticosteroid treatment, exposure to cigarette smoking or noxious agents, preterm birth, and chronic mucus hyper secretion.

2.3 The risk factors for medication side-effects may be minimal, because there are many drugs to choose based on the balance between benefits and risks. The majority of people who take asthma drugs do not have any negative side effects. However, the chance of adverse effects increases when pharmaceutical dosages are increased. Systemic side effects are associated with long-term or high-dose ICS. Local side effects of ICS include oral thrush and dysphonia, which can occur when using a high-dose or strong inhaled corticosteroids or incorrect inhaler use. Possessing any of these risk factors enhances the risk of future asthma progression in patients. Although patients may have only a few asthma symptoms or only one risk factor, they may not be able to control asthma.

Impacts of poor asthma control

Asthma is a chronic condition that requires long-term management. The goals of treatment are only to control the symptoms of the disease and reduce risk factors in the future, so patients can continue their daily lives as much as normal people. Asthma affects the daily lives of patients physically, mentally, economically and socially. Those are discussed as follows:

1. Physical impact

Asthma patients have chronic symptoms and may have intermittent or infrequently appearing symptoms. Asthma exacerbation can impact the physical health of patients. Asthma symptoms such as dyspnea, wheezing, coughing, chest tightness, and nighttime awakening due to coughing or wheezing can deteriorate the health. Patients with asthma suffer from symptom occurrence (Chansakhonporn et al., 2013). Airway obstruction causes hypoxia, which causes the cells to receive less

oxygen. The bodies of patients lose more energy from metabolism. Asthma patients are tired and fatigued, resulting in reduced daily activities (Ferreira et al., 2010). In addition, people with asthma have higher allergic sensitivity, poorer lung function, and much lower quality of life (Smith et al., 2017). Certain people with asthma may have remodeling that alters the anatomy of the airways, including cell damage, fibrosis, and hypertrophy of the smooth airway muscles, resulting in permanent airway blockage (Chansakhonporn et al., 2013; NHLBI, 2007). Asthma typically affects the lungs, but it can have a direct and indirect impact on brain function. Asthma severity and exacerbation are important factors, with severe asthma causing the most cognitive deficits (Irani, Adib, Halaby, & Sibai, 2019).

2. Psychological impact

Chronic conditions such as asthma can impact emotional health and increase psychological complications. Suffering asthma complications is associated with breathing disorders, which can affect the mind and feelings of the patient. Asthma patients often experience mood changes when they are suffering from shortness of breath, resulting in anxiety, ennui, disheartened feelings, discouragement, depression, and more dependence on others (Lavoie et al., 2006). Patients may think they are burden to family and society, resulting in lower self-esteem. However, when symptoms are sudden and uncontrollable, such as frequent coughing, wheezing, and shortness of breath, the results are changes in the image of the patient (Kullowatz, Kanniess, Dahme, Magnussen, & Ritz, 2007). Additionally, there is a strong correlation between psychological discomfort and asthma (Van Lieshout & MacQueen, 2012).

3. Economic impact

Asthma is a chronic disease that needs constant and consistent treatment. The occurrence of asthma in adults of working age, may require patients to take leave or stop work to follow up with doctor's appointments. Some patients who have asthma exacerbations need to stop working for hospitalization (Boonsawat et al., 2004). Asthma patients may lose income from absence. They also have to pay for medical expenses, traveling to hospitals, medication, and other emergency expenses. Patient incomes may not be sufficient for both their lifestyles and their families (Ward et al., 2002). Furthermore, the social and economic burdens of asthma exacerbations are

linked to the direct costs of health-care utilization in the country (Bahadori et al., 2009; Jackson et al., 2011). Asthma causes depletion of both personal and government budgets.

4. Social impact

Asthma can result in decreased engagement in the workforce, sports, and other leisure activities (Andrew & Booth, 1991). Asthma patients are often restricted due to illness from heavy activities that can cause symptoms of asthma. Some patients are afraid they will develop exacerbations when they engage in too much activity, causing them to decide not to do those activities. Illness with asthma causes the patient to become less involved in social activities. Changing social roles may allow patients to participate in limited social activities or decide to isolate themselves from society (Di Marco, Santus, & Centanni, 2011). Some patients also change their roles within the family, resulting in increased family dependency. Changing roles within the family that can cause problems in family relationships (Bruzzese, Fisher, Lemp, & Warner, 2009).

Situation of asthma control in thailand and worldwide

Concerning clinical practice in caring for asthma patients, each country has developed guidelines for treating asthma patients based on international guidelines. The goal of compliance with the guidelines is that patients have good asthma control. Nevertheless, the present degree of asthma control in adults worldwide has not been achieved through the long-term management goals of international guidelines (Viswanathan, & Busse, 2019).

A study by Rabe et al. (2004) conducted in 7,786 adults and 3,153 children in 29 countries in America, Europe, and Asia showed that the level of asthma control worldwide does not achieve the goals for management in guidelines for international asthma care. A significant proportion of patients continue to report high daytime symptoms, ranging from 50 % in Japan to 71% in Central and Eastern Europe, as well as high nighttime wakening, ranging from 36% in Western Europe to 59 % in Central and Eastern Europe. Patients report that asthma restricts regular physical activity, ranging from 17% in Japan to 68.2% in Central and Eastern Europe. It can be concluded, therefore, that there are still many patients with poor asthma control, even after receiving international guidelines.

Previous surveys of asthma care in Thailand have revealed unsatisfactory management and poor control (Boonsawat et al, 2004). Several editions of the Thailand National Asthma Guidelines have been distributed to aid with asthma management. Boonsawat et al. (2015) surveyed to determine whether there were any improvements in asthma control among asthma patients aged 12 years and over. Data were collected from 400 asthma patients out of 8,177 screened households. According to the findings, 92% of participants had poor asthma control, 44% of participants reported symptoms during the day and 34% reported experiencing nighttime symptoms at least once a week in the preceding four weeks. Furthermore, 36% had had exacerbations in the previous year, 17% had been hospitalized and 35% had had an unscheduled emergency visit. It may be concluded that existing asthma care practices are insufficient to increase the effectiveness of asthma control among adolescents and adults in Thailand and abroad.

Although each country has standardized care guidelines for patients with asthma, the patients still have poor asthma control. The current level of asthma control worldwide does not achieve the long-term management goals in international guidelines, especially in adults with asthma (Braido, 2013; Peters et al., 2007; Rabe et al., 2004). Therefore, there is a need to study or develop guidelines for effective care in adults with asthma in real life for the long term.

Based on a review of the literature, a few researches aimed to develop management interventions to increase asthma control in adults and were conducted in long-term studies. Most studies are evaluated shortly after the end of the intervention, which might have resulted in positive outcomes. Research with long-term follow-up after the end of the intervention is rare. However, these researches show that, after the intervention is completed for a long time, patients still have poor asthma control. Some studies have found that asthma control levels are no different from those without interventions or groups receiving standard care only.

The study of Bäuerle et al. (2017) aimed to improve and assess an adult asthma patient education program. The study was a single-center prospective controlled trial conducted at an inpatient rehabilitation facility. The control group (n = 215) received standard lecture-based instruction, whereas the intervention group (n = 209) received a customized patient education program aimed at improving

asthma self-management skills. The sessions included practicing guidelines and information about asthma to foster medication adherence and promote self-help management strategies. Correct inhalation and peak-flow measurement techniques, and score interpretation were practiced. In addition, having a detailed personal written action plan of an asthma exacerbation was critical. Data were assessed at the time of admission, discharge, and six and twelve months afterwards. The findings revealed that statistically significant improvements in asthma control were sustained in the intervention (OR = 1.6, 95% CI = 0.8 - 2.3) and control groups (OR = 1.9, 95% CI = 1.3–2.6) at 12 months. However, there were no significant differences in asthma control between the groups (p = .61). According to the descriptive analysis of the asthma control test [ACT], asthma control rose from 5% at admission to around 10% at 12 months post-discharge (p < .001) in both groups.

The study of Griffiths et al. (2016) had the objective of examining a culturally specific education program aimed at reducing unplanned care for South Asians with asthma in the United Kingdom. The study was a 12-month, cluster randomized controlled trial set in two east London boroughs in 105 asthma patients with a mean age of 25 years. The participants in the intervention group saw an asthma specialist nurse. The nurse provided consultation with the patients, emphasizing the delivery of critical asthma messages and agreement on short- and long- term asthma goals. Patients were provided with a written asthma self-management strategy. To improve asthma specialist nurses' follow-up in primary care, the nurse referred patients to their physicians or practice nurses who had completed the physician asthma care education program. A chronic disease self-management program was also recommended to patients by specialists. The control group received standardized structured consultation only. There were no self-management plans supplied, nor were follow-up appointments planned. Three months after the intervention, the participants had improvements in symptoms on the North of England Scale (OR = -0.64, 95% CI = -1.55-0.28), although there were no significant differences between groups. Twelve months following the intervention, these differences had waned and were no longer statistically significant.

Aaron et al. (2017) studied the impact of goal-setting and goal attainment methods on asthma outcomes. The data came from a randomized clinical trial in

which 212 African American adult women were assigned to the intervention group and 210 to the control group. The trial evaluated a telephone-based asthma self-management program. The program made extensive use of highly customized telephone counseling. The intervention was based on self-regulation ideas used in chronic disease treatment. During the first five sessions of the three-month intervention, the participants identified one short-term and one long-term goal. The goal-achievement tactics deemed most useful were determined retroactively during Session 6, which took place six months after Session 5. When clinical and demographic characteristics were adjusted by using a goal-achievement strategy, the result was that more goals were met during the intervention ($p < .001$). Uses and types of goal attainment methods and goals were not found to significantly affect asthma control ($p = .61$) in terms of frequency of nighttime asthma symptoms ($p = .85$) at the 2-year follow-up. Goal attainment alone did not translate into improved asthma outcomes in the sample for the study (Aaron et al., 2017).

Based on the evidence, practice guidelines were aimed at improving the level of asthma control in adults existing, but remained ineffective and unable to allow patients to control asthma as goals. Controlling the asthma of adult patients in real life involves other factors that affect asthma management. Therefore, it may be possible that the asthma control of patients has other factors that are more relevant. Good asthma control can be achieved with a personalized treatment plan that considers the many factors involved in achieving and maintaining this goal. Therefore, it is necessary to study the factors that influence asthma control in adults with asthma in Thailand, which is a rare topic of study.

Individual and family self-management theory [IFSMT]

Ryan and Sawin (2009; 2014) developed the individual and family self-management theory [IFSMT]. The theory hypothesizes that chronic condition management should be handled by the patients themselves or family members through engagement in healthy behaviors. The IFSMT builds on past work in the area of individual and family self-management, concentrating on individuals, couples in the family, or the family unit as a whole (Ryan & Sawin, 2009). The conceptual definition of IFSMT is the purposeful incorporation of health-related behaviors into

an individual or family's daily functioning. The family unit is not limited to biological families. The IFSMT prevents or attenuates illness or facilitates the management of complex health regimens in ways that reflect individual and family values and beliefs in personally meaningful ways (Ryan & Sawin, 2009).

This theory considers the contexts in which self-management occurs, as well as the process of self-management, and provides connections between the contextual and process dimensions. The IFSMT claims that self-management is a complex, dynamic phenomenon with three dimensions: context, process, and outcomes. Individual and family engagement in the self-management process is influenced by contextual factors, which also have a direct impact on outcomes. Improving the self-management process of individuals and families leads to better outcomes. While the outcomes of concern are those connected to individuals and families, improvements in personal and family outcomes transfer into better outcomes for healthcare practitioners and systems. Thus, these dimensions of this theory are described as follows (Ryan & Sawin, 2009; 2014):

1. Context dimension refers to risks and protective factors that affect the self-management process and outcome. This dimension explains three main categories, including condition-specific factor, physical and social environment, and individual and family factors as follows:

1.1 Condition specific is defined as a physiological, structural, or functional characteristic of the conditions, its treatment, or prevention of the conditions that impact the amount, type, and critical nature of behaviors required to maintain stability or transitional conditions. The category of condition-specific factors has three sub-categories, including complexity of condition and treatment trajectory, and condition stability-transitions.

1.2 Physical and social environment is defined as physical or social factors. The category of this factor has five sub-categories, including physical and social, health care access, transportation, culture and social capital.

1.3 Individual and family factors are defined as personal and family qualities that help or hinder self-management. The category of individual and family factors has five sub-categories, including the developmental stage, learning ability, literacy, family functioning and capacity to self-manage.

2. The process dimension refers to the dynamic management of chronic illnesses or risk factors through the application of knowledge and beliefs, self-regulation skills and abilities, and social facilitation. The process dimension leads to self-management behavior. This describes three main categories emphasizing knowledge and beliefs; self-regulation skills and abilities, and social facilitation.

2.1 Knowledge and beliefs are defined as factual information and perceptions about health conditions or health behaviors, including factual information, self-efficacy, outcome expectancy, and goal congruence.

2.2 Self-regulation is defined as the process used to change health behaviors including activities such as goal setting, self-monitoring and reflective thinking, decision-making, planning and action, self-evaluation, and emotion control.

2.3 Social facilitation is defined as the occurrence inside relationships that improves an individual's ability to change. including social influence, support and negotiated collaboration.

3. The outcomes dimension comprises proximal and distal outcomes, with the proximal outcomes resulting in the achievement of distal outcomes.

3.1 The proximal outcome is direct involvement in self-management behaviors toward specific conditions, risks or transition. The proximal outcome dimension describes two main categories, including individual and family self-management behaviors, and cost of health care services. The category of individual and family self-management behaviors has three sub-categories, i.e. engagement in activities and treatment regiments, symptom management and use of recommended pharmacological therapies. The cost category of health care service has no sub-categories.

3.2 The distal outcomes are partially dependent on the success of proximal outcomes. The distal outcomes dimension describes three main categories including health status, quality of life and cost of health. The category of health status has four sub-categories, i.e. prevention, attenuation, stabilization, worsening of the condition. The category of life quality has perceived well-being as a sub-category. The last category as the cost of health, which has direct and indirect costs as one sub-category.

According to the abovementioned, the interaction among dimensions is described as the factors in the context dimension affecting the capacity of individual and family to engage in the process dimension with direct influence on outcomes. The construction in the process is also linked to the construction in the context dimension. The process dimensions are connected and related to the context dimensions and also impact the dimensions of construction in the outcomes. Participation in self-regulation behaviors is linked to knowledge and specific health beliefs. Social facilitation is entwined with cognition, belief, and self-regulation. Engaging in supported self-regulation activities with sufficient knowledge results in participation in self-management behaviors or proximal outcomes. The outcome dimension constructs are influenced by both the context and process dimensions. At least two possible outcomes are proximal and distal with achievement of proximal outcomes causing, at least in part, distal outcomes (Figure 2-1).

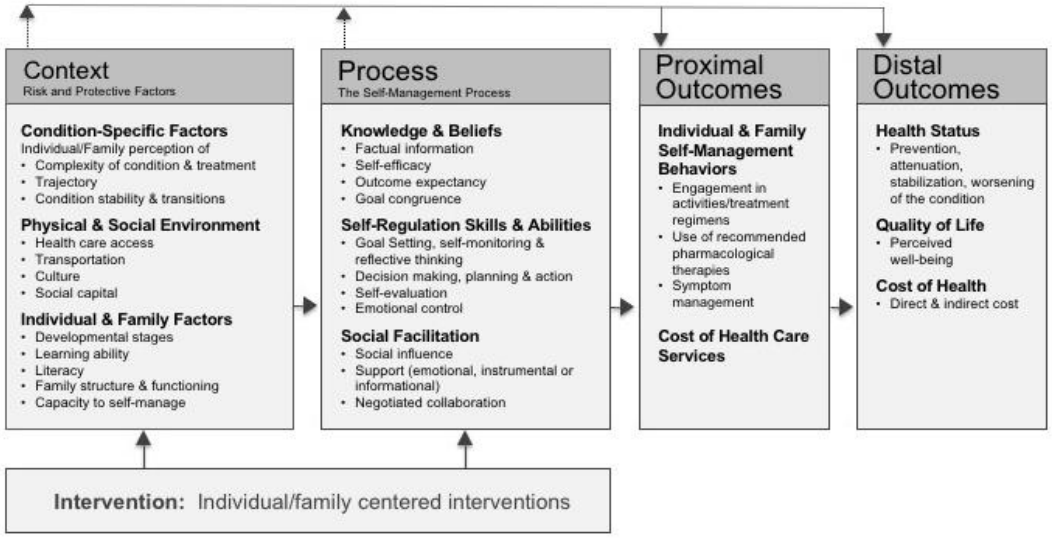


Figure 2-1 The individual and family self-management theory [IFSMT] (Ryan & Sawin, 2014)

The factors related to asthma control and obtained from literature reviews can be linked into networks to illustrate their relationships. The nursing theory used as a conceptual framework in this research should cover these factors and explain the

link between the causes of health outcome. The rationale of this study decided upon using the IFSMT. The IFSMT theory was the guide employing the hypothesized model of asthma control among adult asthma patients in this study.

Factors influencing asthma control

This study emphasized seven factors, including illness perception, depression, job stress, health literacy, self-efficacy, social support, and self-management behavior influencing asthma control among adult asthma patients. In the current study, the IFSMT was used as a research framework to demonstrate the causes of asthma control among adults with asthma. The literature review found the factors related to asthma control to include illness perception, depression, job stress, health literacy, asthma self-efficacy, social support, and asthma self-management behaviors. In-depth studies have found that these factors have both direct and indirect relationships with asthma control. In addition, there is a linking relationship between various factors before they affect asthma control, as presented below.

Illness perception

Illness perception refers to an individual's thinking about health problems and behavior (Leventhal, Brissete, & Leventhal, 2003). All over research literature, illness perception has been used interchangeably with terms such as illness representations, mental presentations, illness cognitions and common-sense representations (Broadbent et al., 2006; Weinman, Petrie, Moss-Morris, & Horne, 1996). The meaning of illness perception has been described by many researchers and referred as the way people understand and make sense of diseases or disabilities. Illness perception of patients with medical conditions refers to how specific beliefs of patients about medicines and treatment affect medication adherence and treatment decisions (Petrie, Jago, & Devcich, 2007). Patients construct their own personal cognitive representation of their illness, which includes ideas about what may have caused the illness, the impact the illness will have on their lives, how long the illness will stay, and whether it is curable or controllable. They also develop emotional responses to the threat in parallel. The term of illness perceptions refers to the cognitive and emotional representations of symptoms and diseases (Aujla et al., 2016).

Adult asthma patients are often confronted with physical problems and psychological stress such as uncertain feelings about the disease symptoms. To deal with the health problems of patients, they practice and generate their action plans, depending on their illness perception. Depending on the need of processes to manage their health problems, cognitive and emotional illness representations are constructed by the patients themselves. The patient's actions vary with the severity of illnesses. Although some patients may consider a disease as a minor condition, others may view it as a genetic condition. These differences may be very difficult to detect in routine assessments. However, illness perception is one factor helping people understand the ways patients manage asthma and asthma control (Hagger & Orbell 2003; Weinman et al., 1996).

Personal beliefs about illness include both cognitive and emotional representations. Cognitive beliefs include five core domains (Aujla et al., 2016; Leventhal et al., 2003) as described below.

1. The identity dimension is defined by the individual's perception of the signs and symptoms associated with the illness, as well as the label for the illness and symptoms, and it establishes the goals for change. Asthma is a chronic disease in which symptoms and severity are varied from person to person (WHO, 2017).

2. The timeline dimension indicates an individual's expectation for the initiation, duration, and recovery from a health threat Asthma is a disease that cannot be cured, but there is a show of asthma, both in the calm and recurrent stages (GINA, 2021; WHO, 2017), which may affect the perceptions of patients.

3. The consequences dimension is involved with one's perceptions of the disease's seriousness and its impact on daily life. Asthma is a chronic disease that has debilitating effects and increases the costs of health care. Asthma can also have a negative impact on a person's physical, emotional, social, or economic well-being (Greener, 2010; Miles et al., 2017).

4. A dimension is the individual's perception of the causes of illness and what the person believes might have been the reasons for his or her illness. Thus, there are a variety of causes of asthma and asthma exacerbations (GINA, 2019), which may affect people's perceptions of their ability to manage the causes and triggering factors (Kaptein et al., 2008).

5. The control dimension is the view of the illness's ability to be cured, prevented, or treated. Prolonged experience in controlling asthma may have an effect on decisions about managing asthma and its health outcomes. Some patients may not deal with asthma, because there is a view that here is nothing that can be done to better their condition (Kaptein et al., 2008).

All five dimensions describe cognitive representations that patients have about their illness. In addition, there is also an emotional response to illness, an awareness of emotions in the face of illness; these are negative reactions such as fear, anger, and stress. Emotional responses can also affect the management of illnesses (Leventhal et al., 2003). Patients create a conceptual framework of their illness, and emotional responses are processed concurrently with illness representations.

In terms of cognitive representations of illness perception in relation to illness outcomes of asthma patients, patients who recognize that asthma is not constant, but only when symptoms of asthma appear, can effectively identify patients who are not predisposed to think of their asthma as a chronic condition or to manage it as such (Kaptein et al., 2008; Hagger & Orbell, 2003). Patients with asthma for a long time may be able to accept the symptoms as normal and grow accustomed to the effects on the life of the patient, causing the symptoms to increase continuously without being resolved by the patient (O'Conor et al., 2017). In addition, the perception of the patients' high control ability makes the patients have positive health outcomes such as fewer asthma symptoms (Kaptein et al., 2008). The patients with fewer asthma symptoms are able to do normal activities and do not require emergency medication. In addition, emotional responses may directly stimulate the patient's exacerbations. Patients perceive the severity of emotions that affect the mind's ability to make patient aware of the psychological stimuli causing the patient to experience exacerbations or uncontrolled asthma (Bernstein & Levy, 2014; NHLBI, 2007).

Poor asthma control is linked to beliefs about cognitive and emotional illness perception characteristics (Bahçecioğlu & Çevikakyl, 2014; Smits et al., 2017). Patients frequently make treatment decisions based on their perceptions and opinions about the disease and its therapy. The study of Smits et al. (2017) showed that illness perception of more asthma impacts on patients' lives resulted in higher probability of poor asthma control (OR = 1.47, 95% CI = 1.31-1.65). On the contrary, the predicted

duration, concern, and emotional attachment to asthma all raise the likelihood of poor asthma control, while increased asthma control is associated with more favorable self-perception of asthma control (OR = 0.70, 95% CI = 0.61-0.79) and belief that current treatment is beneficial (OR = 0.84, 95% CI = 0.74-0.95). This finding is consistent with the study of Bahçecioğlu and Çevikakyl (2014), who found asthma control to be correlated with illness perception. The subscale found personal control, emotional representation, illness coherence, consequences, and timeline to be related asthma control (r = -.56, r = .35, r = .72, r = .20, p < .001, and r = .17, p < .05, respectively). Kaptein et al. (2010) reviewed studies the relationships between illness perceptions and outcomes in patients with differing degrees of asthma severity in a variety of respondents and caregivers in different settings of medical care. The majority of studies were conducted in various nations and involved a large number of patients, which adds to the external validity of the findings. All of the studies revealed illness perceptions that represented personal control over the illness, which is linked to a beneficial outcome, namely asthma control (Kaptein et al., 2010).

Asthma patients who perceive the disease as episodic in nature will not recognize the importance of preventive medicine. If the patient recognizes that they have asthma only when they have symptoms, it will cause the patient to have inadequate self-management behavior (Halm, Mora, & Leventhal, 2006; Kaptein et al., 2008). On the contrary, patients who perceive asthma as a chronic condition requiring ongoing medicine will adhere to medication use. As a result, individuals have a better chance of managing their asthma. Perceptions of illness influence coping behavior, which in turn influences self-management behavior. If the patient believes the self-management behavior is ineffective, the patient will attempt to alter the emotional and cognitive representations of illness in order to regain control. If threats are controlled by effective self-management, it will lead to a better quality of life (Kaptein et al., 2010). The study of Sofianou et al. (2013) found that over half of the studied population had poor self-reported adherence to medication controllers, which persisted that medication is important in self-management. Illness perception was significantly and strongly associated with self-reported adherence to medication controller in this older asthmatic population. In particular, asthma patients who perceive that they have asthma only when they have symptoms have a double risk of

poor adherence reporting compared to those without this belief. According to other studies examining illness perception was significantly related to self-management of asthma (Halm et al., 2006; Horne & Weinman, 2002; Kaptein et al., 2008).

Additionally, illness perception is related to self-efficacy. Perceived control is measured in terms of self-efficacy in social cognitive theory, which is an individual's belief or level of confidence in their ability to do a task successfully. The illness subscale personal control perception is significantly related to asthma-related self-efficacy ($r = .47$, $p < .001$) (Broadbent et al., 2006). A study by Katz et al. (2002) showed less perceived control in asthma patients is associated with less asthma self-efficacy. Adults with asthma, who believe that their disease is so severe that the treatment they are receiving is unable to improve it, may lack self-efficacy when fighting the disease symptoms (Magklara & Morrison, 2016).

Depression

Depression is often found with chronic diseases such as asthma (Loerbroks, Apfelbacher, Bosch, & Stürmer, 2010; Walters et al., 2011). It has been identified as a significant public health issue (Williams, Hagerty, & Ketefian, 2005). When depression is studied as a variable, there are two main considerations: depression as a diagnostic disorder and depression as a self-report symptom (Brunwasser, Gillham, & Kim, 2009). Depressive disorder is defined by the diagnostic and statistical manual of mental disorders [DSM]. The important factor is the presence of a cluster of symptoms that is significant enough to induce distress and/or impair functioning. The definitions of major depressive episodes are explained (Williams et al., 2005). Depression has also been defined as experiencing depressive symptoms, which refers to depressive mood, helplessness, feelings of guilt and worthlessness, psychomotor retardation, loss of appetite and sleeping disturbance (Radloff, 1977; Williams et al., 2005). In this study, depression is defined as a specific alteration in experiencing depressive symptoms such as feeling blue or lonely, crying, depressed mood, feelings of guilt and worthlessness, feelings of helplessness and hopelessness, psychomotor retardation, loss of appetite and sleep disturbance. These symptoms are evaluated by using relevant instruments.

Asthma is a chronic respiratory disease that is more common in adults. A higher prevalence of depression is also frequently found in patients with asthma,

which is not related to asthma severity or oral corticosteroid use (Walters et al., 2011). Asthma patients have to face the disease for a long time, which can cause depression (Slattery & Essex, 2011). The nature of asthma can greatly affect patients, such as uncertain feelings about the symptoms, frequent absence from work, and economic problems related to medical care. These factors make asthma patients susceptible to developing depression (Moussas et al., 2008).

There are many studies about the effects of depression on asthma control in asthma patients. Arpibanwana et al. (2018) studied 130 asthma patients aged 18 years and older in Thailand and found depression to be associated with asthma control with statistical significance. In addition, depression, adherence to inhaled corticosteroids, smoking, and comorbidity can co-predict disease control in patients with asthma at 21.4 percent ($R^2 = .214$, $p < .05$). The above finding is consistent with the study of Di Marco et al. (2010), who found that increasing depression symptoms are associated with poor asthma control as assessed by the asthma control test (OR = 2.45, 95% CI = 1.30 - 4.62). In addition, the presence of depression is also associated with higher healthcare utilization. Furthermore, Çoban and Ediger (2018) studied 137 adult asthma patients and found that 45.6% of the participants had depression, while asthma was poorly controlled in 51%. Patients with adequately controlled asthma had lower depression scores. A significant negative correlation has been discovered between depression and asthma control scores ($p < .001$). The association between depression and asthma control can be caused by some of the symptoms of depression that also encourage more severe asthma attacks such as fatigue and sleep disturbance (Opolski & Wilson, 2005). In addition, depressive symptoms attenuate cortisol response to acute stressors, but only among asthma patients. A study by Trueba, Simon, Auchus, and Ritz (2016) found that having a more depressive mood was associated with a significant increase in cortisol, whereas having a less depressive mood was associated with a lack of cortisol response. Depressive mood has no discernible effects on the cortisol response to the stressors in healthy participants. These findings suggest that depressive mood and chronic inflammatory diseases such as asthma may work synergistically to enhance the cortisol response to stress (Trueba et al., 2016).

In addition, depression is a common stimulus that affects patients, resulting in changes or maintain in self-management behavior. Depression results in impaired

cognitive functioning, energy, and motivation (Radloff, 1977). It has also been identified as one factor that may reduce effectiveness and compliance with asthma self-management (Opolski & Wilson, 2005). According to a meta-analysis by DiMatteo et al. (2000), patients with chronic disease and depression are three times more likely to be noncompliant with medical treatment than non-depressed patients. Cluley and Cochrane (2001) reported that only one of 19 people with asthma who had been diagnosed with depression adhered to their medication regimens during their investigation.

Depression can make it difficult to adhere to asthma therapy and self-management via social support. Depression can also lead to isolation from family, friends, and other essential people who can provide the support that is so important for compliance (DiMatteo, 1994). The study by Loerbroks et al. (2010) found that the prevalence of asthma was positively related to depressive symptoms and negatively related to social support. Adult asthma risks were observed to rise in the presence of depressive symptoms and decrease in social support. Adewuya and Adeyeye (2017) found that depression is more common in adults with asthma and is significantly associated with levels of social support.

Job stress

Adults often have the role of responsibility in jobs or occupations, even if they are patients with chronic diseases like asthma. Adults with asthma are naturally influenced by psychosocial factors in the workplace, meaning situations or work environments patients experience (Pickles et al., 2018).

Job stress is currently one of the leading causes of stress among adults in a variety of countries (Renzaho et al., 2014). Increased job stress, as measured by the perception of having little control, but high demands (Karasek, 1989), has been linked to an increased risk of heart attack, hypertension, and other disorders (Renzaho et al., 2014; Stansfeld & Candy, 2006). However, the type of work does not determine the level of job stress, but an imbalance of any response or environmental and individual needs or abilities, or the person-environment fit that matters (Edwards, Caplan & Van Harrison, 1998).

According to the literature review, there are many contributors to the definition of work, job, or occupational stress. For example, Cooper and Marshall

(2013) stated that job stress refers to negative feelings resulting from the work environment, such as excessive workloads, role ambiguity or role conflict, poor work conditions, highly responsible work and poor relationships with other people in the workplace. These factors cause a person to have pressure or anxiety, which has a negative impact on physical and mental health (Cooper & Marshall, 2013). Parker and DeCottis (1983) asserted that job stress is a term used to describe the sensation experienced by an individual who is compelled to deviate from typical or self-desired workplace performance as a result of opportunities, limits, or demands connected to potentially significant work-related outcomes. These are consistent with Robbin and Judge (2009), who suggested that job stress is a condition that forces a person to face uncertain situations that create pressure and anxiety in a person, further causing negative mental and physical responses. In addition, this type of stress also results in decreased ability to work. In summary, the meaning of job stress in this study is the negative feelings caused by work conditions that create pressure and anxiety in adults with asthma with physical or psychological effects.

Job stress can affect the physiological, psychological, and behavioral condition of a person. In terms of physiological conditions, the most job stress symptoms cause changes in the metabolism in the body, resulting in a higher heart rate, respiration rate, and blood pressure. This leads to headaches, arrhythmia, and hyperventilation, etc. Psychological conditions are a consequence of job stress and cause negative feelings potentially leading to job dissatisfaction. This can be expressed in many forms such as pressure and anxiety. Negative behavioral conditions occur when a person is stressed from a job. Job stress causes behavioral changes such as consumer behavior, sleep-related behavior, functional behavior and other personality traits, etc. These things affect the ability to engage in self-care and work (Cooper & Marshall, 2013; Renzaho et al., 2011; Robbin & Judge, 2009).

Job stress has been linked to an increased incidence and prevalence of asthma in adults, which may also be linked to poor asthma control (Loerbroks et al., 2017; Runeson-Broberg & Norbäck, 2014). Job stress is pressure and the negative emotions caused by work in two main dimensions, including time pressure, and anxiety (Jamal & Baba, 1992; Parker & DeCottis, 1983). Time pressure is linked to the perceived lack of time to manage the multiple tasks that need to be done. Anxiety

is related to unpleasant emotions. This emotional state can lead to stress at work (Parker & DeCottis, 1983). Negative emotions activate the hypothalamic-pituitary-adrenal axis and the autonomic nervous system, resulting in eosinophilic airway inflammation. This is followed by the release of stress hormones into the bloodstream, which enhance type 2 T-helper and type 17 T-helper, both of which are associated with asthma exacerbation (Miyasaka et al., 2018). Heikkilä et al. (2014) found the age and gender adjustments can be used to analyze the job stress found to be related to an elevated risk of severe asthma exacerbations as indicated by the major diagnostic code (hazard ratio, HR: 1.27, 95% CI: 1.00-1.61). In part of the dimension of anxiety, Hartmann, Leucht, and Loerbroks (2017) found that greater work commitment was related to worse asthma control and lower quality of life in both linear regression ($\beta = .26$, $p = .01$ and $\beta = .44$, $p < .01$, respectively) and logistic regression. (OR = 1.87, 95% CI = 1.14-3.07, and OR = 2.34, 95% CI = 1.32-4.15, respectively).

Job stress can affect self-management behaviors in adults with in response to the physical and social environment demands, which include contact with health-care professionals. (Pickles et al., 2018). The work of chronic disease patients such as asthma have an effect on asthma self-management. The nature of work with time regulations and time limits allows patients to work continuously, which may affect symptom monitoring and symptom management when symptoms occur (Heinrichs et al., 2019). Job stress can influence self-management decisions such as whether or not employees with asthma should take time off work, which has been linked to the use of emergency ambulance services for asthma (Heinrichs et al., 2018). In addition, the nature of work requiring exposure to various stimulants causes the patients to be exposed to stimulants causing exacerbation. The patients cannot avoid the triggers, because they have to work urgently within a limited time (Heinrichs et al., 2018). The study by Heinrichs et al. (2019) found that low job decision and social support, which are part of time pressure (Jamal & Baba, 1992; Parker & DeCottis, 1983) were significantly related to lower trigger avoidance ($OR \geq 2.09$) and worse exacerbate symptom management ($OR \geq 2.29$) (Heinrichs et al., 2019).

Health literacy

Health literacy is described as the capacity to receive, process, and comprehend fundamental health information and services in order to make sound

health and medical care decisions (Kickbusch, 2008; Neilsen-Bohlman, Panzor, Hamlin, & Kindig, 2004; U.S. Department of Health and Human Services, 2000). Moreover, the National Library of Medicine defines health literacy as a capacity of individuals to receive, analyze, and comprehend essential health information and services necessary for making sound health decisions (Selden, Zorn, Ratzan, & Parker, 2000). The WHO affirmed a definition of health literacy as the cognitive and social abilities defined as the motivation and capacity of individual to acquire knowledge and information that support and nourish good health (Nutbeam, 2008). According to the current study, health literacy is the capacity to access and comprehend health information. Therefore, health literacy is a factor increasing behavior related to controlling asthma.

Nutbeam (2008) proposed a well-known health literacy model, which consists of three stages of health literacy. Level 1, functional literacy, refers to the effective functioning that is reading and writing sufficiently in daily situations such as reading the medicine label of bottle. Functional literacy is the lowest degree of health literacy utilized in clinical settings to communicate with patients. Level 2 is communicative or interactive literacy. In some studies, it is referred to as the individual capacity for selecting information, deriving forms of communication and applying new information to change circumstances. The last level is critical literacy, which is used to critically assess information and gain greater control over life events and situations. Not only does health literacy play an important role in accessing preventative health services, but it also has an effect on understanding disease and treatment options (Nutbeam, 2008).

Health literacy is related to health access and outcomes. In asthma patients, health literacy is correlated with asthma control. Apter et al. (2013) demonstrated that better health literacy is associated with better adherence and asthma control in adult asthma patients. Patients with a lower level of health literacy are less likely to contemplate the possibility of hazardous asthma attacks. This includes being aware of the warning signs and understanding how to evaluate lung function in order to receive early treatment or the use of inhalers (Mancuso & Rincon, 2006; Rosas-Salazar et al., 2012; Thai & George, 2010).

Inadequate health literacy is a barrier to effective self-management of asthma. Low health literacy is associated with inaccuracies in metered-dose inhaler techniques, decreased use of peak flow meters and asthma action plans, decreased capacity to calculate peak flow zones, and decreased desire to participate in decision-making (Thai & George, 2010). Moreover, health literacy is correlated with self-efficacy among patients with chronic illness (Lee et al., 2016; Osborn et al., 2011). Adults with asthma who have a better level of health literacy may have access to health resources and the ability to analyze and apply knowledge to their situation, resulting in patients developing self-management confidence. Health literacy is critical for obtaining health services and understanding disease and treatment choices. Lee et al. (2016) discovered that health literacy directly affects self-efficacy ($\beta = .450$, $p < .001$) and indirectly impacts self-care actions in individuals with type 2 diabetes.

Asthma self-efficacy

Self-efficacy is defined as beliefs of people in their ability to control the events that affect their lives. Self-efficacy is the ability to plan and carry out the actions necessary to control potential scenarios. Judgment refers to a person's task performance in terms of skills and processes with a complex effect on the task (Bandura, 1997). Self-efficacy is also related to individual judgment. Persons judge their own capacity to execute some activities in order to achieve a desired outcome (Zulkosky, 2009). The WHO defines self-efficacy as a person's belief embraced to attain action in a way that influences the events affecting their lives, and in which people determine their own behaviors, feelings and thoughts in addition to motivating themselves, depending on their self-efficacy and self-reliance (Smith, Tang, & Nutbeam, 2006). In this study, the definition of asthma self-efficacy is an individual's personal confidence regarding their capacity to perform healthy activities following recommended guidelines for managing asthma.

Moreover, Bandura (1997) claimed that there are four major information sources, performance accomplishments, vicarious experience, verbal persuasion and physiological cues, expected for personal efficacy. These are the four antecedents of self-efficacy (Zulkosky, 2009). The first is performance accomplishments which are related to task success. Efficacy increases with successful achievement. The second is vicarious experience, which encourages people to achieve desired outcomes. When

people examine the performance of others, they feel confident and successful at the same task and efficacy increases. The third is verbal persuasion referring to advisors encouraging to be successful. Persons who feel uncertain in their capacity can perform specific behaviors to achieve success after receiving recommendations from successful efficacy builders. The last source is physiological cues consisting of bodily signs such as anxiety and tension. Sometimes, the ability is partly judged according to physiological cues. The cues are interpreted differently in various people, which affects the outcomes of their respective tasks differently (Bandura, 1997; Zulkosky, 2009).

Asthma self-efficacy may influence asthma symptoms and emotional status in the form of frustration, fear, annoyance and concern. The confidence of patients to control symptoms of asthma or perform various activities causers the patients to experience less emotional pressure (Holland, 2014), which may also be a trigger for exacerbation. Mancuso, Sayles, and Allegrante (2010) showed that higher asthma self-efficacy was related to fewer asthma symptoms and better emotional status. In addition, confidence also results in patients being aware of their own power in managing and controlling asthma symptoms. A study by Eilayyan et al. (2015) found asthma self-efficacy to be a significant predictor of perceived asthma control ($\beta = 0.29$, $p < .001$). This is consistent with the study of Rhee et al. (2018), who found self-efficacy to predict better asthma control ($\beta = -0.098$, $p = .004$). The above findings also concur with Lavoie et al. (2008), who studied the relationship of asthma self-efficacy in asthma control and quality of life in 577 adults with asthma. The results showed that higher asthma self-efficacy was correlated with improved asthma control. According to the findings, being confident in one's ability to control asthma symptoms is related to improved asthma control (Lavoie et al., 2008).

Self-efficacy is a factor that engages self-management behaviors and is considered a critical feature of successful self-management of chronic diseases. Bandura (1997) demonstrated that self-efficacy helps patients gain a sense of confidence in their ability to overcome barriers. Patients with high asthma self-efficacy may be more motivated toward adherence to medication regimens, increase the amount of work they are willing to dedicate to asthma care, and make them more tenacious when obstacles arise (Holland, 2014; Talreja et al., 2012). Many studies have shown that

high asthma self-efficacy leads to increased self-management of adults with asthma. For example, Holland (2014) found the self-efficacy of adults with asthma to be associated with self-management behaviors ($r = .49$, $p < .01$).

Social support

Social support is a complex, multi-dimensional concept that incorporates family members and health care providers in assisting the patient in changing behavior. Social support directly affects physical and mental health. Social support refers to providing, influencing and negotiating. It can be defined as the ease with which a person's family, friends, and other significant individuals in his or her life can be contacted through his or her social network (Uchino, 2009).

Other studies have defined social support as the physical, mental and emotional activities and effort involved in looking after, responding to, and supporting others (Chappell & Funk, 2011). Novak and Campbell (2006) defined social support as help and assistance someone gives to and receives from others. McDowell (2006) defined social support as the presence of individuals in one's life who one trusts, on whom one can rely, and who make one feel cared for and appreciated as a person. Therefore, social support is developed throughout an individual's life span, particularly in childhood attachment with parents (Lackey, 2010). Prior research reveals, however, that emotional support is the most significant and has the greatest impact on the recipient's psychological well-being (Greenwood et al., 1996). The sources of emotional support include family, friends, and significant others (Zimet et al., 1988).

The current study defines social support as the perception of adults with asthma about the perceived availability of support from family, friends, and significant others.

Social support can have a direct influence on asthma control, which may be due to patients with social support having less psychological pressure. Reduced negative mood and stress severity are predicted by perceived social support, which may be a direct psychological factor that triggers asthma symptoms (Smyth et al., 2014). The study of Smyth et al. (2014) found that increased perceived social support resulted in fewer reported symptoms when stress was present. This was consistent

with the study of Heinrichs et al. (2019), who found low social support at work to be associated with significantly poorer asthma control.

In addition, social support also helps asthma patients to engage in self-management efficiently and sustainably. Successful asthma self-management requires more ongoing support to help patients understand and remember complicated medical changes in administrative information (Black et al., 2010). Adult patients who have to work, but have chronic illnesses such as asthma, find it difficult to manage their own health conditions. Perception of social support in the workplace will encourage patients to engage in self-disclosure and cope with acute symptoms such as medication use at work (Heinrichs et al., 2018). In addition, practical and emotional support from line managers and co-workers influences asthma self-management behavior (Heinrichs et al., 2018). When colleagues help patients with work, patients may have more time to manage themselves and reduce work stress. Therefore, high social support enables patients to have appropriate self-management behavior. The study of Sin et al. (2005) found that social support had significant positive relationships with asthma self-management behaviors ($r = .30$, $p < .05$).

Asthma self-management behavior

Self-management behavior is a concept used to modify a person's behavior in order to encourage the person to manage their health problems appropriately. There are many concepts in this area. Ryan and Sawin (2009) defined self-management as a task performed to handle the clinical aspects of disease outside of the hospital. Tobin, Reynolds, Holroyd, and Creer (1986) asserted that self-management behaviors are activities related to health care or preventing health problems in which individuals participate in joint activities with healthcare providers. The above finding is consistent with Lorig and Holman (2003), who defined self-management behaviors as a practice that uses the skills of patients in daily life with chronic illness. Self-management may be complex and related to the core skills of patients and healthcare providers such as problem-solving, decision-making, implementing action plans, utilizing resources, and building relationships (Creer, 2000; Lorig & Holman, 2003).

In this study, asthma self-management behaviors are defined as purposeful performance of daily healthy behaviors among adults with asthma to control asthma. Asthma self-management is a concept in which an asthma patient can recognize

symptoms and undertake easy self-help remedies to alleviate them while avoiding costly medical treatments provided by professionals (Jones, 2008; Kuijer, De Ridder, Colland, Schreurs, & Sprangers, 2007; Van der Meer et al., 2009). Patients with asthma use self-management to prevent attacks, detect and manage asthma episodes, and reduce other factors influencing asthma morbidity (Creer, 2000; Lorig & Holman, 2003). Asthma management, symptom management, medication management, and environmental control all necessitate certain actions (NHLBI, 2007; Fitzpatrick & Frey, 1993).

1. Medication management: This is an important aspect of asthma patient self-management. Self-adjustment of medication in response to acute symptoms and changes in peak expiratory force, management of doses and number of medications, frequency of administration according to prescriptions and written asthma plans, medication adherence, proper medication administration, and monitoring for medication effects are all things to consider and include in medication management (NHLBI, 2007). Medication non-adherence is common in asthma patients and frequently results in asthma exacerbations (Fish, Lung, & Antileukotriene Working Group, 2001; Horne & Weinman, 2002) and worsened asthma symptoms with increased emergency department and hospital visits, and requirement for oral steroids (Borrelli, Riekert, Weinstein, & Rathier, 2007). The study of Jabeen et al. (2018) discovered that high medication adherence was significantly related to well-controlled asthma ($p < .05$). Adherence to a treatment schedule was found to be necessary for asthma patients to achieve control.

2. Symptom management: Patients change their level of activity and physical surroundings and commence a pharmaceutical regimen by monitoring asthma symptoms and recognizing exacerbation signs (Fritz, Klein, & Overholser, 1990). Therefore, managing asthma symptoms necessitates daily assessments and ongoing monitoring of asthma signs and symptoms, including peak flow meter assessments, the use of asthma action plans to identify and treat worsening asthma, and the monitoring of limits in usual activities due to asthma symptoms (NHLBI, 2007).

3. Environmental control: Numerous individuals are exposed to elevated levels of indoor allergens as a result of expanded indoor activity options, such as

watching television and using a computer. That means increasing exposure to cockroaches and dust mite allergens in the bedroom (Platts-Mills, Vervloet, Thomas, Aalberse, & Chapman, 1997). To control allergens in houses, people can wash linens or encase pillows to eliminate dust mites or avoid eating in rooms to eliminate cockroaches (Sharma et al., 2007), which may be the cause of asthma exacerbation. Adult asthma patients must be aware of indoor allergens in their homes and workplaces as well as their peers' homes and workplaces. Environmental control behaviors must be implemented at work.

Regardless of the word, both self-management and self-care describe the actions of persons to manage their asthma (Huang, 2007; Huang, Wi, & Wang, 2009). Effective self-management behaviors are an important factor for asthmatic patients in preventing risk factors, monitoring for symptoms and managing exacerbations. Appropriate and continuous self-management behaviors enable patients to control symptoms and risk factors in the future. Research evidence has credited self-management as an intervention method in health care encouraging patients to share responsibility in making decisions and ensure that necessary health-care actions are taken (Kralik, Koch, Price, & Howard, 2004). Patients with chronic diseases, such as asthma, require information and skills to properly self-manage their asthma. (GINA, 2021). Asthma patients who have effective management are able to control their asthma better. The study of Ruengkajorn and Kittiwatanapaisan (2011) showed that asthma patients who engage in very effective self-management practices achieve improved asthma control. According to a study conducted by Kotses and Creer (2010), self-management of adherence reduced the frequency and severity of exacerbations in adult asthma patients. According to the study by Jabeen et al. (2018), high medication adherence was substantially associated with well-controlled asthma in asthma patients ($p < .05$).

Based on the IFSMT, asthma has a variety of symptoms and progress differs in each person. Asthma has both rest and exacerbation phases, which are characteristic of the disease, causing the perception of illness of asthma patients to be different. In addition, asthma is a chronic disease causing the patient to face the effects of the disease continuously. For this reason, asthma may affect the minds of patients until they become depressed. Adult patients have to work, and job stress may

be a social environment factor that affects asthma self-management behavior and control. In addition, health literacy is also a patient's personal factor in decision-making or activities potentially affecting asthma control. Self-efficacy and social support are an important mechanism for the process of self-management that affects outcomes. Lastly, asthma self-management behaviors are represented in the proximal outcomes, and asthma control is represented in the distal outcomes of the study.

Summary

Asthma control is the goal standard of asthma treatment, but most evidence found adults with asthma achieve poor asthma control. Although several interventional studies were implemented, the results showed only short-term outcomes, while studies related influencing factors were limited by researchers' interested factors. There was insufficient empirical evidence concerning the causal relations of influencing factors to asthma control. There is no evidence about the relationship among the simultaneously multiple influencing factors, especially in Thailand. Therefore, the model testing of asthma control in adults with asthma is absolutely necessary. This study was intended to systematically study to find out significant factors which helpful for future programs of controlling asthma. The researcher incorporated the model based on the IFSMT and literature review synthesis. The influencing factors include illness perception, depression, job stress, health literacy, asthma self-efficacy, social support, and asthma self-management behaviors that directly and indirectly affect asthma control among adults with asthma. The SEM will be tested and interpreted with multiple predictors and dependent variables in a causal model.

CHAPTER 3
RESEARCH METHODOLOGY

This chapter focuses on the research methods used to study adults with asthma. The chapter describes the study's research design, study setting, population and sample, research instruments, protection of human rights, data collection, and data analysis.

Research design

This study used descriptive and model testing design to test the hypothesized model of asthma control in adults with asthma. The structural equation modeling [SEM] statistical analysis technique was used to test the hypothesized model to arrive the final model. A confirmatory approach to the SEM multivariate analysis examined causal relations among multiple latent variables that had been specified by IFSMT and literature review. The final model explained the direct and indirect effects among the latent variables on asthma control.

Study setting

The study's sample was recruited at asthma and COPD clinics in the outpatient departments of four tertiary hospitals in eastern Thailand. In 2018, eastern Thailand had reported the second highest number of deaths from chronic lower respiratory diseases, after northeastern Thailand (Bureau of Non-Communicable Disease, 2018). The incidence rate hospital admissions of asthma in eastern Thailand had increased from 85.79 per 100,000 population in 2016 to 190.11 per 100,000 populations in 2018 (Strategy and Planning Division, Ministry of Public Health, 2016; 2018).

The eastern region of Thailand was set up asthma and COPD clinics in outpatient departments at the following six tertiary hospitals: Chonburi Hospital, Prapokklao Hospital, Rayong Hospital, Buddhasothorn Hospital, Abhaiphubejhr Hospital, and Queen Savang Vadhana Memorial Hospital. The mission of the asthma and COPD clinics is to improve the care and treatment of people with asthma.

Treatment follows the guidelines set by the Thai Asthma Council and Association for the diagnosis and treatment of asthma in Thailand, which is an easy-to-follow, standardized procedure (TAC, 2019). In addition, physicians, pharmacists, and nurses working in asthma and COPD clinics had to enroll in workshop training from the Thai Asthma Council (Chansakhonporn et al., 2013; TAC, 2019).

When receiving treatment at asthma and COPD clinics, patients were assessed for the severity of their asthma. Before the patients met a physician, nurses assess them for any underlying disease and their self-care behaviors. If a problem is detected, nurses advise and engage patients in individual problem-solving activities. Nurses also advise them about lifestyle modifications that are appropriate. Patients are assessed for asthma control using a questionnaire and the peak expiratory flow rate [PEFR] to monitor the progress of asthma. The physician provides treatment according to the treatment guidelines. A pharmacist gives advice about asthma medication and evaluates the skills related to nebulizer use (TAC, 2019).

Population and sample

Population

The target population in this study was adults with asthma who were receiving follow up care at asthma and COPD clinics located in the outpatient departments at tertiary hospitals in eastern Thailand.

Sample

Eligible participants had been diagnosed with asthma for at least three months with the following inclusion criteria:

1. Aged 20 to 60 years;
2. Be able to communicate and understand Thai language;
3. No asthma symptoms, such as breathlessness, tight chest, wheezing, and coughing, that would affect their ability to complete a self-administered questionnaire;
4. No history of COPD, myocardial infarction, congestive heart failure, advanced lung carcinoma, or other disability/ conditions that limited movement; and

5. If the participant had a history of the severe persistent asthma, cognitive impairment was evaluated based on a score between 3-5 of the Mini-Cog (Thai version) to indicate normal cognitive function and ability to participate.

Sample size

The sample size was calculated using a ratio of five to 10 respondents per estimated parameter (Hair, Black, Babin, & Anderson, 2010). A sample size of 250 or 500 participants is generally considered sufficient for estimating the SEM model (Schumacker & Lomax, 2010). The current study used five respondents for each estimated parameter with a total of 61 free parameters. Therefore, a sample size of at least 305 participants was considered sufficient. Due to the possibility of dropouts occurring during any study, an attrition rate is considered. Kristman, Manno, and Cote (2005) estimated that attrition might account for at least 10% of the sample. Therefore, the number of participants was set at 336 patients with asthma to account for total sample size.

Sampling technique

Adults with asthma were recruited by a cluster sampling technique as follows:

1. The researcher identified the asthma and COPD clinics in the following six tertiary hospitals in eastern Thailand: Chonburi Hospital, Prapokklao Hospital, Rayong Hospital, Buddhasothorn Hospital, Abhaiphubejhr Hospital, and Queen Savang Vadhana Memorial Hospital.

2. The names of four of the six hospitals were drawn using a simple random sampling technique with a ratio of 2: 3, (Neuman, 1991). The four selected hospitals were the Prapokklao Hospital, Buddhasothorn Hospital, Abhaiphubejhr Hospital, and Queen Savang Vadhana Memorial Hospital (Figure 3-1).

3. Simple random sampling was used to select 84 eligible participants from each of the asthma and COPD clinics at the four hospitals. If the first and subsequent picks did not meet the inclusion criteria, the next number was drawn until 336 adults with asthma who met the inclusion criteria were selected.

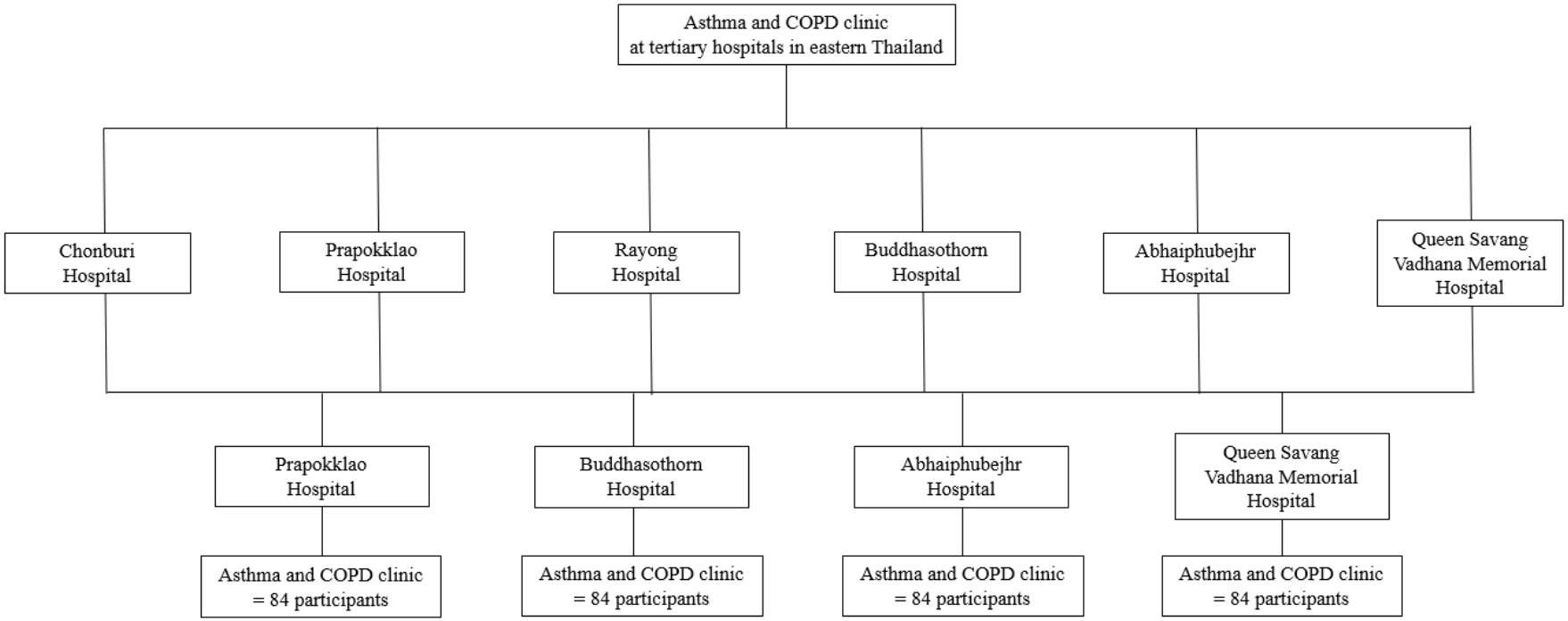


Figure 3-1 The cluster sampling method used in this study

Instruments

The instruments used in this study are described below.

1. The Mini-Cog

The Mini-Cog evaluates cognitive impairment. Originally developed in English by Borson, Scanlan, Brush, Vitaliano, and Dokmak (2000), it was translated into the Thai language by Trongsakul, Lambert, Clark, Wongpakaran, and Cross (2015). The Mini-Cog is a memory test that involves the recall of three unrelated items (for a total score of 3) with drawing a very basic free-hand version of the clock inserted as a distractor for the memory task (for a total score of 2). Its diagnostic value is independent of education or language. Scores between 0 and 2 indicate possible impaired cognitive function; scores between 3 and 5 indicate normal cognitive function. The test takes about three minutes to complete (Borson et al., 2000). The Mini-Cog (Thai version) has shown acceptable interrater reliability (K = .80, $p < .001$; 95% CI = 0.50-1.00) (Trongsakul et al., 2015).

2. The demographic questionnaire

The demographic questionnaire was developed by the researcher. The personal data form is comprised of gender, age, religion, marital status, education level, occupation, average monthly income, sufficiency of income, duration of illness, co-morbidity, history of visits to emergency rooms or admitted hospitalizations during the past one year from a severe asthmatic attack, asthma triggers, weight, height, and peak expiratory flow rate.

3. The brief illness perception questionnaire [Brief IPQ]

The brief IPQ measures illness perception. Broadbent et al. (2006) developed the original English version, based on Leventhal's self-regulatory model to describe the process by which individuals respond to a perceived health threat; it was translated into the Thai language by Sowattanangoon (2011). The 9-item brief IPQ is designed to rapidly assess cognitive and emotional representation dimensions. Five items that are related to cognitive illness representation are consequences, chronology, personal control, treatment control, and identification. One item assesses illness coherence. The two items about emotional representation are concern and emotional responses. The final item is an open question to which participants rank the three primary causes of their illness (Broadbent et al., 2006); however, this item, was

omitted from the current study. The instrument uses a single-item scale approach to assess perceptions on a continuous linear scale. Each of the eight items is scored on an 11-point scale, ranging from 0 to 10. Thus, the total score to measure the degree of illness perception can range from 0 to 80. Scoring is reversed for items 3, 4, and 7, which are negative affect statements. Higher scores indicated higher perceived illness or health threat. Broadbent et al. (2006) evaluated the psychometric properties of the brief IBQ scale in patients with asthma and other illness. They reported good test-retest reliability and concurrent validity with relevant measures. The Cronbach's alpha coefficient for internal reliability was .91. The brief IPQ (Thai version) that measured 92 patients with acute coronary syndrome had a Cronbach's alpha coefficient for internal reliability of .71 (Thepphawan, Watthnakitkrileart, Pongthavornkamol, & Dumavibhat, 2011).

4. The hospital anxiety and depression scale-depression subscale [HADS-D]

The HADS-D is a screening tool that can quickly and effectively identify people that show symptoms of depression. Zigmond and Snaith (1983) developed the original English version. Nilchaikovit et al., (1996) translated it into the Thai language to assess the emotional state of non-psychiatric individuals with physical disease receiving outpatient hospital care. The HADS-D has a total of seven items, each with a four-point response option that ranges from 0 to 3 points. Total scores can range from 0 to 21 with a score of 10 or more points indicative of depression (Nilchaikovit et al., 1996; Zigmond & Snaith, 1983). For the current study, scores were divided into three categories to determine the status of depression: Normal (scores = 0 to 7), Borderline abnormal (scores = 8 to 10), and abnormal (scores = 11 to 21). Labor et al. (2017) used the HADS-D to study the influences of depression on disease control in adults with asthma; the Cronbach's alpha coefficient for internal reliability was .89.

5. The job stress scale [JSS]

The JSS measures job stress. Parker and DeCoittis (1983) developed the JSS in English; it was translated into the Thai language by Jampong (2016). The 13-item JSS has two dimensions: Time pressure (8-items) and job-related anxiety (5-items). Each item has a five-point Likert response option that range from 1 (strongly disagree) to 5 (strongly agree). A total score of job stress can range from 13 to 65.

Higher scores indicate a higher degree of job stress. Parker and DeCoittis (1983) evaluated the psychometric properties of the JSS in managers of a large restaurant. They reported the Cronbach's alpha had satisfactory internal consistency of time pressure and job-related anxiety scores of .87 and .74, respectively. Jampong (2016) used the JSS (Thai version) to study the job stress in the general population; the Cronbach's alpha coefficient for internal reliability of instrument was 0.95.

6. The functional, communicative, and critical health literacy scale [FCCHL scale]

The FCCHL scale measures health literacy in people with a chronic disease. The original English version was developed by Ishikawa, Takeuchi, and Yano (2008) using a model of health literacy based on Nutbeam. They studied health literacy in people with diabetes in outpatient departments. The FCCHL scale was translated into the Thai language by Maneesriwongul (2012). The 14-item FCCHL scale has three dimensions: Functional health literacy (5 items), communicative health literacy (5 items), and critical health literacy (4 items). Each item has a four-point response option that ranges from 1 (never) to 4 (often), with a total score ranging from 14 to 56. Higher scores indicate a higher degree of health literacy (Ishikawa et al., 2008). The three dimensions of the original FCCHL scale had satisfactory Cronbach's alpha coefficients: Functional, communicative and critical health literacy and total health literacy scores of .84, .77, .65, and .78, respectively (Ishikawa et al., 2008). Wannapo, Kunsongkeit, and Duangpaeng (2018) used the FCCHL scale (Thai version) to study the health literacy in patients with acute myocardial Infarction; the Cronbach's alpha coefficient for internal reliability of instrument was 0.82.

7. The asthma self-efficacy questionnaire

The Self-efficacy subscale of the knowledge, attitude, and self-efficacy asthma questionnaire [KASE-AQ] measures self-efficacy (Wigal et al., 1993). The researcher for the current study and colleagues translated the subscale into the Thai language to measure the confidence of adults in managing their asthma. Each of the 20 items has a five-point response option from 1 (false) to 5 (true). Total scores can range from 20 to l00. Higher scores indicate more confidence in managing asthma (Wigal et al., 1993). Wigal et al. (1993) reported test-retest reliability in 30 male and female adults with asthma before and three months after educational intervention

(Pearson $r = 0.85$, $p < .001$); the Cronbach's alpha coefficient was .89 for the self-efficacy subscale (Wigal et al., 1993).

8. The multidimensional scale of perceived social support [MSPSS]

The MSPSS measures social support. Zimet et al. (1988) developed the original English version. It was translated into the Thai language by Wongpakaran et al., (2011) then revised by Wongpakaran, Wongpakaran, Sirirak, Arunpongpaisal, and Zimet (2018). The revised Thai version of the MSPSS [r-T-MSPSS] was tested for its psychometric properties in both clinical and non-clinical samples. Confirmatory factor analysis on the r-T-MSPSS showed improved psychometric properties. The 12-item r-T-MSPSS has three dimensions: Family (4 items), friends (4 items), and significant others (4 items). Each item is on a 7-point Likert-type scale from 1 (very strongly disagree) to 7 (very strongly agree). Total scores can range from 12 to 84 with higher scores indicating a higher perception of social support (Zimet et al., 1988). Wongpakaran et al. (2011) used the r-T-MSPSS in medical students from Chiang Mai University to evaluate the scale's internal consistency. The Cronbach alpha coefficients were 0.91 for the total scores; for the three dimensions, family, friends, and significant others, the coefficients were .88, .91, and .92 respectively. Boonsin, Deenan and Wacharasin (2021) use r-t-MSPSS to collect data about perceived social support of family caregiving for survivors of stroke. They reported a Cronbach's alpha coefficient for internal reliability of .88.

9. The asthma self-management behavior instrument [AsSCPI]

The AsSCPI measures asthma self-management behavior in adolescents with asthma in public health contexts. Originally developed in English by Fitzpatrick and Frey (1993), it was translated into the Thail language by Preechawong (2004). The 22-item AsSCPI has four dimensions: Symptom management (12 items), medical management (6 items), environment control (3 items), and overall (1 item). Each item has a response option ranging from 0 (never) to 10 (always), representing the frequency that respondents perform the behaviors (Preechawong, 2004). Total scores can range from 0 to 220 with higher scores indicating that asthma management behaviors are performed more consistently.

Because the AsSCPI was used to measure self-management behaviors in adolescents, the researcher needed to adjust some of the wording to be more

appropriate for adults with asthma, keeping the content and purpose of the questions the same. For example, the words father, mother, and teacher were changed to husband, wife, daughter or son, and colleagues in item 6. Similarly, the wording for after school was changed to after work in item 11. Fitzpatrick and Frey (1993) reported an internal consistency of .85 and test-retest reliability of .62. In Thailand, Preechawong (2004) used the back-translation method to create the AsSCPI (Thai version) and measure self-management behavior in Thai asthmatic adolescents. The Cronbach's alpha coefficient for internal reliability was .90.

10. The asthma control questionnaire [ACQ]

The ACQ measures asthma control. Originally developed in English by Juniper et al. (1999), the Thai language version was made available from the Mapi Research Institute (Lyon, France). The 6-item version of ACQ has three dimensions: Daytime and nighttime symptoms (4 items), activity limitation (1 item), and rescue bronchodilator use (1 item). Each item has a seven-point response option from 0 (no impairment) to 6 (maximum impairment). Averaged total scores range from 0 to 6 with lower scores indicating that adults had greater asthma control and higher scores indicating they had poorer asthma control (Juniper et al., 1999). Mean scores were divided into three categories for this study to determine the level of asthma control: well controlled (≤ 0.75), partially controlled (> 0.75 but < 1.5), and poor controlled (≥ 1.5) (Juniper et al., 2006). Juniper et al. (2006) used the 6-item ACQ in 1,323 adults with asthma; the Cronbach's alpha coefficient was 0.98.

Quality of measurements

1. Validity

1.1 Translation process

The self-efficacy subscale of the KASE-AQ original version was developed in English. After obtaining permission from the developer, the researcher translated it into Thai using Brislin back-translation method to ensure the validity (Brislin, 1986). The translation process follows the given procedure. The original English version was translated into Thai language by the first bilingual translator, native Thai speaker, with a background in adult nursing. The Thai version accurately conveys the contents of the original instrument by providing precise meanings and

statements. The content equivalence conveys the main ideas of the original English version. The Thai version was translated independently back into the English language by a second bilingual translator who works in nursing and who had not seen the original English version. Finally, all three bilingual experts, with experience in adult nursing, checked the content validity and appropriateness of language by comparing three versions, including the original English, Thai, and back-translated versions. They compared the items based on cultural acceptability, grammar, and structural coherence. Any discrepancies between the original English and the back-translated version were examined for revision in the Thai version until the back-translated version was equivalent to original English. The three-expert panel worked until they reached consensus that the Thai version was equivalent to the original version.

1.2 Content validity

The content validity of the following seven instruments has been documented in studies during their development and also tested in Thai populations: The Brief-IPQ, the HADS-D, the JSS, the FCCHL scale, the MSPSS, the AsSCPI, and the ACQ. They possess acceptable content validity and, therefore, the researcher did not re-validate in the current study.

The English self-efficacy subscale of the KASE-AQ was translated into the Thai language by five experts who are bilingual in both languages and are familiar with the adult nursing material. The content validity and cultural comparability were ensured during the back-translation process.

2. Reliability

A pilot study was conducted to evaluate the reliability of eight instruments with 30 participants who had similarities to the study's sample at Prapokklao Hospital, but they were not included in the actual study. Internal consistency for the eight instruments was acceptable in the study's sample. The internal consistency reliability was presented in Table 3-1.

Table 3-1 Reliability of study instruments

Questionnaire	Number of items	Cronbach's alpha	
		Pilot study	Current study
The Brief Illness Perception Questionnaire [Brief IPQ]	8	.83	.87
The Hospital Anxiety and Depression Scale-Depression subscale [HADS-D]	7	.85	.75
The Job Stress Scale [JSS]	13	.86	.91
The functional, communicative, and critical health literacy scale [FCCHL scale]	14	.81	.86
The Self-efficacy subscale of the Knowledge, Attitude, and Self-efficacy Asthma Questionnaire [KASE-AQ]	20	.88	.94
The multidimensional scale of perceived social support [MSPSS]	12	.90	.92
The Asthma Self-Management Behavior Instrument [AsSCPI]	22	.90	.92
The asthma control questionnaire [ACQ]	6	.86	.85

Protection of human rights

The study received approval from the institutional review board [IRB] of Burapha University (G-HS 027/2563) and the Committee of Rights for Human Research of Prapokklao Hospital (CTIREC-058), Buddhasothorn Hospital (BSH-IRB 038/2563), Abhaiphubejhr Hospital (IRB-BHUBEJHR-163), and Queen Savang Vadhana Memorial Hospital (IRB 081/2563). After obtaining permission to conduct the study, the researcher informed participants of the study's objectives, risks, benefits, voluntary participation, and confidentiality. Participants were assured that the study would not affect their quality of care or access to future nursing care. Participants had the right to refuse to participate at any time during the study. They were asked to sign consent forms after receiving clear information. All data acquired

from this study was kept confidential. Their names were assigned a code number to ensure confidentiality. The results were presented in the form of aggregated data without mentioning personal or institution identities. Data were used only for this research and were destroyed after the study's completion.

Data collection procedures

Data were collected as described below.

1. After obtaining permission from the IRB of Burapha University and the IRB of hospitals related to this study, the researcher asked for permission to collect data and contacted directors of the asthma and COPD clinics at the selected hospitals. The researcher made appointments with the physicians and nurses at asthma and COPD clinics to inform them about the research objectives and process, and then asked for their cooperation.

2. The researcher selected two research assistants who were registered nurses with two or more years' experience in caring for adults with asthma. The two research assistants received the following training:

2.1 The researcher described the research procedures, inclusion criteria of participant eligibility, instruments to be used, and data collection process, including human rights protection.

2.2 Initially, the research assistants observed the researcher collecting data. Any misunderstandings about data collection procedures were discussed and reviewed.

2.3 The research assistants practiced collecting data under the supervision of the researcher until they could collect data independently.

3. The researcher contacted the head nurse of asthma and COPD clinics at the appropriate time for collecting data after the research permission was granted. The researcher and research assistants collected all data and selected participants who met the inclusion criteria based on their medical records and interest to be a participant.

4. The researcher and research assistants introduced themselves to the eligible participants in each hospital setting and explained the research purpose, study process, and its risks and benefits. Informed consent was signed if they agreed to participate.

5. The participants completed the self-administered questionnaire and instruments in a private place before meeting the physician. If participants had an eyesight problem or it was inconvenient for them to read the items, the researcher and research assistants would read the items to them. Data collection took approximately 45 to 60 minutes to complete at a private room in the outpatient unit of each hospital.

6. The participants could ask any question during the process. If the participants did not allow the data collection process to continue, the research was discontinued, and they were withdrawn from the study.

7. During data collection, if the participants displayed physical or emotional symptoms, such as wheezing, stress, or not being ready to answer, the researcher and research assistants stopped and arranged for the participants to rest in a provided location. The researcher and research assistants were prepared to encourage the participants to take deep breaths and ensure their rescue inhaler was used correctly until they recuperated. If the symptoms did not improve, the researcher and research assistants would inform the physician. However, no participant experienced symptoms or wished to leave the study. Additionally, 19 participants were at risk of depression during the data collection. The researcher reported the clinical nurses for review and referral to qualified physicians for further treatment.

8. After a participant finished, the researcher and research assistants checked for the completeness of the data. If there were blanks or non-responses, the researcher/ assistants encouraged the participants to complete all missing items.

Data analysis

The following data analytical procedures were conducted using IBM® SPSS® version 23 and the AMOS® version 23 statistical software programs. The procedures for data analyses are described below.

1. The demographic characteristics of the sample were analyzed using descriptive statistics, including the variables' means, standard deviations, frequencies, percentages, ranges, and distributions.

2. The assumptions underlying the structural equation model analysis were evaluated, including normality of distributions, linearity of relationships, homogeneity of variance, and multicollinearity.

3. The relationships in the hypothesized model, both direct and indirect on asthma control were examined for structural equation modeling by using the Analysis of Moment Structure [AMOS] statistical software program. The statistical significance level was set throughout the analyses at $p < .05$.

CHAPTER 4
RESULTS

This chapter explains the results in the research study's data analysis. The results of the dissertation research are presented in four sections. The first section describes the participants' characteristics. The second section gives the results of testing the multivariate analysis statistical assumptions of the data that underlie the structural equation model. The third section describes model testing and model modification. The last section presents the research hypotheses testing.

Participants' characteristics

A total of 336 adults with asthma were recruited from the asthma and COPD clinics at four hospital outpatient departments. Their demographic characteristics are shown in Table 4-1. Most of the participants were female (72.0%). Their mean age was 45.7 years (*SD* = 9.11), ranging from 20 to 59 years. Less than half of the participants were in the 40 to 49 years age group (41.1%). Most of them were Buddhist (89.6%) and married (61.3%). Most of the participants had completed primary school (37.5%) or high school (31.5%). About one-fourth of the participants (25.6 %) were factory workers or machine operators, 15.8% were service workers, and 15.2% were laborers. Although over one-third of the participants (35.1%) indicated they had a monthly family income between 10,001-20,000 Thai baht, and half (50.3%) reported it was insufficient.

The average time since their asthma diagnosis was 10.48 years (*SD* = 8.78); most of the participants had an asthma diagnosis between 1 to 10 years (53.3 %). More than half of the participants (60.4%) had a comorbidity, including hypertension (29.2%), dyslipidemia (25.6%), diabetes mellitus (16.1 %), rhinitis or chronic sinusitis (14.3), gastroesophageal reflux disease (13.9%), or other (8.6%). Almost two-thirds of the participants had not been admitted to an emergency department or hospitalized for asthma at least once in the past year (63.1%). More than half of the participants (58.9%) had dust and particles in the air as an asthma trigger that they were exposed to daily life. The mean percentage of predicted peak expiratory flow rate of

participants was 69.25 (*SD* = 25.85). Less than half of participants (47.0%) were in the 60.1 to 79.9 moderate persistent group classification, while 28.3% of them were in the ≥ 80 mild persistent or intermittent group. The remaining participants (24.7%) were classified as severe persistent. The mean body mass index (BMI) of participants was 26.51 (*SD* = 4.76). More than half of the participants (58.3%) were classified as either overweight (44.0%) or obese (14.3%).

Table 4-1 Demographic characteristics of the adults with asthma (*n* = 336)

Demographic characteristics	***n***	***%***
Gender		
Female	242	72.0
Male	94	28.0
Age (years) (*M* = 45.70, *SD* = 9.11)		
20-29 years old	26	7.7
30-39 years old	50	14.9
40-49 years old	138	41.1
50-59 years old	122	36.3
Religion		
Buddhist	301	89.6
Muslim	26	7.7
Christian	9	2.7
Marital status		
Married	206	61.3
Single	74	22.0
Divorced/ separated/ widowed	56	16.7
Education level		
Primary school	126	37.5
High school	106	31.5
Diploma	48	14.3
Bachelor's degree or higher	56	16.7

Table 4-1 (Continued)

Demographic characteristics	***n***	***%***
Occupation		
Legislators/ senior officials/ managers	20	6.0
Professionals/ teacher/ instructor	13	3.9
Clerk/ administrative officer/ office worker	31	9.2
Businessman/ Merchant	42	12.5
Service worker/ salesperson/ housekeeper	53	15.8
Factory worker/ machine operator	86	25.6
Farmer/ fisherman/ herdsman	40	11.9
Laborer	51	15.2
Family income (Thai baht per month) (M = 17,726.43, SD = 12,914.98)		
≤ 10,000	99	29.5
10,001-20,000	118	35.1
20,001-30,000	51	15.2
30,001-40,000	36	10.7
> 40,000	32	9.5
Sufficiency of income		
Insufficient income	169	50.3
Sufficient income with savings	78	23.2
Sufficient income but with no savings	89	26.5
Years since asthma diagnosis (M = 10.48, SD = 8.78)		
< 1 year	20	6.0
1-10 years	179	53.3
11-20 years	65	19.3
> 20 years	72	21.4
Comorbidity condition		
Yes	203	60.4
No	133	39.6

Table 4-1 (Continued)

Demographic characteristics	***n***	***%***
Comorbidities (more than one answer)		
Hypertension	98	29.2
Dyslipidemia	86	25.6
Diabetes mellitus	54	16.1
Rhinitis/ chronic sinusitis	48	14.3
Gastroesophageal reflux disease	44	13.9
Other (e.g. rheumatoid arthritis, gastritis, thyroid, gout, cancer, other)	29	8.6
The past one year, being admitted to an emergency department/ hospitalized for asthma		
No	212	63.1
Yes	124	36.9
BMI (M = 26.51, SD = 4.76)		
< 18.5	19	5.7
18.5-24.9	121	36.0
25.0-29.9	148	44.0
≥ 30	48	14.3
Asthma triggers		
Dust and particles in the air	198	58.9
Pets	67	19.9
Cigarette smoke	44	13.1
Foods	28	8.3
Other (e.g. fumes, odors, chemicals, exercise, weather, emotion, other)	169	50.3
The percent of predicted peak expiratory flow rate (M = 69.25, SD = 25.85)		
≤ 60% (Severe persistent)	83	24.7
60.1-79.9% (Moderate persistent)	158	47.0
≥ 80% (Intermittent asthma or mild persistent)	95	28.3

Table 4-2 displays the frequency and percentage of depression and asthma control of the participants. Depression was evaluated by the sum score of the hospital anxiety and depression scale-Depression subscale [HADS-D] that determined the status of depression. Most of the participants had normal or no depression (94.3%). Asthma control was evaluated by the mean score of the asthma control questionnaire [ACQ] that determined the level of asthma control. More than half of the participants had poor controlled (50.7%) and partially controlled (23.8%) asthma. Therefore, only 19% of the participants would be classified as having well asthma control.

Table 4-2 Frequency and percentage of depression and asthma control of the participants (n = 336)

Characteristics	n	%
Depression		
Normal	317	94.3
Borderline abnormal	17	5.1
Abnormal	2	0.6
Asthma control		
Well controlled	64	19.0
Partially controlled	80	23.8
Poor controlled	192	57.1

Table 4-3 displays the descriptive statistics of all variables in the asthma control model. Adults with asthma had an illness perception's total score that ranged from 0 to 67 (M = 32.92, SD = 12.36), job stress's total score ranged from 13 to 65 (M = 34.63, SD = 10.58), health literacy's total score ranged from 16 -56 (M = 49.96, SD = 7.23), asthma self-efficacy's total score ranged from 27 to 100 (M = 73.32, SD = 12.69), and social support's total score ranged from 12 to 84 (M = 64.20, SD = 11.72). The total score for asthma self-management behaviors ranged from 32 to 206 (M = 118.60, SD = 33.22), that included four subscale scores: symptom management, medical management, environment control, and overall. The actual score of symptom management ranged from 13 to 112 (M = 62.18, SD = 19.50),

medical management ranged from 5 to 57 (*M* = 32.43, *SD* = 5.13), environment control ranged from 5 to 30 (*M* = 17.67, *SD* = 10.47), and), overall ranged from 0 to 10 (*M* = 6.33, *SD* = 2.05). On average, they were not depression (*M* = 3.56, *SD* = 2.46), but had poor asthma control (*M* = 1.59, *SD* = 0.97).

Table 4-3 Descriptive statistics of study variables (*n* = 336)

Variables	**Possible Range**	**Actual Range**	***M***	***SD***	**Level**
Illness perception[1]	0-80	0-67	32.92	12.36	-
Depression[2]	0-21	0-14	3.56	2.46	Normal
Job stress[3]	13-65	13-65	34.63	10.58	-
Health literacy[4]	14-56	16-56	41.96	7.29	-
Asthma self-efficacy[5]	20-100	27-100	73.32	12.69	-
Social support[6]	12-84	12-84	64.20	11.72	-
Asthma self-management behaviors[7]	0-220	32-206	118.60	33.22	-
Symptom management	0-120	13-112	62.18	19.50	
Medical management	0-60	5-57	32.43	5.13	
Environment control	0-30	5-30	17.67	10.47	
Overall	0-10	0-10	6.33	2.05	
Asthma control[8]	0-6	0-4.17	1.59	0.97	Poor control
Daytime and nighttime symptoms	0-6	0-5	1.68	1.08	
Activity limitation	0-6	0-6	1.76	1.43	
Rescue bronchodilator use	0-6	0-4	1.06	0.84	

[1] The Brief Illness Perception Questionnaire [Brief IPQ], [2] The Hospital Anxiety and Depression Scale-Depression subscale [HADS-D], [3] The Job Stress Scale [JSS], [4] The Functional, Communicative, and Critical Health Literacy Scale [FCCHL scale], [5] The Self-efficacy subscale of the Knowledge, Attitude, and Self-efficacy Asthma Questionnaire [KASE-AQ], [6] The multidimensional scale of perceived social support [MSPSS], [7] The Asthma Self-Management Behavior Instrument [AsSCPI], [8] The asthma control questionnaire [ACQ]

Note: The instruments were the Thai versions.

Statistical assumption tests for the SEM analysis

Before testing the multivariate SEM model, statistical assumptions were checked for outliers, normality, linearity, and multicollinearity (Hair et al., 2010). Assessing diagnostic tests helps reduce potential distortions and biases in the results that would affect parameter estimates for model testing (Schumacker & Lomax, 2010).

In the first step, univariate outliers were checked by examining cases with extreme value or high standardized scores (z-scores of ≥ 3.29 or < -3.29) on one or more variables (Tabachnick & Fidell, 2013). Six variables had univariate outliers: depression (#96, 144), health literacy (#25, 32), asthma self-efficacy (#31), and social support (#108). The diagnostic method was assessed by examining the multivariate outliers with the Mahalanobis' distance that measures the chi-square distribution for each case. A range with a probability value of the chi-square statistic < .001 was considered an outlier (Tabachnick & Fidell, 2013). There were three outliers (#25, 96, and 108) based on the Mahalanobis' distance. All other outliers had been detected in the univariate analyses. In total, six participants were eliminated from further analysis, leaving 330 participants to test for multivariate normal distribution, linearity, and multicollinearity.

Multivariate normality was tested by examining skewness and kurtosis (Tabachnick & Fidell, 2013). Asymmetric distribution of skewness and peakedness of kurtosis was zero, and the critical ratios were between -1.96 and 1.96, indicating a normal distribution (Hair et al., 2010; Tabachnick & Fidell, 2013). The findings indicated the job stress, asthma self-efficacy, asthma self-management behaviors, and asthma control met both criteria of normal distribution. The other four variables did not meet the requirements. Hair, Black, Babin, and Anderson (2019) indicate that a problem exists if the skewness index is extremely skewed (value > 3) and kurtosis index is > 10. Absolute values of the kurtosis index > 20 indicate a more serious problem. No problems with extreme skewness and kurtosis were detected for the eight variables, indicating they met the assumptions of normal distributions. Pearson's correlation coefficients reflected linear relationships between the variables (Table 4-4).

Multicollinearity was evaluated using tolerance values, variance inflation factors [VIF], and Pearson's correlation coefficients between variables (Table 4-4). Correlation coefficients between the predictors ranged from -.60 to .50, indicating no high correlations were detected (≥ .90). The tolerance values ranged from .44 to .86, while the VIF values were between 1.17 and 2.29. Tolerance values should be > .20 and VIFs should be < 4. As a result, there was no indication of multicollinearity among the research variables.

Table 4-4 Correlation matrix of study variables (n = 330)

Variables	**1**	**2**	**3**	**4**	**5**	**6**	**7**
1. Illness perception[1]							
2. Depression[2]	-.23**						
3. Job stress[3]	.09	.35**					
4. Health literacy[4]	.00	-.18**	-.26**				
5. Asthma self-efficacy[5]	-.12*	-.29**	-.24**	.29**			
6. Social support[6]	.18**	-.48**	-.26**	.28**	.38**		
7. Asthma self-management behaviors[7]	.46**	-.60**	-.28**	.23**	.36**	.50**	
8. Asthma control[8]	-.12*	.46**	.44**	-.17**	-.29**	-.36**	-.54**

*p < .05, **p < .01

[1] The Brief Illness Perception Questionnaire [Brief IPQ], [2] The Hospital Anxiety and Depression Scale-Depression subscale [HADS-D], [3] The Job Stress Scale [JSS], [4] The Functional, Communicative, and Critical Health Literacy Scale [FCCHL scale], [5]The Self-efficacy subscale of the Knowledge, Attitude, and Self-efficacy Asthma Questionnaire [KASE-AQ], [6]The multidimensional scale of perceived social support [MSPSS], [7] The Asthma Self-Management Behavior Instrument [AsSCPI], [8]The asthma control questionnaire [ACQ]

Results of model testing

This study used the analysis of moment structure [AMOS] statistical software program to examine how the hypothesized model fit with the sample data. An important preceding step in the analysis of SEM is to test first the reliability of the measurements before making any attempt to evaluate the structural model.

Measurement model

The researcher used confirmatory factor analysis [CFA] technique to examine measurement models of eight variables, including Measuring illness perception, depression, job stress, health literacy, asthma self-efficacy, social support, asthma self-management behaviors, and asthma control. The results show that these variables were a good construct. Each measurement model was also examined for internal consistency using Cronbach's alpha (Table 4-5).

Table 4-5 Summary of measurement models of studied variables (n = 330)

Names of Variables	Instruments	Items	Factor loading	Fit Indices								Cronbach's alpha
				CMIN	*df*	*p*	CMIN/ *df*	GFI	AGFI	NFI	CFI	RMSEA	
Illness perception	Brief IPQ	8	.70-.93	.00	0	n/a	n/a	1	n/a	1	n/a	n/a	.87
Depression	HADS-D	7	.46-.57	23.02	14	.06	1.64	.98	.96	.93	.97	.04	.75
Job stress	JSS	13	.79-.84	.00	0	n/a	n/a	1	n/a	1	n/a	n/a	.91
Health literacy	FCCHL	14	.45-.80	.00	0	n/a	n/a	1	n/a	1	n/a	n/a	.86
Asthma self-efficacy	KASE-AQ	20	.50-.78	309.75	157	.00	1.97	.92	.89	.91	.96	.05	.94
Social support	MSPSS	12	.67-.86	.00	0	n/a	n/a	1	n/a	1	n/a	n/a	.92
Asthma self-management behaviors	AsSCPI	22	.65-.89	2.02	2	.36	1.01	1	.99	1	1	.01	.92
Asthma control	ACQ	6	.53-.91	.00	0	n/a	n/a	1	1	n/a	n/a	n/a	.85

Note: See Table 2 for the names of the measurement instruments

Results of the hypothesized model testing

After CFA procedures were tested, the next step was to analyze relation latent variables in the model. The results showed the extent to which a hypothesized model fits to sample data (Byrne, 2013) by model-fit indices (Schumacker & Lomax, 2010). The fit indicator included a minimum chi-square value [CMIN] should be non-significant ($p > .05$), and the CMIN divided in degrees of freedom [CMIN/df] should be < 2. The goodness-of-fit index [GFI] should be between .90 to 1.00 and the adjusted goodness-of-fit index [AGFI] between .90 to 1.00. The normed fit index [NFI] should be between .90 to 1.00 and the comparative fit index [CFI] between .95 to 1.00. The root square error of approximation [RMSEA] should be < .05 (Schumacker & Lomax, 2010; Tabachnick & Fidell, 2013).

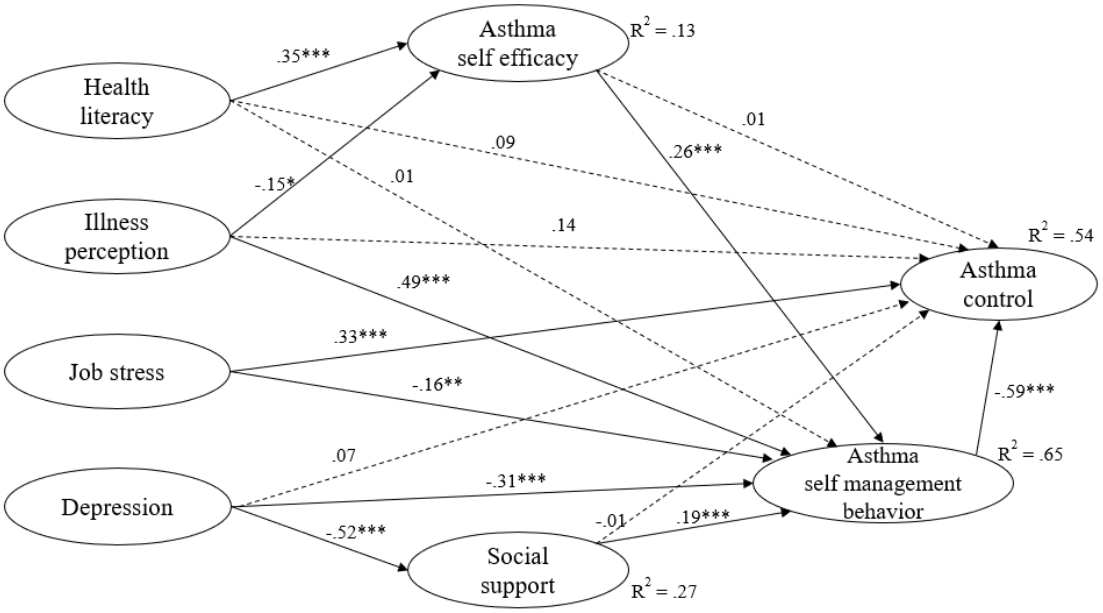
In this study, the hypothesized model consisted of four exogenous latent variables (illness perception, depression, job stress, and health literacy) and four endogenous latent variables (asthma self-efficacy, social support, asthma self-management behaviors, and asthma control). However, the results showed that hypothesized model testing did not fit the data well. The initial results of the hypothesized model testing showed that the CMIN was 293.57 ($p < .001$, $df = 132$), CMIN/df was 2.22, GFI was .92, AGFI was .86, NFI was .89, CFI was .94, and RMSEA was .06 as presented in Figure 4-7.

The relationship between the latent variables indicated the parameter estimates were statistically significant ($p \leq .05$). The initial results of model testing showed that 10 parameter estimates had significant paths (Figure 4-1). Parameter estimates showed significant effects between the following exogenous and endogenous variables. Asthma self-management behaviors had a negative direct effect on asthma control ($\beta = -.59$, $p < .001$). Job stress had a positive direct effect on asthma control ($\beta = .33$, $p < .001$). In addition, job stress had a negative direct effect on asthma self-management behaviors ($\beta = -.16$, $p < .01$). Health literacy had a positive direct effect on asthma self-efficacy ($\beta = .35$, $p < .001$). Illness perception had a negative direct effect on asthma self-efficacy ($\beta = -.15$, $p < .05$) and a positive direct effect on asthma self-management behaviors ($\beta = .49$, $p < .001$). Depression had a negative direct effect on both social support ($\beta = -.52$, $p < .001$) and asthma self-management behaviors ($\beta = -.31$, $p < .001$). Both social support and asthma self-

efficacy had positive direct effects on asthma self-management behaviors (β = .19, $p < .001$; β = .26, $p < .001$, respectively). However, the parameter estimates from health literacy, illness perception, depression, asthma self-efficacy and social support to asthma control were not significant (β = .09, $p > .05$, β = .14, $p > .05$, β = .07, $p > .05$, β = .01, $p > .05$, and β = -.01, $p > .05$, respectively). Also, the parameter estimates from health literacy to asthma self-management behavior was not significant (β = .01, $p > .05$).

Parameter estimates showed significant indirect effects between the following exogenous and endogenous variables (Table 4-6). Illness perception had an indirect effect on asthma control (β = -.27, $p < .001$) through asthma self-efficacy and asthma self-management behaviors. Depression had an indirect effect on asthma control (β = .25, $p < .001$) through asthma social support and asthma self-management behaviors. Job stress had an indirect effect on asthma control (β = .09, $p < .01$) through asthma self-management behaviors. Asthma self-efficacy had an indirect effect on asthma control (β = -.15, $p < .001$) through asthma self-management behaviors. In addition, social support had an indirect effect on asthma control (β = -.12, $p < .01$) through asthma self-management behaviors. However, health literacy did not have a significant indirect effect on asthma control (β = -.05, $p > .05$) through asthma self-efficacy nor asthma self-management behaviors.

Table 4-5 presents the total effects of variables on asthma control. Asthma self-management behaviors had the strongest total direct effect on asthma control (β = -.59, $p < .001$; Table 4-6). The negative total effects on asthma control were illness perception (β = -.13, $p < .05$) and asthma self-efficacy (β = -.14, $p < .01$). The positive total effects on asthma control were job stress (β = .42, $p < .01$) and depression (β = .32, $p < .001$). The path directions that had a significant impact on asthma control in adults with asthma accounted for 54 % of the total variance ($R^2 = .54$).



*p < .05, **p < .01, ***p < .001

Figure 4-1 The hypothesized model of asthma control in adult persons with asthma

Table 4-6 Parameter estimates of direct, indirect, and total effects of hypothesized model (n = 330)

Variables	Asthma self-efficacy			Social support			Asthma self-management behaviors			Asthma control		
	DE	**IE**	**TE**	**DE**	**IE**	**TE**	**DE**	**IE**	**TE**	**DE**	**IE**	**TE**
Illness perception	-.15*		-.15*				.49***	-.04*	.45**	.14	-.27**	-.13*
Depression				-.52***		-.52***	-.31***	-.10*	-.41***	.07	.25***	.32***
Job stress							-.16**		-.16**	.33***	.09**	.42**
Health literacy	.35***		.35***				.01	.09**	.10	.09	-.05*	.04*
Asthma self-efficacy							.26***		.26***	.01	-.15**	-.14**
Social support							.19**		.19**	-.01	-.12**	-.13**
Asthma self-management behaviors										-.59***		-.59***
	R^2 = .13			R^2 = .27			R^2 = .65			R^2 = .54		

Note: *p < .05, **p < .01, ***p < .001

DE = direct effect, IE = indirect effect, TE = total effect

Model modification

The hypothesized model did not fit the data well. Consequently, the hypothesized model was modified by considering the conceptual and modification indices. Model trimming was used by deleting six parameters with low standardized factor loadings and non-significant parameters, including two paths from health literacy to asthma self-management behaviors and asthma control, one path from illness perception to asthma control, one path from depression to asthma control, one path from asthma self-efficacy to asthma control, and one path from social support to asthma control. The modification indices suggested adding paths between the following variables: A path from health literacy to social support and a path from social support to asthma self-efficacy.

The results of the modified model improved the goodness-of-fit indices: The CMIN was equal to 239.57 ($p < .001$, $df = 136$); CMIN/df was 1.76; GFI was .93; AGFI was .91; NFI was .91; CFI was .96; and RMSEA was .048. The modified model fit the data well. Goodness-of-fit indices between the hypothesized model and the modified model met the acceptable levels (Table 4-7).

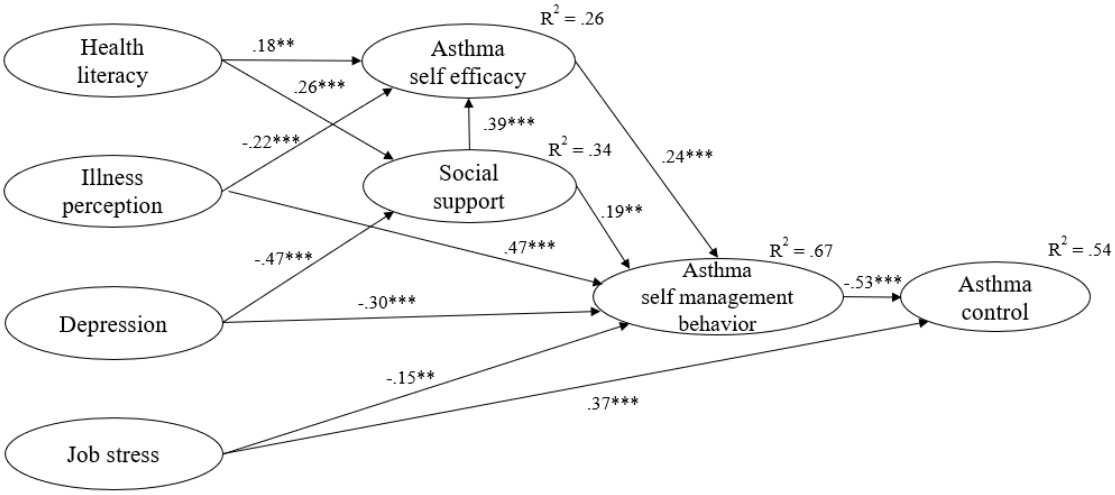
Table 4-7 A comparison of hypothesized model and modified model (n = 330)

Model fit criterion	**Acceptable levels**	**Hypothesized model**	**Modified model**
CMIN	$p > .05$	$\chi^2 = 293.57$ $p < .001$ ($df = 132$)	$\chi^2 = 239.57$ $p < .001$ ($df = 136$)
CMIN/ df	≤ 2	2.22	1.76
GFI	.90 - 1.00	.92	.93
AGFI	.90 - 1.00	.86	.91
NFI	.90 - 1.00	.90	.91
CFI	$\geq .95$	.94	.96
RMSEA	$< .05$	.06	.048

In the modified model of asthma control in adults with asthma, the results of model testing showed that 12 parameter estimates had statistically significant direct paths (Figure 4-2). Asthma self-management behaviors had a negative direct effect on asthma control (β = -.53, p < .001). Job stress had a positive direct effect on asthma control (β = .33, p < .001). Job stress also had a negative direct effect on asthma self-management behaviors (β = -.15, p < .01). Health literacy had a positive direct effect on both asthma self-efficacy (β = .18, p < .01) and social support (β = .26, p < .001). Illness perception had a negative direct effect on asthma self-efficacy (β = -.22, p < .001) and a positive direct effect on asthma self-management behaviors (β = .47, p < .001). Depression had a negative direct effect on both social support (β = -.47, p < .001) and asthma self-management behaviors (β = -.30, p < .001). Social support had a positive direct effect on both asthma efficacy (β = .39, p < .001) and asthma self-management behaviors (β = .19, p < .01). In addition, asthma self-efficacy had a positive direct effect on asthma self-management behaviors (β = .24, p < .001).

Illness perception had an indirect effect on asthma control (β = -.22, p <.001) through asthma self-efficacy and asthma self-management behaviors (Table 4-8). Depression had an indirect effect on asthma control (β = .23, p < .001) through asthma social support and asthma self-management behaviors. Job stress had an indirect effect on asthma control (β = .08, p < .01) through asthma self-management behaviors. Health literacy had an indirect effect on asthma control (β = -.06, p < .001) through asthma self-efficacy and social support. Asthma self-efficacy had an indirect effect on asthma control (β = -.13, p < .001) through asthma self-management behaviors. In addition, social support had an indirect effect on asthma control (β = -.15, p < .01) through asthma self-efficacy and asthma self-management behaviors.

Table 4-8 displays that asthma self-management behaviors had the strongest total effect on asthma control (β = -.53, p < .001). The negative total effects on asthma control were illness perception (β = -.22, p < .001), health literacy (β = -.06, p < .001), and asthma self-efficacy (β = -.13, p < .001). Furthermore, the positive total effects on asthma control were job stress (β = .45, p < .01), and depression (β = .23, p < .001). The paths that had an impact on asthma control in adults with asthma accounted for 54% of the total variance (R^2 = .54).



*p < .05, **p < .01, *** p < .001

Figure 4-2 The final model of asthma control adult persons with asthma

Table 4-8 Parameter estimates of direct, indirect, and total effects of modified model (n = 330)

Variables	Asthma self-efficacy			Social support			Asthma self-management behaviors			Asthma control		
	DE	**IE**	**TE**	**DE**	**IE**	**TE**	**DE**	**IE**	**TE**	**DE**	**IE**	**TE**
Illness perception	-.22***		-.22***				.47***	-.05***	.52***		-.22***	-.22***
Depression		-.18**	-.18**	-.47***		-.47***	-.30***	-.13***	-.43***		.23***	.23***
Job stress							-.15**		-.15**	.37***	.08**	.45**
Health literacy	.18**	.10***	.28***	.26***		.26***		.12***	.12***		-.06***	-.06***
Asthma self-efficacy							.24***		.24***		-.13***	-.13***
Social support	.39***		.39***				.19**	.09***	.28***		-.15***	-.15***
Asthma self-management behaviors										-.53***		-.53***
	R^2 = .26			R^2 = .34			R^2 = .67			R^2 = .54		

Note: *p < .05, **p < .01, ***p < .001

DE = direct effect, IE = indirect effect, TE = total effect

In summary, the final model of asthma control among adults with asthma was influenced by illness perception, depression, job stress, health literacy, asthma self-efficacy, social support, and asthma self-management behaviors. Evaluations of goodness of fit in the final model fit met all acceptable criteria and all path coefficients were statistically significant. The explained variance (R^2) was 54% in the final model.

CHAPTER 5
CONCLUSION AND DISCUSSION

This chapter is comprised of three parts. The first part presents the summary of the study. The second part is a discussion of the research findings and a conclusion. The last part suggests the implications for nursing, limitations of the study, and recommendations for future research.

Summary of the study

The study's objective was to develop and test the causal relationships between predictors and asthma control in adults with asthma. This study used a cross-sectional design to test a hypothesized model. A cluster sampling technique was used to recruit participants at asthma and COPD clinics in four tertiary hospitals in eastern Thailand. Three hundred and thirty-six participants were recruited based on the following inclusion criteria: 1) adults with asthma who were 20 to 60 years; 2) communicate and understand the Thai language; 3) no asthma symptoms that affect their ability to complete a self-administered questionnaire; 4) absence of COPD, heart disease, a disability, or conditions that limited movement; and 5) no cognitive impairment. Nine instruments were used to collect data: A demographic questionnaire, the brief illness perception questionnaire, the Depression subscale of the hospital anxiety and depression scale, the Job Stress Scale, the functional, communicative, and critical health literacy scale, the Self-efficacy subscale of the Knowledge, Attitude, and Self-efficacy Asthma Questionnaire [KASE-AQ], the multidimensional scale of perceived social support, the Asthma Self-Management Behavior Instrument, and The asthma control questionnaire. All instruments were Thai versions. The researcher back-translated the Self-efficacy subscale of the KASE-AQ from the original English into the Thai language. The instruments' Cronbach's alpha coefficients ranged from .75 to .94.

The majority of adults with asthma were female (72.0%) with a mean age of 45.7 years (*SD* = 9.11). More than half were in the middle adult group (77.4%), married (61.3%), and 89.6% were Buddhist. Most participants had completed primary

school (37.5%) or high school (31.5%). Most of them had occupation related to labor (52.7%). Half had insufficient income (50.3%), and about a third had monthly family incomes between 10,001-20,000 Thai baht (35.1%). Over half (53.3%) of the adults with asthma had their diagnosis between 1 to 10 years; the mean length of time of asthma diagnosis was 10.48 years (*SD* = 8.78). More than half of the participants (60.4%) had comorbidity conditions, such as hypertension (29.2%), dyslipidemia (25.6%), diabetes mellitus (16.1%), or other. Most of them (71.7%) were in the moderate and severe persistent group, 36.9% had ever admit to an emergency department or hospitalized for asthma at least once in the past year, and 58.9% had dust and particles in the air as an asthma trigger. More than half of the participants (58.3%) were either overweight or obese.

The results of model testing found that the hypothesized model of adults with asthma did not fit the data well. After modification, the final model showed that job stress and asthma self-management behaviors had statistically significant direct effects on asthma control ($\beta = .37$ and $\beta = -.53$, respectively). Illness perception, depression, job stress, asthma self-efficacy, and social support had significant indirect effects on asthma control through asthma self-management behaviors ($\beta = -.25$, $\beta = .16$, $\beta = .08$, $\beta = -.13$, and $\beta = -.10$, respectively). Health literacy, illness perception, and social support had significant indirect effects on asthma control through asthma self-efficacy and asthma self-management behaviors ($\beta = -.02$, $\beta = .03$, and $\beta = .02$, respectively). In addition, health literacy and depression had significant indirect effects on asthma control through social support and asthma self-management behaviors ($\beta = -.03$ and $\beta = -.05$, respectively). The statistically significant variables explained 54% of the total variance of the model for asthma control in adults with asthma. Goodness-of-fit indices were CMIN = 239.57, $df = 136$, $p < .001$, CMIN/df = 1.76, GFI = .93, AGFI = .91, NFI = .91, CFI = .96, and RMSEA = .048.

Discussion of the research findings

The results of this study found that the sample reported poor asthma control ($M = 1.59$, $SD = 0.97$). This may be the result of decreased lung function that caused the adults to have more severe asthma and difficulty controlling the disease (Irani

et al., 2019; Tomisa, Horváth, Sánta, Keglevich, & Tamási, 2021). Most of the participants (71.7%) had moderate or severe persistent peak expiratory flow rate that indicates lower lung functioning. The participants were between 20-59 years old (M = 45.7, SD = 9.11), and 77.4% of the participants were over 40 years old. Lung function begins to decline at age 35, leading to a slight increase in breathing difficulties (Asthma UK and British Lung Foundation Partnership, 2019). The long length of time since asthma diagnosis (M = 10.48, SD = 8.78) also suggests a prolonged lung inflammation that impairs lung function (Tomisa et al., 2021).

The BMI of the overweight group (M = 26.51, SD = 4.76) is another factor that can increase the inflammatory system in the body and make it difficult to control asthma (Tomisa et al., 2021, Zaibi et al., 2021). In addition, most of the participants (60.4%) had co-morbidities. A comorbidity can affect the response to asthma treatment and worsen the disease's pathology (Tomisa et al., 2021). This makes it more difficult to control asthma and increases the risk of exacerbation, especially the comorbidities related to respiratory, cardiovascular, and metabolic diseases (Su et al., 2016).

Poor control of asthma may be influenced by a person's education, income, and occupation. About a third of the participants completed only primary education and earned an insufficient income (Ilmarinen, Vähätalo, Tuomisto, Niemelä, & Kankaanranta, 2021). Many of the participants were employed as workers who had low job decision latitude or could not modify their work environments to accommodate their asthma. These are barriers in preventing triggers of asthma exacerbation (Hartmann et al., 2017). Moreover, more than half of the participants were female; sex hormones can affect asthma control (Zein & Erzurum, 2015). Women experience more asthma symptoms than men and use more rescue medications (Pignataro, Bonini, Forgione, Melandri, & Usmani, 2017; Tomisa et al., 2021).

Factors influencing asthma control

There were seven factors that influenced asthma control. Results showed that illness perception, depression, job stress, health literacy, asthma self-efficacy, social support, asthma self-management behaviors had direct and/or indirect effects on asthma control. Additionally, there were three factors found to be mediators

between illness perception, depression, job stress, health literacy, and asthma control in the modified model, including asthma self-efficacy, social support, and asthma self-management behaviors.

This model supported the individual and family self-management theory [IFSMT] (Ryan & Sawin, 2014). The IFSMT guided this study and illustrated how individuals or family members should respond to achieve personal health goals. Desirable health status is related to achieving self-management behaviors that are specific actions taken to manage the condition or maintain a healthy state (Ryan & Sawin, 2009; 2014). This study established that asthma control in adults with asthma requires individual and family self-management behaviors and stress-related work. It also shows factors affecting self-management behaviors to achieve asthma control. Self-efficacy and social support within the process dimensions emphasize the facilitation to promote asthma self-management behaviors. In the context dimension, health literacy, illness perception, and depression all affect an individual's and family's ability to engage in the self-management process, which directly affects outcomes. Additionally, Job stress, depression, and illness perceptions also directly affected the success of asthma self-management behaviors. The researcher discussed the effect of various factors as follows.

Direct effect on asthma control

Asthma self-management behaviors in adults with asthma had a direct effect on asthma control ($\beta = -.53$, $p < .001$). Appropriate and continuous asthma self-management behaviors, related to managing medications, symptoms, and the environment, are important risk factors controlling future symptoms.

Asthma requires long-term treatment in which controller medications should be taken daily to curb the underlying inflammation of the lungs (GINA, 2019; Jabeen et al., 2018). Adults who adhere to their prescribed asthma medication and proper use of inhaler devices will receive more benefit from treatment, allowing them to control their asthma (Allegra, Braga, & Dal Negro, 2012; Al-Zahrani et al, 2015; Jabeen et al., 2018). Those who neglect to monitor asthma symptoms or accept it as a normal routine may not be able to detect the worsening effects of asthma.

If adults with asthma regularly observe asthma symptoms, they may detect early symptoms. Asthma symptoms that are not at a severe level may make it easier

for them to control (GINA, 2019). Asthma control is influenced by environmental changes that are associated with environmental exposure and viral infections (Sterling, 2012). Adults with poor asthma control are more likely to experience symptoms when exposed to environmental triggers. Avoiding them is a self-management behavior that improves asthma control (De Vries et al., 2005).

The study's results were consistent with previous research that has shown that asthma self-management behaviors are significantly related to asthma control. For example, highly effective self-management behaviors result in better control of asthma (Ruengkajorn & Kittiwatanapaisan, 2011). Adherence self-management reduces the frequency and severity of exacerbations in adults with asthma (Kotses & Creer, 2010). High adherence to medication in adults with asthma results in well-controlled asthma (Jabeen et al., 2018). Low adherence to inhaled corticosteroids produces poor asthma control (Clatworthy, Price, Ryan, Haughney, & Horne, 2009). Administering medications can reduce exposure to triggers, thus improving asthma control (De Vries et al., 2005). In addition, inappropriately used devices by adults result in uncontrolled asthma (Al-Zahrani et al., 2015).

Job stress in adults with asthma had a direct effect on asthma control ($\beta = .37$, $p < .001$). Job stress may increase arousal, rumination, anxiety, and work pressures that can lead to psychological stress. Job stress may induce airway inflammation because of the role of altered corticosteroid responsiveness (Vliagoftis, 2014; Kullowatz et al., 2008). Adults with asthma may experience increased severity, frequency, and duration of asthma symptoms. Additionally, job stress can cause people to become more sensitive to their usual asthma triggers. It may cause the body to release stress hormones that prepare for a "fight or flight" response. The body responds to the stress hormones with shallow and rapid breathing, higher heart rate, and tense muscles (Asthma UK, 2019; Vliagoftis, 2014). These changes in the normal breathing pattern can lead to asthma exacerbation. Adults with asthma who work under constant job stress may smoke or drink alcohol to reduce their anxiety. These actions can exacerbate their asthma symptoms, indicating the disease is not well managed (Asthma UK, 2019).

The study's results were consistent with previous research that has shown job stress is significantly associated with asthma control. A review of two decades of

experimental and observational studies indicates there is a causal relationship between chronic stress, such as job stress, and poor asthma control (Hurwitz, 2003). More recent studies have shown that adults with asthma who have very stressful or extremely stressful jobs are twice as likely to have asthma symptoms compared to those with little or mildly stressful jobs (Eng, Mannetje, Pearce, & Douwes, 2011). Job stress also correlates with asthma control in that overcommitment is associated with poor asthma control (Hartmann et al., 2017).

Indirect effect on asthma control

The results of model testing found that illness perception, depression, job stress, health literacy, asthma self-efficacy, and social support had indirect effects on asthma control.

Asthma self-efficacy had an indirect effect on asthma control through asthma self-management behaviors in adult persons with asthma ($\beta = .24$, $p < .001$). People with self-efficacy have the ability to complete a task. This is an important predictor of the self-management and control of chronic diseases (Bodenheimer, Lorig, Holman, & Grumbach, 2002). Self-efficacy gives confidence that people can overcome barriers in maintaining asthma self-management behaviors. Higher self-efficacy is associated with lower barrier perceptions and higher asthma outcome expectations (Rhee et al., 2018). Self-efficacy helps adults with asthma to control their disease and reduce uncertainty when living with the unpredictable nature of asthma. If people believe that they have the power and skills to attain certain outcomes, they will put forth their best effort to achieve it (Capa-Aydin, Uzuntiryaki-Kondakci, & Ceylandag, 2018). Adults with asthma with high self-efficacy levels may be more motivated to be involved in asthma prevention and asthma management activities (Holland, 2014; Talreja et al., 2012). Confidence instills the abilities to accomplish self-management behaviors; therefore, high self-efficacy in adults with asthma leads to more effective self-management behaviors for promoting asthma control. This is consistent with Holland (2014) who reported that self-efficacy in adults with asthma is associated with self-management behaviors.

Model testing found that social support had an indirect effect on asthma control through asthma self-efficacy ($\beta = .18$, $p < .001$) and asthma self-management behaviors ($\beta = .19$, $p < .01$). A person's daily activities often involve interactions with

others in society, whether they are family, friends, or significant others. Social support is linked to many physical and psychological benefits for people with chronic diseases (Gallant, 2003). Social support provides adults with asthma encouragement and empowerment, as well as tangible support, such as receiving advice from those around them. They may be more confident in dealing with problems caused by asthma. Holland (2014) found that higher social support was associated with higher self-efficacy in adults with asthma. Family, friends, or significant others may facilitate the self-management process in different ways, such as providing occasional advice, and emotional support. Social support strengthens adults with asthma to implement self-management behaviors that reduce risk factors related to asthma attacks, promote medication adherence, and provide the necessary resources to achieve the goals of asthma control. Both Sin et al. (2005) and Holland (2014) found that higher social support is associated with higher asthma self-management behaviors.

The results of model testing found that job stress had an indirect effect on asthma control through asthma self-management behaviors ($\beta = -.15, p < .01$). Adults spend much of their time working, leaving less time for other activities. Adults with asthma may not be able to plan and maintain self-management behaviors, such as adhering closely to medication use and observing asthma symptoms. It may often be more difficult to self-manage their asthma when they are unable to adjust work to the asthma conditions they are experiencing. Jobs that are characterized by lower flexibility or low job decision latitude are barriers to self-manage asthma conditions (Hartmann et al., 2017). Extreme work anxiety and overcommitment can lead to a decreased awareness in asthma-related physiological changes and inadequate avoidance of triggers in the workplace. When immersed in work, adults with asthma may not be able to manage their acute asthma symptoms properly and promptly. Those who experience high job stress may feel guilty or reluctant to take time off from work to keep a doctor's appointment or go to the emergency room when they are having an exacerbation because they do not want it to impact their work (Heinrichs et al., 2018). High overcommitment is associated with inadequate trigger avoidance and acute symptom management (Heinrichs, Schultz, Hummel, Jütjens, & Loerbroks, 2021).

The results of model testing also found that illness perception had an indirect effect on asthma control through asthma self-efficacy ($\beta = -.22, p < .001$) and asthma self-management behaviors ($\beta = .47, p < .001$). Illness perception is how a person senses an asthma problem or threat to health. If someone perceives that they are unable to understand and uncontrol the diseases it will make them less confident in disease management (Katz et al., 2002; Magklara & Morrison, 2016). A study by Katz et al. (2002) showed less perceived control in asthma patients is associated with less asthma self-efficacy. Adults with asthma, who believe that their disease is so severe that the treatment they are receiving is unable to improve it, may lack self-efficacy when fighting the disease symptoms (Magklara & Morrison, 2016). Illness perceptions can form coping behaviors that create asthma self-management behavior (Keptein et al., 2010). If adults with asthma are aware of the severity of their symptoms and the effects of asthma, they may try to maintain self-management behaviors to reduce the suffering. On the other hand, if adults with asthma believe that the absence of symptoms indicates an absence of the disease or they become accustomed to normal symptoms in daily life, they may not practice asthma self-management (Boonsawat et al., 2015). Crowder (2012) found a significant relationship between representations of identity, consequences, and symptom management, which are part of asthma self-management behaviors. Adults with asthma who recognize that their incurable disease is chronic in nature will strive to improve their health and find ways to have effective self-management behaviors that will increase their ability to control the asthma (Bahçecioğlu & Çevikakyl, 2014).

Model testing also found that depression had an indirect effect on asthma control through social support ($\beta = -.47, p < .001$) and asthma self-management behaviors ($\beta = -.30, p < .001$). Depression may cause patients to isolate themselves from family, friends, and significant others who could provide emotional support (DiMatteo, 1994). Adewuya and Adeyeye (2017) found that depression is more common in adults with asthma and is significantly associated with levels of social support. Depression contributes to creating injurious effects on asthma self-management behaviors. Depressive symptoms occurring in people with chronic illness may impair cognitive function, energy, and motivation (Radloff, 1977). Depression may increase the burden on those who are coping with multiple diseases,

leading them to neglect asthma self-management. Adults with asthma who are depressed have a decreased effectiveness on self-management and treatment compliance (Opolski & Wilson, 2005). Moreover, those with depressive symptoms have lower medication adherence (Krauskopf et al., 2013).

Health literacy also had an indirect effect on asthma control through both asthma self-efficacy ($\beta = .18$, $p < .01$) and social support ($\beta = .26$, $p < .001$). Adults with asthma use functional, communicative, and critical literacy to provide them with access to useful health information about asthma control. Health literacy serves as a tool to help individuals scrutinize and seek quality social support resources that match their situations (Lee et al., 2016). People with lower health literacy often hide their deficiencies from family, friends, and significant others because they experience shame or guilt that can cause them to become isolated and to perceive themselves to be less available to social support (Liu, Meng, Tu, & Liu, 2020; Stewart et al., 2014). It has been documented that health literacy has a direct positive association with social support (Liu et al., 2020). Health literacy is also correlated with self-efficacy in people with chronic illness (Lee et al., 2016).

Adults with asthma with higher health literacy have better access to health resources and can analyze and apply the knowledge appropriate to their situations, resulting in gaining confidence in self-management. Health literacy plays an important role in accessing health services, and influences a better understanding the disease and its treatment options. Therefore, adults with asthma with higher health literacy can communicate more effectively with healthcare providers about their disease and its treatment. They may be able to participate in decision-making and choosing treatment options, thus increasing their self-efficacy for asthma management (Melton, Graff, Holmes, Brown, & Bailey, 2014). Lee et al. (2016) reported that health literacy has direct effects on self-efficacy in adults with type 2 diabetes.

According to the IFSMT, factors in the context dimension affect an individual's and family's ability to engage in the process dimension and directly impact proximal and distal outcomes (Ryan & Sawin, 2009; 2014). This model showed illness perception, depression, job stress, and health literacy were in the context dimension. Illness perception, depression, and health literacy directly affected asthma self-efficacy or/ and social support in the process dimension. Illness

perception, depression, and job stress directly affected asthma self-management behaviors, which were the proximal outcome. Moreover, job stress directly affected asthma control, which is a distal outcome of the IFSMT.

In the process dimension, constructs in the process dimension are linked to constructs in the context dimension, are internally related, and affect the outcome dimension (Ryan & Sawin, 2009; 2014). This model showed asthma self-efficacy and social support in the process dimension received influence from illness perception, depression and health literacy. Furthermore, asthma self-efficacy and social support are interrelated, with social support affecting asthma self-efficacy. In addition, asthma self-efficacy and social support affected asthma self-management behaviors or proximal outcomes in the IFSMT.

In the outcome dimension, the achievement of proximal outcomes caused distal outcomes. The proximal and distal outcomes were affected by both context and process dimensions (Ryan & Sawin, 2009; 2014). This model showed asthma self-management behaviors had a direct effect on asthma control. The context dimension, including; illness perception, depression, and job stress, and the process dimension, including; asthma self-efficacy and social support, directly affected asthma self-management behaviors. Moreover, job stress also had a direct effect on asthma control. In overview, this model represented the IFSMT.

Conclusion

Asthma control is the goal of treatment management for adults with asthma; however, most adults with asthma have poor asthma control. Although the hypothesized model with seven factors derived from the literature did not fit the data well, modification of the model retained the seven factors with significant paths showing their effects on asthma control. The total variance explained was 54% for asthma control. The results of this study are explained by the IFSMT. By model testing, it was shown that risk and protective factors in the context dimension, constructs in the process dimension, proximal outcome, and distal outcome were interrelated. The seven factors that influenced asthma control were illness perception, depression, job stress, health literacy, asthma self-efficacy, social support, asthma

self-management behaviors. Asthma self-efficacy, social support, and asthma self-management behaviors were mediators of asthma control. Asthma self-management behaviors were the strongest factor influencing asthma control.

Implications for using

The results of this study provide an understanding of the seven factors that influence asthma control in adults with asthma. These are useful for nursing practice, nursing education, nursing research, and nursing administration.

1. Nursing practice: Nurses should implement strategies to promote asthma control by improving illness perception, health literacy, asthma self-efficacy, social support, asthma self-management behaviors, and reducing depression and job stress. Nurses should emphasize individual activities that enable adults with asthma to actively involve themselves in self-care.

2. Nursing education: Nurse educators could use the results by teaching nursing students about important factors affecting asthma control. Nursing student could better understand the relationship between factors and use them in their nursing care plans to help asthma adults to achieve the goals of asthma treatment.

3. Nursing research: The findings support the individual and family self-management theory [IFSMT]. Nurses can use the new knowledge to develop evidence-based interventions that reduce depression and job stress, whereas promote illness perception, health literacy, asthma self-efficacy, social support, and asthma self-management behaviors to improve asthma control in adults with asthma.

4. Nursing administration: Nurse administrators may use the new knowledge about the seven factors that affect asthma control, particularly self-management behaviors. Nurse administrators can oversee the development and evaluation of policies and guidelines for treating adults with asthma that emphasize self-management behaviors.

Limitation of the study

This study had some limitations. First, the model testing with the cross-sectional study design that does not identify true causal relationships because data are

collected at a single time point. Asthma control can change throughout the duration of the illness and treatment. Second, the participants were at tertiary hospitals in eastern Thailand. This limits the ability to generalize to the entire population of adults with asthma. Third, some instruments may not have been suitable for adults with asthma. The asthma self-care practice instrument was developed for adolescents and the original items were not specific to adults; changes in wording, however, attempted to correct for this problem. And, the functional, communicative, and critical health literacy scale measured general health literacy, not specific health literacy in asthma. Finally, the data collected during the COVID-19 pandemic might have exposed participants to unforeseen problems that they normally would not have experienced in the situation. This might have affected the results.

Recommendations for future research

The results were useful for future research as follows:

1. Further research could recruit participants from a variety of locales and settings in Thailand to have a better representation of Thai adults with asthma. The results would expand the understanding of asthma control in Thailand.

2. It would be useful to develop an adult asthma self-management behavior instrument to assess all aspects of self-management behaviors in adults with asthma. The instrument might provide a more suitable understanding of adults with asthma in Thailand.

3. Future studies should develop intervention programs to promote and enhance asthma control in adults with asthma. They would be designed and based on significant factors found in this and other studies, including illness perception, depression, job stress, health literacy, asthma self-efficacy, social support, and asthma self-management behaviors.

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APPENDICES

APPENDIX A

Institutional review board

ที่ ๐๒๔/๒๕๖๓

เอกสารรับรองผลการพิจารณาจริยธรรมการวิจัยในมนุษย์
มหาวิทยาลัยบูรพา

คณะกรรมการพิจารณาจริยธรรมการวิจัยในมนุษย์ มหาวิทยาลัยบูรพา ได้พิจารณาโครงการวิจัย

รหัสโครงการวิจัย : G-HS 027/2563
โครงการวิจัยเรื่อง : โมเดลเชิงสาเหตุของปัจจัยที่มีผลต่อการควบคุมโรคหืดในผู้ป่วยโรคหืดวัยผู้ใหญ่
หัวหน้าโครงการวิจัย : ร.อ.หญิงพัทธ์ชนก วิถีธรรมศักดิ์
หน่วยงานที่สังกัด : นิสิตระดับบัณฑิตศึกษา คณะพยาบาลศาสตร์

คณะกรรมการพิจารณาจริยธรรมการวิจัยในมนุษย์ มหาวิทยาลัยบูรพา ได้พิจารณาแล้วเห็นว่า โครงการวิจัยดังกล่าวเป็นไปตามหลักการของจริยธรรมการวิจัยในมนุษย์ โดยที่ผู้วิจัยเคารพสิทธิและศักดิ์ศรีในความเป็นมนุษย์ ไม่มีการล่วงละเมิดสิทธิ สวัสดิภาพ และไม่ก่อให้เกิดภยันตรายแก่ตัวอย่างการวิจัยและผู้เข้าร่วมโครงการวิจัย

จึงเห็นสมควรให้ดำเนินการวิจัยในขอบข่ายของโครงการวิจัยที่เสนอได้ (ดูตามเอกสารตรวจสอบ)

๑. แบบเสนอเพื่อขอรับการพิจารณาจริยธรรมการวิจัยในมนุษย์	ฉบับที่ ๒ วันที่ ๒๒ เดือน เมษายน พ.ศ. ๒๕๖๓
๒. เอกสารโครงการวิจัยฉบับภาษาไทย	ฉบับที่ ๒ วันที่ ๒๒ เดือน เมษายน พ.ศ. ๒๕๖๓
๓. เอกสารชี้แจงผู้เข้าร่วมโครงการวิจัย	ฉบับที่ ๒ วันที่ ๒๒ เดือน เมษายน พ.ศ. ๒๕๖๓
๔. เอกสารแสดงความยินยอมของผู้เข้าร่วมโครงการวิจัย	ฉบับที่ ๑ วันที่ ๒๖ เดือน มีนาคม พ.ศ. ๒๕๖๓
๕. เอกสารแสดงรายละเอียดเครื่องมือที่ใช้ในการวิจัยซึ่งผ่านการพิจารณาจากผู้ทรงคุณวุฒิแล้ว หรือชุดที่ใช้เก็บข้อมูลจริงจากผู้เข้าร่วมโครงการวิจัย	ฉบับที่ ๒ วันที่ ๒๒ เดือน เมษายน พ.ศ. ๒๕๖๓
๖. เอกสารอื่น ๆ (ถ้ามี)	ฉบับที่ - วันที่ - เดือน - พ.ศ. -

วันที่รับรอง : วันที่ ๘ เดือน มิถุนายน พ.ศ. ๒๕๖๓
วันที่หมดอายุ : วันที่ ๗ เดือน มิถุนายน พ.ศ. ๒๕๖๔

ลงนาม
(รองศาสตราจารย์ ดร.วิทวัส แจ้งเอี่ยม)
ประธานคณะกรรมการพิจารณาจริยธรรมการวิจัยในมนุษย์ มหาวิทยาลัยบูรพา
ชุดที่ ๑ (กลุ่มคลินิก/ วิทยาศาสตร์สุขภาพ/ วิทยาศาสตร์และเทคโนโลยี)

ที่ ปจ ๐๐๓๒.๓๐๒/จ๖๓๑

โรงพยาบาลเจ้าพระยาภัยภูเบศร
๒๒/๓ หมู่ที่ ๑๒ ถ.บอทำงาม
อำเภอเมือง จังหวัดปราจีนบุรี

๕ ธันวาคม ๒๕๖๓

เรื่อง แจ้งผลการดำเนินการเก็บข้อมูลวิจัย

เรียน คณบดีคณะพยาบาลศาสตร์

อ้างถึง หนังสือมหาวิทยาลัยบูรพา คณะพยาบาลศาสตร์ ที่ อว ๘๓๐๖/๐๐๕๔๖ ลงวันที่ ๑๒ มิถุนายน ๒๕๖๓

ตามที่ ร้อยเอกพัทธ์ชนก วิถีธรรมศักดิ์ นิสิตหลักสูตรปรัชญา - ดุษฎีบัณฑิต สาขาวิชาพยาบาลศาสตร์ (หลักสูตรนานาชาติ) คณะพยาบาลศาสตร์ มหาวิทยาลัยบูรพา ได้จัดทำดุษฎีนิพนธ์ เรื่อง "A CAUSAL MODEL OF ASTHAMA CONTROL IN ADULT PERSONS WITH ASTHMA " ได้ขออนุญาตเก็บข้อมูลจากกลุ่มตัวอย่าง คือ ผู้ป่วยโรคหืดที่มารับการรักษาอายุระหว่าง ๑๘ – ๖๐ ปี ณ แผนกผู้ป่วยนอก โรงพยาบาลเจ้าพระยาภัยภูเบศร จังหวัดปราจีนบุรี ตามหนังสือที่อ้างถึง

ในการนี้ คณะกรรมการพิจารณาจริยธรรมสำหรับงานวิจัย โรงพยาบาลเจ้าพระยาภัยภูเบศร ชุดที่ประชุมครั้งที่ ๑/๒๕๖๔ เมื่อวันที่ ๒๗ พฤศจิกายน ๒๕๖๓ เลขที่ IRB – BHUBEJHR – ๑๐๓ พิจารณาแล้ว เห็นควรให้ ร้อยเอกพัทธ์ชนก วิถีธรรมศักดิ์ เก็บข้อมูลดังกล่าวได้

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายแพทย์ชาติชาย คล้ายสุบรรณ)
ประธานคณะกรรมการพิจารณาจริยธรรมสำหรับงานวิจัย
โรงพยาบาลเจ้าพระยาภัยภูเบศร

สำเนาเพื่อ
๑๔/๑๒/๖๓

กลุ่มงานพัฒนาทรัพยากรบุคคล
ทร. ๐ ๓๗๒๑ ๑๐๘๘ ท่อ ๒๕๑๐
ทรสาร ๐ ๓๗๔๕ ๖๒๐๕

เรียน คณบดี
ด้วย โรงพยาบาลเจ้าพระยาภัยภูเบศร อ้างถึงหนังสือที่ อว ๘๓๐๖/๐๐๕๔๖ ลว ๑๒ มิ.ย.๖๓ อนุญาตให้ ร้อยเอกพัทธ์ชนก วิถีธรรมศักดิ์ นิสิตหลักสูตรปรัชญา-ดุษฎีบัณฑิต สาขาวิชาพยาบาลศาสตร์ (หลักสูตรนานาชาติ) เก็บข้อมูลงานวิจัยได้
จึงเรียนมาเพื่อ
๑. เพื่อโปรดทราบ
๒. เห็นควร มอบงานบัณฑิต (คุณพรรณนิภา), ทราบ เพื่อดำเนินการส่วนที่เกี่ยวข้องต่อไป

๑๔ ธ.ค. ๖๓

โรงพยาบาลพุทธโสธร

เอกสารรับรองโครงการวิจัย เลขที่ BSH-IRB ๐๓๘/๒๕๖๓

โดย

คณะกรรมการพิจารณาจริยธรรมการวิจัยในคน โรงพยาบาลพุทธโสธร

ชื่อโครงการ : โครงการวิจัยเรื่อง "โมเดลเชิงสาเหตุของปัจจัยที่มีผลต่อการควบคุมโรคหืดในผู้ป่วยโรคหืดวัยผู้ใหญ่ (A causal model of asthma control in adult persons with asthma)"

ผู้วิจัยหลัก : ร้อยเอกหญิงพัทธ์ชนก วิลีธรรมศักดิ์

คณะกรรมการจริยธรรมการวิจัยในคน โรงพยาบาลพุทธโสธร พิจารณาแล้ว มีมติเอกฉันท์ ให้การรับรอง โครงร่างการวิจัยตามขอบข่ายที่เสนอขอดำเนินการวิจัย

วันที่รับรอง : ๒๔ สิงหาคม ๒๕๖๓

วันหมดอายุ : ๒๓ สิงหาคม ๒๕๖๔

โดยผู้วิจัยจะดำเนินการวิจัยในโรงพยาบาลพุทธโสธร ดังนี้

๑. มีกระบวนการคุ้มครองอาสาสมัครงานวิจัย ตามรายละเอียดที่เสนอขออนุมัติจริยธรรมวิจัย

๒. ดำเนินการเก็บรวบรวมข้อมูลตามกระบวนการวิจัยที่ขอรับการรับรองทุกขั้นตอน

๓. รายงานเหตุการณ์ไม่พึงประสงค์ที่เกิดขึ้นกับอาสาสมัครเข้าร่วมการวิจัยต่อคณะกรรมการฯ

๔. รายงานความก้าวหน้า/การยุติโครงการวิจัยต่อคณะกรรมการฯ

๕. ส่งรายงานวิจัย ฉบับสมบูรณ์แก่โรงพยาบาลพุทธโสธร จำนวน ๑ เล่ม

ลงนาม.....
(นายเวทิส ประทุมศรี)
ประธานคณะกรรมการพิจารณาจริยธรรมการวิจัยในคน
โรงพยาบาลพุทธโสธร

ลงนาม.....
(นางสาวสมบัติ ชุติมานุกูล)
ผู้อำนวยการโรงพยาบาลพุทธโสธร

ฉบับที่ 018/2563

สภากาชาดไทย
The Thai Red Cross Society

หนังสือรายงานผลการพิจารณาจริยธรรมการวิจัย
โรงพยาบาลสมเด็จพระบรมราชเทวี ณ ศรีราชา

1. ชื่อโครงการวิจัย: โมเดลเชิงสาเหตุของปัจจัยที่มีผลต่อการควบคุมโรคหืดในผู้ป่วยโรคหืดวัยผู้ใหญ่
(A causal model of asthma control in adult persons with asthma)

2. ผู้วิจัยหลัก: ร.อ.หญิงพัทธ์ชนก วิถีธรรมศักดิ์
นิสิตปริญญาเอก หลักสูตรปรัชญาดุษฎีบัณฑิต สาขาวิชาพยาบาลศาสตร์ (นานาชาติ)
คณะพยาบาลศาสตร์ มหาวิทยาลัยบูรพา

3. ผลการพิจารณาของคณะกรรมการพิจารณาจริยธรรมงานวิจัย มีมติเห็นชอบ ดังนี้
(/) อนุมัติ (โดยไม่มีเงื่อนไข)
( ) อนุมัติโดยมีเงื่อนไข ให้ปรับปรุงแก้ไข
( ) รอการพิจารณาหรือยังไม่พิจารณา
( ) ไม่อนุมัติ

4. วันที่ให้การรับรอง : 23 ก.ค. 2563

ลงนาม.....
(รองศาสตราจารย์นายแพทย์เรืองศักดิ์ เลิศชจรสุข)
ประธานคณะกรรมการพิจารณาจริยธรรมการวิจัย

ลงนาม.....
(รองศาสตราจารย์ นายแพทย์โสภณ นภาธร)
ผู้ช่วยเลขาธิการสภากาชาดไทย และ
ผู้อำนวยการโรงพยาบาลสมเด็จพระบรมราชเทวี ณ ศรีราชา

หนังสือรับรองการพิจารณาจริยธรรมการวิจัยในมนุษย์ จังหวัดจันทบุรี/เขตสุขภาพที่ 6

สำนักงานคณะกรรมการพิจารณาจริยธรรมการวิจัยในมนุษย์ จังหวัดจันทบุรี/เขตสุขภาพที่ 6
โรงพยาบาลพระปกเกล้า อำเภอเมือง จังหวัดจันทบุรี
เอกสารรับรองเลขที่ CTIREC 058 วันที่ 21 ก.ค. 2563
ชื่อโครงการวิจัยเรื่อง

โมเดลเชิงสาเหตุของปัจจัยที่มีผลต่อการควบคุมโรคหอบหืดในผู้ป่วยโรคหืดวัยผู้ใหญ่
A causal model of asthma control in adult persons with asthma

เลขที่โครงการ	CTIREC 060/63
ชื่อหัวหน้าโครงการ	ร.อ.หญิงพัทธ์ชนก วิธีธรรมศักดิ์
หน่วยงานที่สังกัด	คณะพยาบาลศาสตร์ มหาวิทยาลัยบูรพา
วิธีการทบทวน	การพิจารณาโครงการวิจัยแบบเร่งด่วน
รายงานความคืบหน้า	เมื่อดำเนินการเสร็จสิ้นแต่ไม่เกิน 1 ปี
เอกสารที่ได้การรับรอง	

1. โครงร่างงานวิจัยเรื่อง โมเดลเชิงสาเหตุของปัจจัยที่มีผลต่อการควบคุมโรคหอบหืดในผู้ป่วยโรคหืดวัยผู้ใหญ่ Version 1 Date 21/07/63
2. แบบเอกสารชี้แจงข้อมูลสำหรับอาสาสมัคร (Participant information sheet) Version 1 Date 21/07/63
3. แบบเอกสารแสดงความยินยอมโดยได้รับการบอกกล่าว (Informed consent form) Version 1 Date 21/07/63
4. เครื่องมือที่ใช้ในการวิจัย
   - แบบสอบถามการวิจัย เรื่อง โมเดลเชิงสาเหตุของการควบคุมโรคหืดในผู้ป่วยโรคหืดวัยผู้ใหญ่ Version 1 Date 21/07/63
5. แบบบันทึกประวัตินักวิจัย Version 1 Date 21/07/63

คณะกรรมการพิจารณาจริยธรรมการวิจัยในมนุษย์ จังหวัดจันทบุรี/เขตสุขภาพที่ 6 ขอรับรองว่าโครงการดังกล่าวข้างต้นได้ผ่านการพิจารณาเห็นชอบโดยสอดคล้องกับแนวทางที่เป็นมาตรฐานสากลได้แก่ Declaration of Helsinki, The Belmont Report, CIOMS Guideline และ International Conference on Harmonization in Good Clinical Practice (ICH-GCP)

ลงนาม .....
(ดร.พรทิพย์ สุขอติศัย)
เลขานุการคณะกรรมการพิจารณาจริยธรรมการวิจัยในมนุษย์ จังหวัดจันทบุรี/เขตสุขภาพที่ 6

ลงนาม .....
(นายแพทย์ชีรยุทธ นิ่มคณิสรณ์)
ประธานคณะกรรมการพิจารณาจริยธรรมการวิจัยในมนุษย์ จังหวัดจันทบุรี/เขตสุขภาพที่ 6

APPENDIX B

Participant information and consent form

เอกสารชี้แจงผู้เข้าร่วมโครงการวิจัย
(Participant Information Sheet)

รหัสโครงการวิจัย : G-HS 027/2563
(สำนักงานคณะกรรมการพิจารณาจริยธรรมในมนุษย์ มหาวิทยาลัยบูรพา เป็นผู้ออกรหัสโครงการวิจัย)
โครงการวิจัยเรื่อง : โมเดลเชิงสาเหตุของปัจจัยที่มีผลต่อการควบคุมโรคหืดในผู้ป่วยโรคหืดวัยผู้ใหญ่
เรียน ผู้ร่วมโครงการวิจัย

ข้าพเจ้า ร.อ.หญิงพัทธ์ชนก วิมีธรรมศักดิ์ นิสิตหลักสูตรปรัชญาดุษฎีบัณฑิต สาขาวิชาพยาบาลศาสตร์ คณะพยาบาลศาสตร์ มหาวิทยาลัยบูรพา ขอเรียนเชิญท่านเข้าร่วมโครงการวิจัย "โมเดลเชิงสาเหตุของปัจจัยที่มีผลต่อการควบคุมโรคหืดในผู้ป่วยโรคหืดวัยผู้ใหญ่" ก่อนที่ท่านจะตกลงเข้าร่วมการวิจัย ขอเรียนให้ท่านทราบรายละเอียดของโครงการวิจัย ดังนี้

โครงการวิจัยนี้มีวัตถุประสงค์เพื่อทดสอบความสัมพันธ์เชิงสาเหตุของปัจจัยที่มีผลต่อการควบคุมโรคหืดในผู้ป่วยโรคหืดวัยผู้ใหญ่ ทั้งนี้เพื่อประโยชน์ในการพัฒนาการพยาบาลผู้ป่วยโรคหืดในการควบคุมโรคหืดให้มีประสิทธิภาพต่อไป หากท่านตกลงที่จะเข้าร่วมการวิจัยนี้ ผู้วิจัยจะขออนุญาตคัดลอกบันทึกข้อมูลที่เกี่ยวข้องกับงานวิจัยจากแฟ้มประวัติของท่านและขอความร่วมมือให้ท่านทำแบบสอบถามของการวิจัย จำนวน 9 ชุด ได้แก่ 1) แบบสอบถามข้อมูลส่วนบุคคล 2) แบบสอบถามการรับรู้ความเจ็บป่วย 3) แบบสอบถามภาวะซึมเศร้า 4) แบบสอบถามความเครียดจากการทำงาน 5) แบบสอบถามความฉลาดทางสุขภาพ 6) แบบสอบถามสมรรถนะแห่งตนของผู้ป่วยโรคหืด 7) แบบสอบถามการสนับสนุนทางสังคม 8) แบบสอบถามพฤติกรรมการจัดการตนเองของผู้ป่วยโรคหืด 9) แบบประเมินระดับการควบคุมโรคหืด รวมจำนวนทั้งสิ้น 118 ข้อ ซึ่งจะใช้เวลาทั้งสิ้นประมาณ 45 - 60 นาที หลังจากการทำแบบสอบถามท่านจะได้รับคำแนะนำในการดูแลรักษาโรคหอบหืด และของที่ระลึกคือหนังสือคู่มือและแผ่นพับความรู้

การเข้าร่วมการวิจัยของท่านครั้งนี้เป็นไปโดยสมัครใจ ท่านอาจปฏิเสธที่จะเข้าร่วมหรือถอนตัวจากการวิจัยนี้ได้ตลอดเวลา โดยไม่มีผลกระทบใด ๆ ต่อท่านทั้งสิ้น

ผลของการวิจัยนี้อาจมีประโยชน์ในการพัฒนาระบบบริการสุขภาพและการพยาบาลเพื่อการดูแลผู้ป่วยโรคหืดที่มีประสิทธิภาพต่อไป ผลของการวิจัยจะใช้เพื่อวัตถุประสงค์ทางวิชาการเท่านั้น การเข้าร่วมโครงการวิจัยนี้ไม่มีความเสี่ยงแต่อย่างใด ข้อมูลต่าง ๆ ของท่านจะถูกเก็บไว้เป็นความลับ ไม่มีการเปิดเผยชื่อของท่าน การนำเสนอข้อมูลจะเป็นในภาพรวม ทั้งนี้ ข้อมูลจะถูกเก็บไว้ในเครื่องคอมพิวเตอร์ที่มีรหัสผ่านของคณะผู้วิจัยเท่านั้น ส่วนเอกสารจะเก็บไว้ในตู้เอกสารที่ใส่กุญแจไว้เป็นเวลา 1 ปี หลังการเผยแพร่ผลการวิจัยและจะถูกนำไปทำลายหลังจากนั้น

หากท่านมีคำถามหรือข้อสงสัยประการใด ท่านสามารถติดต่อข้าพเจ้า ร.อ.หญิงพัทธ์ชนก วิมีธรรมศักดิ์ คณะพยาบาลศาสตร์ มหาวิทยาลัยบูรพา หมายเลขโทรศัพท์ 086-582-5212 หรือที่ รศ.ดร.อาภรณ์ ตันตานี อาจารย์ที่ปรึกษาหลัก หมายเลขโทรศัพท์ 038-102-880 ข้าพเจ้ายินดีตอบคำถาม และข้อสงสัยของท่านทุกเมื่อ และหากผู้วิจัยไม่ปฏิบัติตามที่ได้ชี้แจงไว้ในเอกสารชี้แจงผู้เข้าร่วมโครงการวิจัย สามารถแจ้งมายังคณะกรรมการพิจารณาจริยธรรมการวิจัยในมนุษย์ มหาวิทยาลัยบูรพา กองบริหารการวิจัยและนวัตกรรม หมายเลขโทรศัพท์ 038-102561-62

เมื่อท่านพิจารณาแล้วเห็นสมควรเข้าร่วมในการวิจัยนี้ ขอความกรุณาลงนามในใบยินยอมร่วมโครงการที่แนบมาด้วยนี้ และขอขอบพระคุณในความร่วมมือของท่านมา ณ ที่นี้

ร.อ.หญิงพัทธ์ชนก วิมีธรรมศักดิ์
ผู้วิจัย

เอกสารแสดงความยินยอม

ของผู้เข้าร่วมโครงการวิจัย (Consent Form)

รหัสโครงการวิจัย : G-HS 027/2563

(สำนักงานคณะกรรมการพิจารณาจริยธรรมในมนุษย์ มหาวิทยาลัยบูรพา เป็นผู้ออกรหัสโครงการวิจัย)

โครงการวิจัยเรื่อง โมเดลเชิงสาเหตุของปัจจัยที่มีผลต่อการควบคุมโรคหืดในผู้ป่วยโรคหืดวัยผู้ใหญ่

ให้คำยินยอม วันที่ ..... เดือน ..... พ.ศ. .....

ก่อนที่จะลงนามในเอกสารแสดงความยินยอมของผู้เข้าร่วมโครงการวิจัยนี้ ข้าพเจ้าได้รับการอธิบายถึงวัตถุประสงค์ของโครงการวิจัย วิธีการวิจัย และรายละเอียดต่างๆ ตามที่ระบุในเอกสารข้อมูลสำหรับผู้เข้าร่วมโครงการวิจัย ซึ่งผู้วิจัยได้ให้ไว้แก่ข้าพเจ้า และข้าพเจ้าเข้าใจคำอธิบายดังกล่าวครบถ้วนเป็นอย่างดีแล้ว และผู้วิจัยรับรองว่าจะตอบคำถามต่างๆ ที่ข้าพเจ้าสงสัยเกี่ยวกับการวิจัยนี้ด้วยความเต็มใจ และไม่ปิดบังซ่อนเร้นจนข้าพเจ้าพอใจ

ข้าพเจ้าเข้าร่วมโครงการวิจัยนี้ด้วยความสมัครใจ และมีสิทธิที่จะบอกเลิกการเข้าร่วมโครงการวิจัยนี้เมื่อใดก็ได้ การบอกเลิกการเข้าร่วมการวิจัยนั้นไม่มีผลกระทบต่อการใช้บริการและการรักษาที่ข้าพเจ้าจะพึงได้รับต่อไป

ผู้วิจัยรับรองว่าจะเก็บข้อมูลเกี่ยวกับตัวข้าพเจ้าเป็นความลับ จะเปิดเผยได้เฉพาะในส่วนที่เป็นสรุปผลการวิจัย การเปิดเผยข้อมูลของข้าพเจ้าต่อหน่วยงานต่างๆ ที่เกี่ยวข้องต้องได้รับอนุญาตจากข้าพเจ้า

ข้าพเจ้าได้อ่านข้อความข้างต้นแล้วมีความเข้าใจดีทุกประการ และได้ลงนามในเอกสารแสดงความยินยอมนี้ด้วยความเต็มใจ

กรณีที่ข้าพเจ้าไม่สามารถอ่านหรือเขียนหนังสือได้ ผู้วิจัยได้อ่านข้อความในเอกสารแสดงความยินยอมให้แก่ข้าพเจ้าฟังจนเข้าใจดีแล้ว ข้าพเจ้าจึงลงนามหรือประทับลายนิ้วหัวแม่มือของข้าพเจ้าในเอกสารแสดงความยินยอมนี้ด้วยความเต็มใจ

ลงนาม .....ผู้ยินยอม

(.....)

ลงนาม .....พยาน

(.....)

<u>หมายเหตุ</u> กรณีที่ผู้เข้าร่วมโครงการวิจัยให้ความยินยอมด้วยการประทับลายนิ้วหัวแม่มือ ขอให้มีพยานลงลายมือชื่อรับรองด้วย

APPENDIX C

Questionnaires

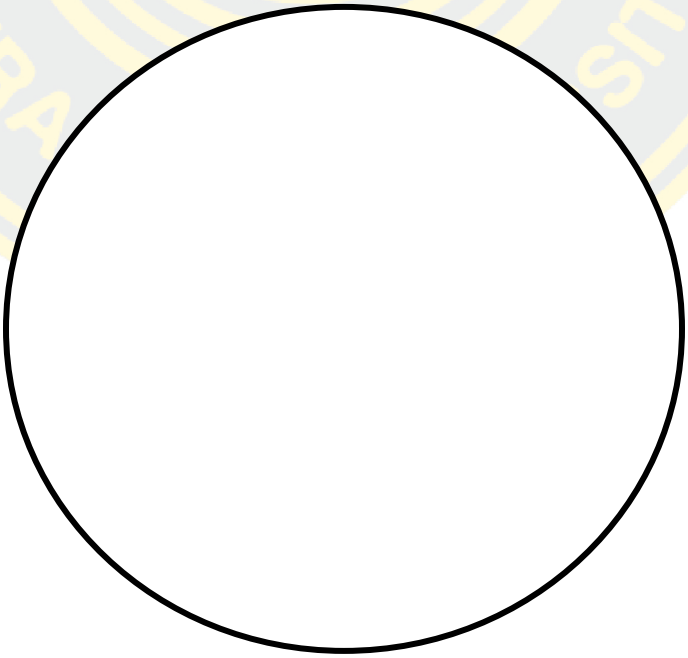
เครื่องมือคัดกรองผู้ป่วย

แบบประเมินสมรรถภาพการรู้คิด (Mini-Cog)

คำชี้แจง ใช้ประเมินสมรรถภาพการรู้คิดผู้ป่วยที่สามารถสื่อสารได้

ขั้นตอนการประเมิน
1. ผู้วิจัยบอกคำทั้งสามคำที่ไม่สัมพันธ์กันกับผู้ป่วยอย่างชัดเจนและแน่ใจว่าผู้ป่วยเข้าใจและได้ยินชัดเจน 1 รอบ (1……., 2……..., 3……..)
2. ให้ผู้ป่วยวาดรูปนาฬิกาโดยกำหนดเวลา 11 โมง 10 นาที สำหรับขั้นตอนนี้ สามารถบอกข้อความซ้ำได้ตามต้องการ โดยให้เวลาผู้ป่วย 3 นาที คะแนนเต็ม 2 คะแนน รวม.....คะแนน
3. ขอให้ผู้ป่วยบอกคำศัพท์ที่ให้จดจำไว้ในขั้นตอนที่ 1 1).....2).....3)..... คะแนนเต็ม 3 คะแนน รวม.....คะแนน

วาดภาพ นาฬิกา



การแปลผลคะแนน

ส่วนที่ 1 คำศัพท์ (คะแนนเต็ม 3 คะแนน):

1 คะแนนต่อการจดจำได้ 1 คำศัพท์

ส่วนที่ 2 นาฬิกา (คะแนนเต็ม 2 คะแนน):

1 คะแนนสำหรับการเขียนตัวเลขบนหน้าปัดได้อย่างถูกต้องครบถ้วน

1 คะแนนสำหรับการเขียนเข็มนาฬิกาทั้งเข็มสั้นและเข็มยาวได้อย่างถูกต้องตามเวลาที่กำหนด

คะแนนเต็ม 5 คะแนน = ส่วนที่ 1 คำศัพท์ + ส่วนที่ 2 นาฬิกา

หากผู้ป่วยได้คะแนนมากกว่า 3 คะแนนถือว่าไม่มีภาวะการรู้คิดบกพร่อง

หากผู้ป่วยได้คะแนนน้อยกว่าหรือเท่ากับ 3 คะแนนถือว่าอาจมีภาวะการรู้คิดบกพร่อง

เลขที่.....

แบบสอบถาม

เรื่อง โมเดลเชิงสาเหตุของปัจจัยที่มีผลต่อการควบคุมโรคหืดในผู้ป่วยโรคหืดวัยผู้ใหญ่

โรงพยาบาล..... วันที่เก็บข้อมูล.....

ตอนที่ 1 ข้อมูลส่วนบุคคล

คำชี้แจง: กรุณาตอบแบบสอบถามนี้โดยทำเครื่องหมาย ✓ ลงในช่อง ( ) หน้าข้อความหรือเติมข้อความลงในช่องว่างให้สมบูรณ์และตรงกับความเป็นจริงเกี่ยวกับตัวท่านมากที่สุด

1. เพศ ( ) ชาย ( ) หญิง
2. อายุ.....ปี.....เดือน
3. ศาสนา ( ) พุทธ ( ) อิสลาม
   ( ) คริสต์ ( ) อื่น ๆ โปรดระบุ.....
4. สถานะภาพสมรส ( ) โสด
   ( ) คู่
   ( ) หม้าย / หย่า / แยกกันอยู่
5. ระดับการศึกษา ( ) ไม่ได้เข้าศึกษาตามระบบ
   ( ) อ่านออก เขียนได้
   ( ) อ่านออก เขียนไม่ได้
   ( ) อ่านไม่ออก เขียนไม่ได้
   ( ) เข้าศึกษาตามระบบ
   ( ) ประถมศึกษาปีที่ 1-6
   ( ) มัธยมศึกษาปีที่ 1-6
   ( ) อนุปริญญา หรือประกาศนียบัตร
   ( ) ปริญญาตรี
   ( ) สูงกว่าระดับปริญญาตรี

6. อาชีพ ( ) ผู้บริหาร / ผู้จัดการ / ข้าราชการอาวุโส

( ) นักวิชาการ / ครู / อาจารย์

( ) เสมียน / เจ้าหน้าที่ธุรการ / พนักงานออฟฟิศ

( ) นักธุรกิจ / ค้าขาย

( ) พนักงานบริการ / พนักงานขาย / แม่บ้าน

( ) ผู้ปฏิบัติงานในโรงงาน / ผู้ควบคุมเครื่องจักร / ผู้ปฏิบัติงานที่ใช้ฝีมือ

( ) เกษตรกร / ประมง / เลี้ยงสัตว์

( ) ผู้ใช้แรงงาน / รับจ้าง

( ) อื่น ๆ โปรดระบุ.....

7. รายได้ของครอบครัวโดยเฉลี่ย.....บาทต่อเดือน

ความเพียงพอของรายได้กับรายจ่ายของครอบครัว

( ) ไม่เพียงพอ

( ) เพียงพอแต่ไม่เหลือเก็บ

( ) เพียงพอและเหลือเก็บ

8. ระยะเวลาที่เจ็บป่วยด้วยโรคหืด.....ปี.....เดือน

9. โรคประจำตัวอื่นนอกจากโรคหืด

( ) ไม่มี

( ) มี โปรดระบุ.....

10. ในระยะเวลา 1 ปีที่ผ่านมาเคยเข้ารับการรักษาในโรงพยาบาลจากโรคหืดหรือไม่

( ) ไม่เคย

( ) เคย คือ รับการรักษา ณ ห้องฉุกเฉินและกลับบ้าน..... ครั้ง

นอนพักรักษาในโรงพยาบาล.....ครั้ง

11. ปัจจัยกระตุ้นโรคหืดที่ท่านสัมผัสในชีวิตประจำวัน สามารถตอบได้มากกว่า 1 ข้อ

( ) สูบบุหรี่ จำนวน.....มวน ต่อวัน

( ) สัตว์เลี้ยง ชนิด.....

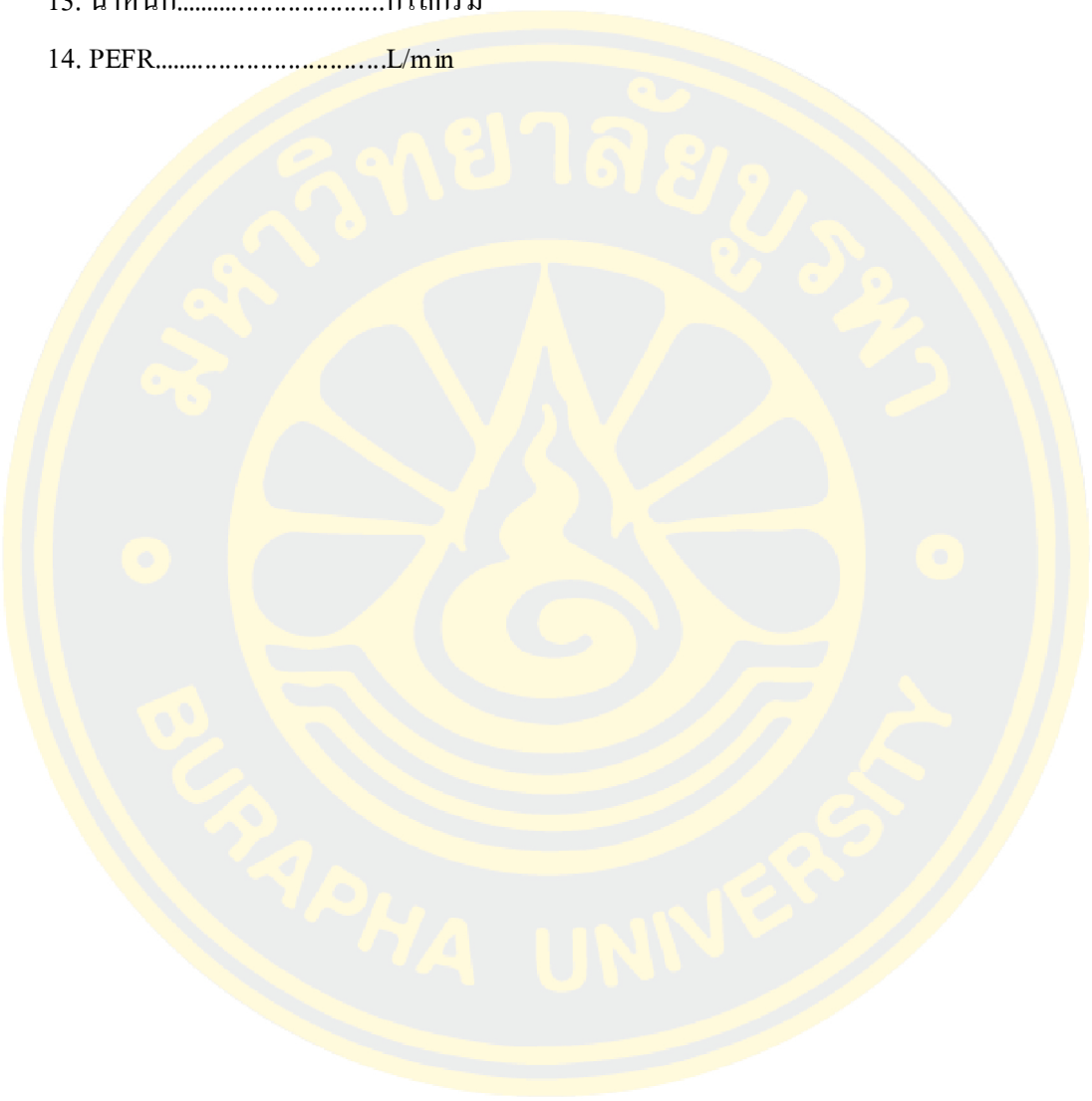
( ) แพ้อาหาร ชนิด.....

( ) ฝุ่นละออง

( ) อื่น ๆ โปรดระบุ.....

(สำหรับผู้วิจัย)

12. ส่วนสูง.....เซนติเมตร
13. น้ำหนัก.....กิโลกรัม
14. PEFR.....L/min



ตอนที่ 2 แบบสอบถามการรับรู้ความเจ็บป่วย

คำชี้แจง: โปรดวงกลม O รอบตัวเลขที่แสดงถึงความคิดเห็นของท่านในช่วง 1 เดือนที่ผ่านมา และตอบคำถามในข้อที่ 9

1. โรคหืดมีผลกระทบต่อการดำเนินชีวิตของท่านมากน้อยเพียงใด

0 1 2 3 4 5 6 7 8 9 10

ไม่มีผลกระทบ มีผลกระทบมากที่สุด

2. ท่านคิดว่าโรคหืดของท่านจะคงอยู่นานเท่าไร

0 1 2 3 4 5 6 7 8 9 10

หายขาด ตลอดชีวิต

3. ท่านรู้สึกว่าตัวของท่านสามารถควบคุมโรคหืดได้มากน้อยเพียงใด

0 1 2 3 4 5 6 7 8 9 10

ไม่สามารถควบคุมได้ สามารถควบคุมได้ดีที่สุด

4. .....

5. .....

6. .....

7. .....

8. โรคหืดมีผลต่ออารมณ์ของท่านมากน้อยเพียงใด (เช่น มันทำให้ท่านโกรธ กลัว ไม่สบายใจ หรือซึมเศร้า หรือไม่)

0 1 2 3 4 5 6 7 8 9 10

ไม่มีผลต่ออารมณ์เลย มีผลต่ออารมณ์มากที่สุด

ตอนที่ 3 แบบสอบถามภาวะซึมเศร้า

คำชี้แจง: กรุณาตอบแบบสอบถามนี้โดยทำเครื่องหมาย ✓ ลงในช่อง ( ) หน้าข้อความที่ตรงกับความรู้สึกของท่านมากที่สุดในช่วง 1 เดือนที่ผ่านมา

1. ฉันรู้สึกเพลิดเพลินใจกับสิ่งต่าง ๆ ที่ฉันเคยชอบได้

( ) เหมือนเดิม

( ) น้อยลงกว่าเดิมเล็กน้อย

( ) น้อยลงกว่าเดิมมาก

( ) เกือบไม่เหมือนเดิม

2. ฉันสามารถหัวเราะและมีอารมณ์ขันในเรื่องต่าง ๆ ได้

( ) เหมือนเดิม

( ) น้อยลงกว่าเดิมเล็กน้อย

( ) น้อยลงกว่าเดิมมาก

( ) ไม่สามารถหัวเราะและมีอารมณ์ขันได้เลย

3. .....

4. .....

5. .....

6. .....

7. ฉันรู้สึกเพลิดเพลินไปกับการอ่านหนังสือ ฟังวิทยุ หรือดูโทรทัศน์ หรือกิจกรรมอื่น ๆ ที่เคยเพลิดเพลินได้

( ) บ่อยครั้ง

( ) เป็นบางครั้ง

( ) นาน ๆ ครั้ง

( ) ไม่มีเลย

ตอนที่ 4 แบบสอบถามความเครียดจากการทำงาน

คำชี้แจง: กรุณาตอบแบบสอบถามตามความคิดเห็นหรือความรู้สึกของท่านในช่วง 1 เดือนที่ผ่านมา โดยทำเครื่องหมาย✓ลงในช่องเพียงช่องเดียว

ข้อความ	ไม่เห็นด้วยอย่างมาก	ไม่เห็นด้วย	บางส่วนเห็นด้วยและบางส่วนไม่เห็นด้วย	เห็นด้วย	เห็นด้วยอย่างมาก
1. ฉันมักจะรู้สึกหงุดหงิดและกระวนกระวายใจกับการทำงานของฉัน					
2. การทำงานทำให้ฉันมีเวลาให้กับครอบครัวน้อยลง					
3. ฉันต้องทุ่มเทให้กับงานของฉันมากกว่าที่ควรจะเป็น					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13. เพื่อนร่วมงานที่อยู่ในระดับเดียวกับฉันหลายคนหมดไฟในการทำงานจากงานที่ทำ					

ตอนที่ 5 แบบสอบถามความฉลาดทางสุขภาพ

คำชี้แจง: โปรดทำเครื่องหมาย ✓ในช่องที่ตรงกับความคิดเห็นของท่านมากที่สุด

1. ในการอ่านเอกสารให้ความรู้ด้านสุขภาพที่ได้จากโรงพยาบาลหรือคำแนะนำในฉลากยา ท่านมีประสบการณ์อย่างไรในช่วง 1 เดือนที่ผ่านมา

	ทุกครั้ง	**บางครั้ง**	**นาน ๆ ครั้ง**	**ไม่เคย**
1.1 ตัวอักษรมีขนาดเล็กเกินไป				
1.2 ……..				
1.3 ……..				
1.4 ……				
1.5 ท่านให้คนอื่นช่วยอ่านและอธิบายให้เข้าใจในเนื้อหาเหล่านั้น				

2. ตั้งแต่ท่านได้รับการตรวจวินิจฉัยว่าเป็น *โรคหืด* ท่านมีประสบการณ์อย่างไรในการค้นหาข้อมูลเกี่ยวกับ*โรคหืด* (เช่น ลักษณะของโรค, การรักษา, การดูแลตนเอง)

	ทุกครั้ง	**บางครั้ง**	**นาน ๆ ครั้ง**	**ไม่เคย**
2.1 ท่านได้หาข้อมูลด้านสุขภาพจากแหล่งข้อมูลต่าง ๆ				
2.2 ……				
2.3 ……				
2.4 ……				
2.5 ท่านได้นำข้อมูลที่ได้รับมาปฏิบัติในชีวิตประจำวัน				

3. ตั้งแต่ท่านได้รับการตรวจวินิจฉัยว่าเป็น *โรคหืด* ท่านมีประสบการณ์อย่างไรในการพิจารณาข้อมูลเกี่ยวกับ*โรคหืด*

	ทุกครั้ง	**บางครั้ง**	**นาน ๆ ครั้ง**	**ไม่เคย**
3.1 ท่านพิจารณาว่าข้อมูลด้านสุขภาพที่ได้รับมีความเหมาะสมกับท่านหรือไม่				
3.2 ……				
3.3 ……				
3.4 ท่านรวบรวมข้อมูลด้านสุขภาพเพื่อใช้ในการตัดสินใจเกี่ยวกับการดูแลรักษา				

ตอนที่ 6 แบบสอบถามสมรรถนะแห่งตนของผู้ป่วยโรคหืด

คำชี้แจง : กรุณาตอบแบบสอบถามตามความคิดเห็นหรือความรู้สึกของท่านในช่วง 1 เดือนที่ผ่านมา โดยทำเครื่องหมาย ✓ ลงในช่องเพียงช่องเดียว

ข้อความ	จริง	ส่วนใหญ่จริง	บางส่วนจริงและบางส่วนไม่จริง	ส่วนใหญ่ไม่จริง	ไม่จริง
1. ฉันสามารถรับรู้การเปลี่ยนแปลงที่เกิดขึ้นในปอดของฉัน ก่อนที่โรคหืดจะกำเริบ					
2. ฉันสามารถแก้ไขปัญหาต่าง ๆ ที่เกิดจากโรคหืดได้ดี					
3. ฉันสามารถหลีกเลี่ยงการขาดงานหรือหยุดกิจกรรมประจำวันอื่น ๆ อันเกิดโรคหืดได้					
.....					
.....					
.....					
.....					
.....					
19. โดยส่วนใหญ่ ฉันสามารถหลีกเลี่ยงหรือลดตัวกระตุ้นโรคหืดของฉันได้					
20. ฉันสามารถใช้การพูดกับตนเองเชิงบวกในการช่วยควบคุมโรคหอบหืดของฉัน					

ตอนที่ 7 แบบสอบถามการสนับสนุนทางสังคม

คำชี้แจง: กรุณาตอบแบบสอบถามตามความคิดเห็นหรือความรู้สึกของท่านในช่วง 1 เดือนที่ผ่านมาโดยทำเครื่องหมาย✓ลงในช่องเพียงช่องเดียว

หมายเหตุ: บุคคลพิเศษ หมายถึง บุคคลที่นอกเหนือจากครอบครัวและเพื่อน เช่น แฟน ครู หรือผู้ให้คำปรึกษา เป็นต้น

รายการประเมิน	ไม่เห็นด้วยที่สุด	ไม่เห็นด้วยอย่างมาก	ไม่เห็นด้วยเล็กน้อย	มีความเห็นเป็นกลาง	เห็นด้วยเล็กน้อย	เห็นด้วยอย่างมาก	เห็นด้วยที่สุด
1. ฉันมีบุคคลพิเศษ ซึ่งพร้อมจะช่วยเหลือเมื่อท่านต้องการ							
2.							
3. ครอบครัวของฉันพยายามอย่างยิ่งที่จะช่วยฉัน							
4.							
5.							
6. เพื่อนของฉันพยายามอย่างยิ่งที่จะช่วยฉัน							
7.							
8.							
9.							
10.							
11. ครอบครัวของฉันเต็มใจที่จะช่วยฉันในการตัดสินใจ							
12. ฉันสามารถเล่าปัญหาของฉันกับเพื่อนของฉันได้							

ตอนที่ 8 แบบสอบถามพฤติกรรมการจัดการตนเองของผู้ป่วยโรคหืด

คำชี้แจง : เมื่อพิจารณาข้อความในแต่ละข้อแล้ว โปรดวงกลม O รอบตัวเลขที่แสดงถึงระดับของการปฏิบัติกิจกรรมของท่านในช่วง 1 เดือนที่ผ่านมา โดยเมื่อท่านเลือกตัวเลขน้อย หมายถึง ท่านปฏิบัติกิจกรรมนั้นน้อย และตัวเลขมาก หมายถึง ท่านปฏิบัติกิจกรรมนั้นมากตามลำดับ

1. บ่อยแค่ไหนที่คุณคอยสังเกตตัวเองเกี่ยวกับความผิดปกติที่เกิดจากโรคหืด เช่น อาการไอ หายใจลำบาก เสียงวี๊ด

0 1 2 3 4 5 6 7 8 9 10

ไม่เคย บ่อยมาก

2. บ่อยครั้งแค่ไหนที่คุณรู้ล่วงหน้าว่าอาการหอบหืดจะกำเริบ

0 1 2 3 4 5 6 7 8 9 10

ไม่เคย บ่อยมาก

3. .....

4. .....

5. .....

6. .....

7. .....

8. .....

9. .....

10. .....

11. .....

12. .....

13. บ่อยแค่ไหนที่คุณหลีกเลี่ยงจากสิ่งที่จะทำให้คุณมีอาการของโรคหืด

0 1 2 3 4 5 6 7 8 9 10

ไม่เคย บ่อยมาก

14. บ่อยแค่ไหนที่คุณพยายามหลีกเลี่ยงจากผู้ที่ป่วย ไม่สบาย หรือเป็นหวัด

0 1 2 3 4 5 6 7 8 9 10

ไม่เคย บ่อยมาก

15. .....

16. บ่อยแค่ไหนที่คุณถามแพทย์หรือพยาบาล เมื่อคุณไม่ทราบหรือไม่เข้าใจเกี่ยวกับยารักษาโรคหืด

0 1 2 3 4 5 6 7 8 9 10

ไม่เคย บ่อยมาก

17. บ่อยครั้งแค่ไหนที่คุณใช้ยารักษาหอบหืดของคุณด้วยตนเอง

0 1 2 3 4 5 6 7 8 9 10

ไม่เคย บ่อยมาก

18. .....

19. .....

20. .....

21. .....

22. โดยภาพรวม บ่อยครั้งแค่ไหนที่คุณดูแลตนเองเกี่ยวกับโรคหืด

0 1 2 3 4 5 6 7 8 9 10

ไม่เคย บ่อยมาก

ตอนที่ 9 แบบประเมินระดับการควบคุมโรคหืด

คำชี้แจง: กรุณาตอบแบบสอบถามนี้โดยทำเครื่องหมาย ✓ ลงในช่อง ( ) หน้าข้อความที่ตรงกับความรู้สึกของท่านมากที่สุดในช่วง 1 สัปดาห์ที่ผ่านมา

1. ในช่วงหนึ่งของสัปดาห์ที่ผ่านมา โดยเฉลี่ยแล้วโรคหอบหืดที่คุณเป็นทำให้คุณตื่นขึ้นมาในตอนกลางคืนบ่อยแค่ไหน

( ) ไม่เลย [0]
( ) แทบจะไม่เคยเลย [1]
( ) บางครั้ง [2]
( ) บางครั้งบ่อย [3]
( ) บ่อย ๆ [4]
( ) บ่อยที่สุด [5]
( ) ไม่ได้นอนเลยเพราะโรคหอบหืด [6]

2. .....
3. .....
4. .....
5. .....

6. ในช่วงเวลาหนึ่งสัปดาห์ที่ผ่านมา โดยเฉลี่ยแล้วคุณใช้ยาพ่นขยายหลอดลมชนิดออกฤทธิ์สั้นวันละกี่ครั้ง (ถ้าคุณไม่แน่ใจว่าจะตอบข้อนี้อย่างไร ให้ถามเพื่อขอความช่วยเหลือ)

( ) ไม่ได้ใช้เลย [0]
( ) โดยมากพ่นหรือสูด 1-2 ครั้ง [1]
( ) โดยมากพ่นหรือสูด 3-4 ครั้ง [2]
( ) โดยมากพ่นหรือสูด 5-8 ครั้ง [3]
( ) โดยมากพ่นหรือสูด 9-12 ครั้ง [4]
( ) โดยมากพ่นหรือสูด 13-16 ครั้ง [5]
( ) โดยมากพ่นหรือสูดมากกว่า 16 ครั้ง [6]

APPENDIX D

Permission instruments

Re: Requesting permission to use the Brief IPQ

Elizabeth Broadbent <e.broadbent@auckland.ac.nz>
พ 22/1/2020 9.15
ถึง: Patchanok Witheethammasak <p.patchanok@hotmail.com>

Dear Patchanok

You have permission to use the questionnaire for your study

Regards

Elizabeth Broadbent
Professor of Health Psychology
Department of Psychological Medicine
Faculty of Medical and Health Sciences
The University of Auckland
New Zealand
e.broadbent@auckland.ac.nz
google scholar

On 22/1/2020 , at 2:31 PM, Patchanok Witheethammasak <p.patchanok@hotmail.com> wrote:

Dear Professor Dr. Elizabeth Broadbent

Firstly, I would like to introduce myself. My name is Patchanok Witheethammasak and I'm a doctoral nursing candidate at Burapha University, Thailand. I am doing my dissertation entitled "A causal model of asthma control in adult persons with asthma"

I read your article about "The Brief Illness Perception Questionnaire" published in the Journal of Psychosomatic Research 60(2006) 631-637. I appreciated your work very much. I'm very interested in your measurement named the Brief IPQ. I will use your measurement for this study. Therefore, I would like to ask you for permission to use the Brief IPQ in my study. I trust that your tools will be greatly benefited to adult asthma patients and create an effective nursing intervention that increases asthma control.

If you have any questions, please kindly contact me at E-mail address p.patchanok@hotmail.com.

Finally, I would like to thank you in advance for your kindness and any of your attention given to this request is greatly appreciated.

Best Regards,
Patchanok Witheethammasak
Student of doctoral of philosophy in nursing science

Re: ขออนุญาตใช้เครื่องมือวิจัย the Brief IPQ

NAPAPORN SOWATTANANGOON <nsow001@yahoo.com>
ส. 2020-01-24 19:27
ถึง: pare patchanok <p.patchanok@hotmail.com>

สวัสดีค่ะ ร.อ. หญิง พัทธ์ชนก วิถีธรรมศักดิ์

ขอขอบคุณที่สนใจใช้เครื่องมือ The Brief Illness Perception (BIPQ ฉบับภาษาไทย)

ท่านได้รับอนุญาตให้ใช้เครื่องมือ BIPQ ฉบับภาษาไทย เพื่อทำดุษฎีนิพนธ์เรื่อง โมเดลเชิงสาเหตุของปัจจัยที่มีผลต่อการควบคุมโรคหืดในผู้ป่วยโรคหืดวัยผู้ใหญ่

ขอให้ท่านประสบผลสำเร็จตามวัตถุประสงค์

ด้วยความยินดี
นภาพร โสสัฒนางกูร

สำนักงานวิจัย วิชาการและนวัตกรรม
คณะแพทยศาสตร์โรงพยาบาลรามาธิบดี
มหาวิทยาลัยมหิดล
๒๗๐ ถนนพระราม ๖ เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐
โทรศัพท์และโทรสาร ๐๒-๒๐๑-๑๗๐๑

ที่ อว ๗๘.๐๒/ ๔๖๗
วันที่ ๑๖ เมษายน ๒๕๖๓
เรื่อง ขอนุญาตให้ใช้เครื่องมือวิจัย

เรียน อธิการบดีมหาวิทยาลัยบูรพา
อ้างถึง หนังสือมหาวิทยาลัยบูรพา คณะพยาบาลศาสตร์ ที่ อว ๘๑๐๒/๐๑๗๗ ลงวันที่ ๑๙ กุมภาพันธ์ ๒๕๖๒

ตามหนังสือที่อ้างถึงแจ้งว่า ร้อยเอกหญิงพิทย์ชนก วิถีธรรมศักดิ์ รหัสประจำตัว ๖๐๘๑๐๐๐๘ นิสิตหลักสูตรปรัชญาดุษฎีบัณฑิต สาขาวิชาพยาบาลศาสตร์ (หลักสูตรนานาชาติ) คณะพยาบาลศาสตร์ มหาวิทยาลัยบูรพา มีความประสงค์ขออนุญาตใช้แบบสอบถาม ชื่อ Hospital anxiety and depression scale ฉบับภาษาไทย (Thai HADS) ที่พัฒนาโดย ผู้ช่วยศาสตราจารย์ นายแพทย์ธนา นิลชัยโกวิทย์ เพื่อใช้ประกอบการวิจัย เรื่อง A CAUSAL MODEL OF ASTHMA CONTROL IN ADULT PERSONS WITH ASTHMA ความละเอียดแจ้งแล้ว นั้น

ในการนี้ คณะแพทยศาสตร์โรงพยาบาลรามาธิบดี มหาวิทยาลัยมหิดล พิจารณาแล้วไม่ขัดข้องยินยอนุญาตให้ใช้เครื่องมือวิจัยดังกล่าวได้

จึงเรียนมาเพื่อโปรดทราบ

ขอแสดงความนับถือ

(ศาสตราจารย์ นายแพทย์บุญส่ง องค์พิพัฒนกุล)
รองคณบดีฝ่ายวิจัย ปฏิบัติหน้าที่แทน
คณบดีคณะแพทยศาสตร์โรงพยาบาลรามาธิบดี

Reply about parker's job stress scale

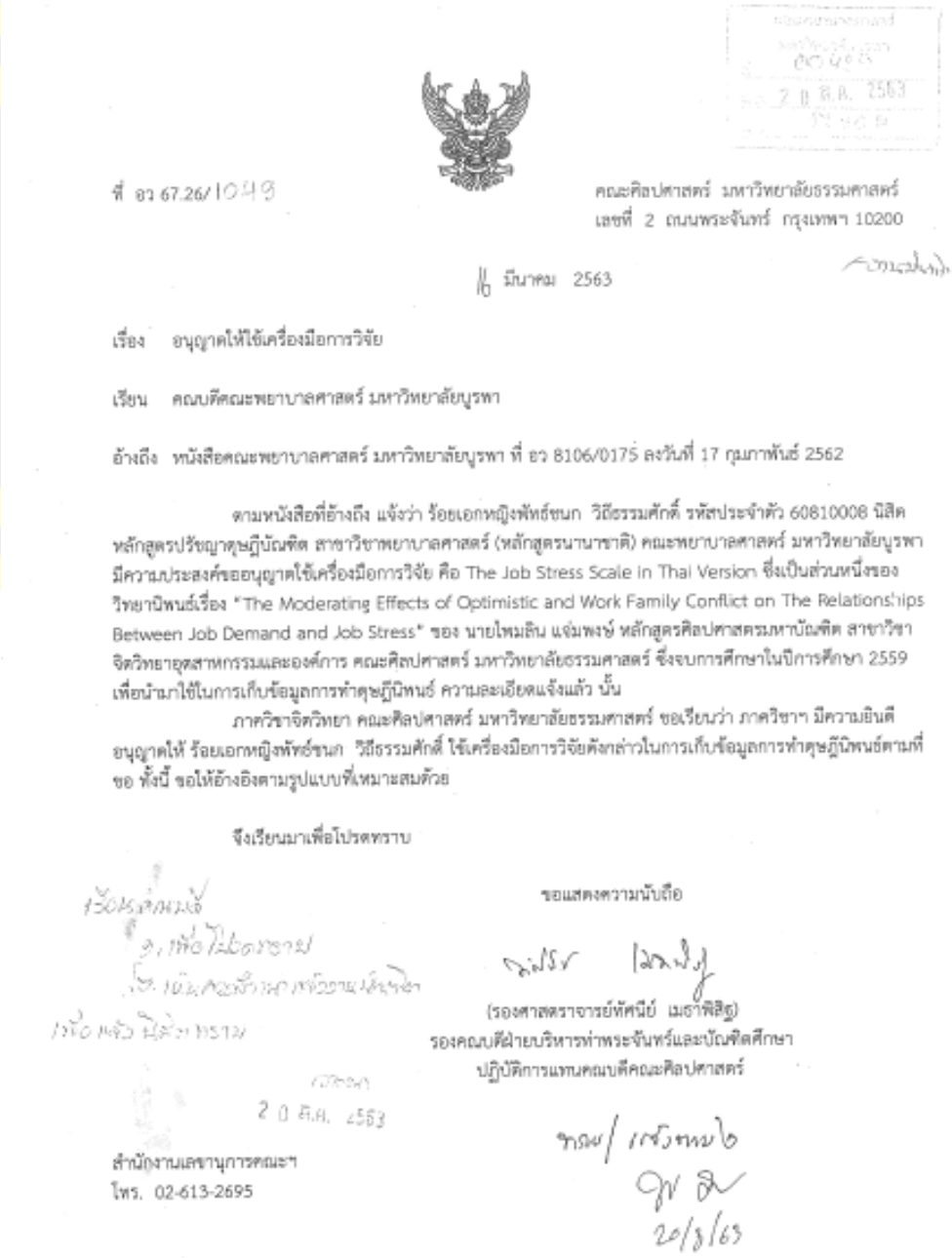
محمد جواد <memjavad@gmail.com>
พ 2020-02-05 12:54
ถึง: p.patchanok@hotmail.com <p.patchanok@hotmail.com>

Hello

Thank you for contacting us.

You have our permission to use this scale in your study as long as you cite us a source

Regrards
Arab psychology team



ที่ อว 67.26/1049

คณะศิลปศาสตร์ มหาวิทยาลัยธรรมศาสตร์
เลขที่ 2 ถนนพระจันทร์ กรุงเทพฯ 10200

16 มีนาคม 2563

เรื่อง อนุญาตให้ใช้เครื่องมือการวิจัย

เรียน คณบดีคณะพยาบาลศาสตร์ มหาวิทยาลัยบูรพา

อ้างถึง หนังสือคณะพยาบาลศาสตร์ มหาวิทยาลัยบูรพา ที่ อว 8106/0175 ลงวันที่ 17 กุมภาพันธ์ 2562

ตามหนังสือที่อ้างถึง แจ้งว่า ร้อยเอกหญิงพัทธ์ชนก วิถีธรรมศักดิ์ รหัสประจำตัว 60810008 นิสิตหลักสูตรปรัชญาดุษฎีบัณฑิต สาขาวิชาพยาบาลศาสตร์ (หลักสูตรนานาชาติ) คณะพยาบาลศาสตร์ มหาวิทยาลัยบูรพา มีความประสงค์ขออนุญาตใช้เครื่องมือการวิจัย คือ The Job Stress Scale in Thai Version ซึ่งเป็นส่วนหนึ่งของวิทยานิพนธ์เรื่อง "The Moderating Effects of Optimistic and Work Family Conflict on The Relationships Between Job Demand and Job Stress" ของ นายไหมลิน แจ่มพงษ์ หลักสูตรศิลปศาสตรมหาบัณฑิต สาขาวิชาจิตวิทยาอุตสาหกรรมและองค์การ คณะศิลปศาสตร์ มหาวิทยาลัยธรรมศาสตร์ ซึ่งจบการศึกษาในปีการศึกษา 2559 เพื่อนำมาใช้ในการเก็บข้อมูลการทำดุษฎีนิพนธ์ ความละเอียดแจ้งแล้ว นั้น

ภาควิชาจิตวิทยา คณะศิลปศาสตร์ มหาวิทยาลัยธรรมศาสตร์ ขอเรียนว่า ภาควิชาฯ มีความยินดีอนุญาตให้ ร้อยเอกหญิงพัทธ์ชนก วิถีธรรมศักดิ์ ใช้เครื่องมือการวิจัยดังกล่าวในการเก็บข้อมูลการทำดุษฎีนิพนธ์ตามที่ขอ ทั้งนี้ ขอให้อ้างอิงตามรูปแบบที่เหมาะสมด้วย

จึงเรียนมาเพื่อโปรดทราบ

ขอแสดงความนับถือ

(รองศาสตราจารย์หัศนีย์ เมธาพิสิฐ)
รองคณบดีฝ่ายบริหารท่าพระจันทร์และบัณฑิตศึกษา
ปฏิบัติการแทนคณบดีคณะศิลปศาสตร์

20 มี.ค. 2563

สำนักงานเลขานุการคณะฯ
โทร. 02-613-2695

20/3/63

Re: The permission for the use of the FCCHL

Hirono Ishikawa <hirono@med.teikyo-u.ac.jp>
ส่ 2020-02-15 21:54
ถึง: pare patchanok <p.patchanok@hotmail.com>

สิ่งที่แนบมา 1 รายการ (296 กิโลไบต์)
HL scale.pdf;

Dear Ms. Patchanok Witheethammasak,

Thank you for your interest in our health literacy scale.
I am attaching a copy of the English version of the FCCHL scale.
I think Dr. Wantana Maneesriwongul at Mahidol University has translated and published this scale in Thai language.

Here is Dr. Wantana Maneesriwongul's contact information:
Nursing Department, Ramathibodi Hospital Faculty of Medicine,
Mahidol University, 270 Rama 6 Road, Bangkok 10400, Thailand.
E-mail: rwantana.lim@mahidol.ac.th

Let me know If you have any questions about the scale or its use.

Best regards,
Hirono Ishikawa

Hirono Ishikawa, PhD
Graduate School of Public Health, Teikyo University
Address: 2-11-1 Kaga, Itabashi-ku, Tokyo, 173-8605, Japan
Phone: +81-3-3964-1211 (ext. 46161)
Fax: +81-3-3964-1058
email: hirono-tky@umin.ac.jp

2020年2月13日(木) 7:07 pare patchanok <p.patchanok@hotmail.com>:

Dear Dr. Hirono Ishikawa

Firstly, I would like to introduce myself. My name is Patchanok Witheethammasak and I'm a doctoral nursing candidate at Burapha University, Thailand. I am doing my dissertation entitled "A causal model of asthma control in adult persons with asthma"

I read your article about "Measuring Functional, Communicative, and Critical Health Literacy Among Diabetic Patients" published in the Diabetes Care 31(5) 874-879. I appreciated your work very much. I'm very interested in your measurement named the Functional Communicative and Critical Health Literacy scale (FCCHL). I will use your measurement for this study. Therefore, I would like to ask you for permission to use the FCCHL in my study. If you allow me to use the FCCHL, I also need permission to translate the FCCHL to Thai language and modify the FCCHL for use in asthma patients.

I trust that your measurement will be greatly benefited to adult asthma patients and develop an effective nursing care that increases asthma control.

If you have any questions, please kindly contact me at E-mail address p.patchanok@hotmail.com.

Finally, I would like to thank you in advance for your kindness and any of your attention given to this request is greatly appreciated.

Best Regards,
Patchanok Witheethammasak
Student of doctoral of philosophy in nursing science
at Faculty of Nursing, Burapha University, Thailand

ตอบกลับ: ขอความอนุเคราะห์ใช้เครื่องมือวิจัย the FCCHL

Wantana Maneesriwongul <wantana.lim@mahidol.ac.th>
ศ. 2020-03-20 13:34
ถึง: pare patchanok <p.patchanok@hotmail.com>
เรียน คุณ พัทธ์ชนก วิถีธรรม

อาจารย์ยินดีให้ คุณ พัทธ์ชนก วิถีธรรม ใช้เครื่องมือ Health literacy ฉบับแปลไทย ในงานวิจัยในหัวข้อเรื่อง "โมเดลเชิงสาเหตุของปัจจัยที่มีผลต่อการควบคุมโรคหืดในผู้ป่วยโรคหืดวัยผู้ใหญ่: A Causal Model of Asthma Control In Adult Asthma Patients" ทั้งนี้ขอให้มีหนังสือเป็นทางการ ขอมาที่คณะด้วยค่ะ

และยินดีที่จะเป็นผู้ทรงคุณวุฒิให้คำปรึกษาเกี่ยวกับเครื่องมือวิจัยนี้ และเครื่องมือวิจัยอื่นๆ สามารถติดต่อได้ที่ 086 3643468 ค่ะ

Assoc. Prof. Wantana Maneesriwongul, DNSc, MPH
Community Health Nursing Division
Ramathibodi School of Nursing
Faculty of Medicine Ramathibodi Hospital
270 Rama6 Rd, Rajthevi,
Bangkok 10400
Thailand

จาก: pare patchanok <p.patchanok@hotmail.com>
ส่ง: 20 มีนาคม 2563 13:20:52
ถึง: Wantana Maneesriwongul
ชื่อเรื่อง: ตอบกลับ: ขอความอนุเคราะห์ใช้เครื่องมือวิจัย the FCCHL

เรียน รองศาสตราจารย์ ดร.วันทนา มณีศรีวงศ์กุล

ดิฉัน พัทธ์ชนก วิถีธรรมศักดิ์ นิสิตปริญญาเอก คณะพยาบาลศาสตร์ มหาวิทยาลัยบูรพา ซึ่งท่านอาจารย์ได้อนุญาตให้ใช้แบบสอบถาม the Functional Communicative and Critical Health Literacy scale (FCCHL) ฉบับภาษาไทยของท่านอาจารย์ในการทำดุษฎีนิพนธ์

ขณะนี้ดิฉันอยู่ระหว่างดำเนินการขออนุมัติหนังสือจากคณะพยาบาลศาสตร์ มหาวิทยาลัยบูรพา และจะนำส่งถึงโรงเรียนพยาบาลรามาธิบดี คณะแพทยศาสตร์โรงพยาบาลรามาธิบดี มหาวิทยาลัยมหิดลต่อไป ทั้งนี้ หากท่านเห็นควร ดิฉันใคร่ขอความกรุณาจากท่านอาจารย์ส่งแบบสอบ the Functional Communicative and Critical Health Literacy scale (FCCHL) ฉบับภาษาไทย มายัง Email: p.patchanok@hotmail.com นี้ จักเป็นพระคุณยิ่ง

จึงเรียนมาเพื่อโปรดพิจารณา หวังเป็นอย่างยิ่งว่าจะได้รับความอนุเคราะห์จากท่านอาจารย์ และขอขอบพระคุณมา ณ โอกาสนี้

ขอแสดงความนับถืออย่างสูง
ร.อ.หญิง พัทธ์ชนก วิถีธรรมศักดิ์
นิสิตปริญญาเอก คณะพยาบาลศาสตร์ มหาวิทยาลัยบูรพา
โทรศัพท์ 086-5825212

Re: Requesting permission to use the KASE-AQ

John A. winder <wheezedoc@aol.com>

ๆ 10/2/2020 4.30

ถึง: Patchanok Witheethammasak <p.patchanok@hotmail.com>

Dear Patchanok Witheethammasak

You have my permission to translate the Knowledge, Attitude, and Self-Efficacy Asthma Questionnaire (The KASE-AQ) for your research.

John A. Winder

On 10/2/2020 , at 9.15 AM, Patchanok Witheethammasak <p.patchanok@hotmail.com> wrote:

Dear Dr. John A. Winder

Firstly, I would like to introduce myself. My name is Patchanok Witheethammasak and I'm a doctoral nursing candidate at Burapha University, Thailand. I am doing my dissertation entitled "A causal model of asthma control in adult persons with asthma"

In doing this thesis, I will use your measurement named The Knowledge, Attitude, and Self-Efficacy Asthma Questionnaire (The KASE-AQ). Therefore, I would like to ask you for permission to use the KASE-AQ in my study. If you kindly allow me to utilize it, could you please provide the questionnaires for me? I also need permission to translate the KASE-AQ to the Thai language and modify the measurement because this study is focused on self-efficacy, so I will use the items in the self-efficacy part in my study. I trust that your measurement will be greatly benefited to adult asthma patients and develop an effective nursing care that increases asthma control.

Finally, I would like to thank you in advance for your permission and your kindness given to this request is greatly appreciated.

Best Regards,
Patchanok Witheethammasak
Student of doctoral of philosophy in nursing science

Re: The permission for the use of the MSPSS

Zimet, Gregory D <gzimet@iu.edu>
พ 2020-01-22 8:19
ถึง: pare patchanok <p.patchanok@hotmail.com>

Dear Patchanok Witheethammasak,

You have my permission to use the Multidimensional Scale of Perceived Social Support (MSPSS) in your research. I have attached the original English language version of the scale (with scoring information on the 2nd page), a document listing several of the articles that have reported on the reliability and validity of the MSPSS, and a chapter that I wrote about the scale. Also attached is a Thai translation, which you may find helpful (and 2 published papers about the translation).

I hope your research goes well.

Best regards,
Greg Zimet

Gregory D. Zimet, PhD, FSAHM | Professor of Pediatrics & Clinical Psychology
Co-Director, IUPUI Center for HPV Research
Division of Adolescent Medicine, Department of Pediatrics
Indiana University School of Medicine
410 W. 10th Street, HS 1001, Indianapolis, IN 46202, USA
T +1 317-274-8812 | Fax +1 317-274-0133
Email gzimet@iu.edu

http://pediatrics.iu.edu/center-hpv-research/about-us/
http://pediatrics.iu.edu/sections-and-faculty/adolescent-medicine/our-team/faculty/bio-zimet/

From: pare patchanok <p.patchanok@hotmail.com>
Sent: Tuesday, January 21, 2020 5:46 PM
To: Zimet, Gregory D
Subject: [External] The permission for the use of the MSPSS

Dear Professor Dr. Gregory D. Zimet

Firstly, I would like to introduce myself. My name is Patchanok Witheethammasak and I'm a doctoral nursing candidate at Burapha University, Thailand. I am doing my dissertation entitled "A causal model of asthma control in Thai adult persons with asthma"

I read your article about "The multidimensional scale of perceived social support" published in the Journal of personality assessment, 52(1), 30-41. I appreciated your work very much. I'm very interested in your measurement named the multidimensional scale of perceived social support (MSPSS). Therefore, I would like to ask you for permission to use the MSPSS in my study. I trust that your tools will be greatly benefited to adult asthma patients and create an effective nursing intervention that increases asthma control.

Finally, I would like to thank you in advance for your kindness and any of your attention given to this request is greatly appreciated.

Best Regards,
Patchanok Witheethammasak
Student of doctoral of philosophy in nursing science
at Faculty of Nursing, Burapha University, Thailand

Re: ขอความอนุเคราะห์ใช้เครื่องมือวิจัย the MSPSS – Thai version

TINAKON WONGPAKARAN <tinakon.w@cmu.ac.th>
พ 2020-01-22 14:11
ถึง: pare patchanok <p.patchanok@hotmail.com>

เรียน ร.อ.หญิง พัทธ์ชนก
ยินดีครับ เป็นวิจัยที่น่าสนใจ MPSS แนะนำให้ใช้ฉบับ revised Thai MSPSS ที่ ศ.พญ. ณหทัย รับผิดชอบ
สามารถ email ไปแจ้งอาจารย์ได้เลยครับ ที่ nahathai.wongpakaran@cmu.ac.th

อ ทินกร

ศาสตราจารย์ นายแพทย์ ทินกร วงศ์ปการันย์
คลินิกและศูนย์การศึกษาทางจิตบำบัดและบุคลิกภาพแปรปรวน
หน่วยจิตบำบัด และ หน่วยจิตเวชศาสตร์ผู้สูงอายุ
ภาควิชาจิตเวชศาสตร์ คณะแพทยศาสตร์
มหาวิทยาลัยเชียงใหม่ จ. เชียงใหม่ 50200

Tinakon Wongpakaran, MD, FRCPsychT

Professor of Psychiatry
Psychotherapy/Personality disorder Clinic and Education Center, Psychotherapy Unit & Geriatric Psychiatry Unit, Department of Psychiatry, Faculty of Medicine, Chiang Mai University, Chiang Mai, Kingdom of Thailand. 50200

tinakon@gmail.com
Tel: 66-53-935422 to 4 ext 317, Fax: 66-53-289219
http://www.pakaranhome.com/
fb.com/professors.wongpakaran

Re: ขอความเคราะห์ใช้เครื่องมือวิจัย revised Thai MSPSS

NAHATHAI WONGPAKARAN <nahathai.wongpakaran@cmu.ac.th>
อ 2020-01-28 0:14
ถึง: pare patchanok <p.patchanok@hotmail.com>
สำเนาถึง: TINAKON WONGPAKARAN <tinakon.w@cmu.ac.th>

เรียน ร.อ.หญิง พัทธ์ชนก วิถีธรรมศักดิ์
ยินดีให้ใช้ r-T-MSPSS ค่ะ
ได้แนบแบบสอบถามมาใน email ฉบับนี้
ค่าคุณสมบัติทางจิตมิติศึกษาได้จากเอกสารอ้างอิงท้ายแบบสอบถาม

อนึ่ง การศึกษาในผู้สูงอายุศึกษาได้จากงานวิจัย
นี้ https://www.tandfonline.com/doi/abs/10.1080/13607863.2017.1339778?journalCode=camh20

ขอให้โชคดีในงานวิจัยค่ะ

ณหทัย

ศาสตราจารย์แพทย์หญิง ณหทัย วงศ์ปการันย์
หน่วยจิตเวชศาสตร์ผู้สูงอายุ ภาควิชาจิตเวชศาสตร์ คณะแพทยศาสตร์ มช.
110 ถ.อินทวโรรส ต.ศรีภูมิ อ.เมือง เชียงใหม่ 50200

Nahathai Wongpakaran, MD, FRCPsychT
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Kingdom of Thailand 50200; Tel: +66 53 935422 ext 320, Fax: +66 53 935426
www.wongpakaran.com, www.facebook.com/professors.wongpakaran, Ig: nahathai.tinakon

From: pare patchanok <p.patchanok@hotmail.com>
Sent: January 23, 2020 03:47
To: NAHATHAI WONGPAKARAN <nahathai.wongpakaran@cmu.ac.th>
Subject: ขอความเคราะห์ใช้เครื่องมือวิจัย revised Thai MSPSS

เรียน ศ.พญ. ณหทัย วงศ์ปการันย์

ดิฉัน ร.อ.หญิง พัทธ์ชนก วิถีธรรมศักดิ์ นิสิตปริญญาเอก คณะพยาบาลศาสตร์ มหาวิทยาลัยบูรพา ขณะนี้ดิฉันกำลังทำดุษฎีนิพนธ์ เรื่อง "โมเดลเชิงสาเหตุของปัจจัยที่มีผลต่อการควบคุมโรคหืดในผู้ป่วยโรคหืดวัยผู้ใหญ่: A Causal Model of Asthma Control in Adult Asthma Patients" ทั้งนี้ดิฉันมีความเห็นว่าแบบสอบถาม A revised Thai Multi-Dimensional Scale of Perceived Social Support (revised Thai MSPSS) ซึ่งท่านอาจารย์ได้แปลเป็นภาษาไทยนั้นมีความสำคัญและเป็นประโยชน์ต่อการวิจัยอย่างมาก

ดังนั้นดิฉันจึงเรียนมาเพื่อขอความอนุเคราะห์ใช้แบบสอบถาม the revised Thai MSPSS ฉบับภาษาไทยจากท่านอาจารย์ หากท่านอาจารย์อนุญาต ดิฉันใคร่ขอความกรุณาท่านอาจารย์ส่งแบบสอบถามดังกล่าวมาที่ E-mail: p.patchanok@hotmail.com หรือช่องทางอื่นที่ท่านอาจารย์สะดวกจักเป็นพระคุณยิ่ง ทั้งนี้ดิฉันอยู่ระหว่างดำเนินการขออนุมัติหนังสือจากคณะพยาบาลศาสตร์ มหาวิทยาลัยบูรพา และจะนำส่งถึงท่านอาจารย์และคณะแพทยศาสตร์ มหาวิทยาลัยเชียงใหม่ต่อไป

จึงเรียนมาเพื่อโปรดพิจารณา หวังเป็นอย่างยิ่งว่าจะได้รับความอนุเคราะห์จากท่านอาจารย์ และขอขอบพระคุณมา ณ โอกาสนี้

ขอแสดงความนับถืออย่างสูง

ร.อ.หญิง พัทธ์ชนก วิถีธรรมศักดิ์
นิสิตปริญญาเอก คณะพยาบาลศาสตร์ มหาวิทยาลัยบูรพา
โทรศัพท์ 086-5825212

T[illegible]the AsSCPI

The permission for the use of the AsSCPI

pare patchanok <p.patchanok@hotmail.com>

ม 2020-01-29 16:12

ถึง: mfrey@howellusa.com <mfrey@howellusa.com>

Dear Dr. Maureen A. Frey

Firstly, I would like to introduce myself. My name is Patchanok Witheethammasak and I'm a doctoral nursing candidate at Burapha University, Thailand. I am doing my dissertation entitled "A causal model of asthma control in adult persons with asthma"

In doing this thesis, I will use your measurement named the Asthma Self-Care Practice Instrument (AsSCPI). I tried to contact Michelle M. Fitzpatrick but I was unable to contact. Therefore, I would like to ask you for permission to use the AsSCPI in my study. If you kindly allow me to utilize it, could you please provide the questionnaires for me? I also need permission to translate the AsSCPI to Thai language and modify the AsSCPI for use in adult patients I trust that your measurement will be greatly benefited to adult asthma patients and develop effective nursing care that increases asthma control.

Finally, I would like to thank you in advance for your kindness and any of your attention given to this request is greatly appreciated.

Best Regards,
Patchanok Witheethammasak
Student of doctoral of philosophy in nursing science
at Faculty of Nursing, Burapha University, Thailand

จาก: maureenfrey41cooper@gmail.com <maureenfrey41cooper@gmail.com>
ส่ง: 14 กุมภาพันธ์ 2563 20:23
ถึง: p.patchanok@hotmail.com <p.patchanok@hotmail.com>
ชื่อเรื่อง: Self care

Thank you for your interest in the asthma questionnaire. You are free to use it and adapt it any way you want. I no longer have a copy of it. Have not been involved in research since I retired 10 years ago. All the best with your dissertation.

Sent from my iPad

ที่ - /2563

คณะพยาบาลศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย
อาคารบรมราชชนนีศรีศตพรรษ ชั้น 11
ถนนพระราม 1 แขวงวังใหม่ เขตปทุมวัน
กรุงเทพฯ 10330

4 มีนาคม 2563

เรื่อง อนุญาตให้ใช้เครื่องมือวิจัย

เรียน คณบดีคณะพยาบาลศาสตร์ มหาวิทยาลัยบูรพา

อ้างถึง หนังสือ มหาวิทยาลัยบูรพา คณะพยาบาลศาสตร์ ที่ อว 8106/0176 ลงวันที่ 19 กุมภาพันธ์ 2563 เรื่อง ขออนุญาตใช้เครื่องมือวิจัย

ตามหนังสือที่อ้างถึง ดังรายละเอียดแจ้งแล้วนั้น ดิฉัน ผู้ช่วยศาสตราจารย์ ดร. สุนิดา ปรีชาวงษ์ พิจารณาแล้วยินดีอนุญาตให้ ร้อยเอกหญิงพัศช์ชนก วิถีธรรมศักดิ์ ใช้เครื่องมือการวิจัย ซึ่งเป็นส่วนหนึ่งของดุษฎีนิพนธ์ ของ ผู้ช่วยศาสตราจารย์ ดร. สุนิดา ปรีชาวงษ์ หากท่านประสงค์จะปรับปรุงเครื่องมือวิจัยขอให้แจ้งดิฉัน ทั้งนี้ขอความร่วมมือเขียนรายการอ้างอิงจากบทความวิจัย ดังนี้

Preechawong, S., (2004) "Self-Esteem, Learned Resourcefulness, and Self-Management Behavior of Thai Adolescents with Asthma", The Degree of Doctoral Philosophy, Case Western Reserve University.

จึงเรียนมาเพื่อโปรดทราบและดำเนินการต่อไปด้วย จักขอบพระคุณยิ่ง

ขอแสดงความนับถือ

สุนิดา ปรีชาวงษ์

(ผู้ช่วยศาสตราจารย์ ดร. สุนิดา ปรีชาวงษ์)
รองคณบดีคณะพยาบาลศาสตร์

ฝ่ายวิชาการ
โทร. 0-2218-1356 Email: fonbox@chula.ac.th

12 ส.ค. 2563

จาก: Jilly Styles <jill@qoltech.co.uk>
ส่ง: 22 มกราคม 2563 16:30
ถึง: p.patchanok@hotmail.com <p.patchanok@hotmail.com>
สำเนาถึง: jill@qoltech.co.uk <jill@qoltech.co.uk>; Penny Freeman <penny@qoltech.co.uk>
ชื่อเรื่อง: RE: The permission for the use of the ACQ

Dear Patchanok Witheethammasak ,

Professor Juniper thanks you for your email which she has passed to me for a response. We are happy to provide the ACQ Thai translation for Thailand, and send free of charge as it is for non-commercial use and the pack includes the questionnaires, instruction booklet, validation papers and coloured response card.

Please note that all Professor Juniper's questionnaires are covered by strict copyright laws so no attempts at any translation, amendments or modifications are allowed, nor uploading onto any electronic device. Thank you for your understanding and agreement to this.

If you would let me have your full postal address we can send the package to you.

I will wait to hear from you to progress your request.

With best wishes

Victoria Sayer
Assistant to Jilly Styles
Director - QOL Technologies Ltd
20 Marcuse Fields
Bosham
West Sussex.
UK. PO18 8NA
Tel: + 44 (0) 1243 572124
Fax: + 44 (0) 1243 573680
E-Mail: jill@qoltech.co.uk

From: pare patchanok [mailto:p.patchanok@hotmail.com]
Sent: 21 January 2020 21:18
To: juniper@goltech.co.uk
Subject: The permission for the use of the ACQ

Dear Professor Elizabeth Juniper

Firstly, I would like to introduce myself. My name is Patchanok Witheethammasak and I'm a doctoral nursing candidate at Burapha University, Thailand. I am doing my dissertation entitled "A causal model of asthma control in adult persons with asthma"

I read your article about "Development and validation of a questionnaire to measure asthma control" published in the European respiratory journal, 14(4), 902-907. I appreciated your work very much. I'm very interested in your measurement named the Asthma Control Questionnaire. Therefore, I would like to ask you for permission to use the ACQ-Thai version in my study. If you kindly allow me to utilize it, could you please provide the questionnaires for me?

I trust that your tools will be greatly benefited to adult asthma patients and create an effective nursing intervention that increases asthma control.

If you have any questions, please kindly contact me at E-mail address p.patchanok@hotmail.com.

Finally, I would like to thank you in advance for your kindness and any of your attention given to this request is greatly appreciated.

Best Regards,
Patchanok Witheethammasak
Student of doctoral of philosophy in nursing science
at Faculty of Nursing, Burapha University, Thailand

APPENDIX E

Committee and translator

Committee and translator

1. Associate Professor Dr. Pornpat Hengudomsub, Psychiatric and Mental Health Nursing Division, Faculty of Nursing, Burapha University

2. Assistant Professor Dr. Chutima Chantamit-O-Pas, Adult Nursing Division, Faculty of Nursing, Burapha University

3. Wanida Noimontree Ph.D., RN. Gerontological Nursing Division, Faculty of Nursing, Burapha University

4. Jantana Koedbangkham Ph.D., RN. Psychiatric and Mental Health Nursing Division, Faculty of Nursing, Burapha University

5. Lieutenant Colonel Dr. Sasiphon Aunjaichon, Adult Nursing Division, The Royal Thai Army Nursing College

สำเนา

บันทึกข้อความ

ส่วนงาน มหาวิทยาลัยบูรพา คณะพยาบาลศาสตร์ งานบริการการศึกษา (บัณฑิตศึกษา) โทร.๒๘๓๖
ที่ อว ๘๑๐๖/๗๖๐ **วันที่** ๒๗ พฤษภาคม พ.ศ. ๒๕๖๓
เรื่อง ขอเรียนเชิญเป็นผู้ทรงคุณวุฒิในการแปลเครื่องมือเพื่อการวิจัย

เรียน รองศาสตราจารย์ ดร.ภรภัทร เฮงอุดมทรัพย์

ด้วย ร้อยเอกหญิงพัทธ์ชนก วิถีธรรมศักดิ์ รหัสประจำตัว ๖๐๘๑๐๐๐๘ นิสิตหลักสูตรปรัชญาดุษฎีบัณฑิต สาขาวิชาพยาบาลศาสตร์ (หลักสูตรนานาชาติ) คณะพยาบาลศาสตร์ มหาวิทยาลัยบูรพา ได้รับอนุมัติเค้าโครงดุษฎีนิพนธ์ เรื่อง "A CAUSAL MODEL OF ASTHMA CONTROL IN ADULT PERSONS WITH ASTHMA" โดยมี รองศาสตราจารย์ ดร.อาภรณ์ ดีนาน เป็นประธานกรรมการควบคุมดุษฎีนิพนธ์ ซึ่งอยู่ในขั้นตอนการเตรียมเครื่องมือเพื่อการเก็บรวบรวมข้อมูล

เนื่องจากท่านเป็นผู้มีความเชี่ยวชาญ และประสบการณ์สูง ในการนี้ คณะฯ จึงขออนุญาตเชิญเป็นผู้ทรงคุณวุฒิในการแปลเครื่องมือเพื่อการวิจัยจากภาษาไทยเป็นภาษาอังกฤษของนิสิต จำนวน ๑ เครื่องมือ คือ แบบสอบถามการรับรู้สมรรถนะแห่งตนของผู้ป่วยโรคหืด (Asthma Self Efficacy) ทั้งนี้ หากท่านมีปัญหาหรือต้องการข้อมูลเพิ่มเติม โปรดติดต่อผู้วิจัยได้ที่ โทร ๐๘ ๖๕๘๒ ๕๒๑๒

จึงเรียนมาเพื่อโปรดพิจารณาอนุญาตด้วย จะเป็นพระคุณยิ่ง

(ผู้ช่วยศาสตราจารย์ ดร.พรชัย จูลเมตต์)
คณบดีคณะพยาบาลศาสตร์

สำเนา

บันทึกข้อความ

ส่วนงาน มหาวิทยาลัยบูรพา คณะพยาบาลศาสตร์ งานบริการการศึกษา (บัณฑิตศึกษา) โทร.๒๘๓๖
ที่ อว ๘๑๐๖/๑๐๔๗ **วันที่** ๒๒ พฤษภาคม พ.ศ. ๒๕๖๓
เรื่อง ขอเรียนเชิญเป็นผู้ทรงคุณวุฒิในการแปลเครื่องมือเพื่อการวิจัย

เรียน ผู้ช่วยศาสตราจารย์ ดร.ชุติมา ฉันทมิตรโอภาส

ด้วย ร้อยเอกหญิงพัทธ์ชนก วิถีธรรมศักดิ์ รหัสประจำตัว ๖๐๘๑๐๐๐๘ นิสิตหลักสูตรปรัชญาดุษฎีบัณฑิต สาขาวิชาพยาบาลศาสตร์ (หลักสูตรนานาชาติ) คณะพยาบาลศาสตร์ มหาวิทยาลัยบูรพา ได้รับอนุมัติเค้าโครงดุษฎีนิพนธ์ เรื่อง "A CAUSAL MODEL OF ASTHMA CONTROL IN ADULT PERSONS WITH ASTHMA" โดยมี รองศาสตราจารย์ ดร.อาภรณ์ ตีนาน เป็นประธานกรรมการควบคุมดุษฎีนิพนธ์ ซึ่งอยู่ในขั้นตอนการเตรียมเครื่องมือเพื่อการเก็บรวบรวมข้อมูล

เนื่องจากท่านเป็นผู้มีความเชี่ยวชาญ และประสบการณ์สูง ในการนี้ คณะฯ จึงขออนุญาตเชิญเป็นผู้ทรงคุณวุฒิในการแปลเครื่องมือเพื่อการวิจัยจากภาษาอังกฤษเป็นภาษาไทยของนิสิต จำนวน ๑ เครื่องมือ คือ The Self-efficacy Subscale of the Knowledge, Attitude, and Self-efficacy Asthma Questionnaire (KASE-AQ) ทั้งนี้ หากท่านมีปัญหาหรือต้องการข้อมูลเพิ่มเติม โปรดติดต่อผู้วิจัยได้ที่ โทร ๐๘ ๖๕๘๒ ๕๒๑๒

จึงเรียนมาเพื่อโปรดพิจารณาอนุญาตด้วย จะเป็นพระคุณยิ่ง

(ผู้ช่วยศาสตราจารย์ ดร.พรชัย จูลเมตต์)
คณบดีคณะพยาบาลศาสตร์

สำเนา

บันทึกข้อความ

ส่วนงาน มหาวิทยาลัยบูรพา คณะพยาบาลศาสตร์ งานบริการการศึกษา (บัณฑิตศึกษา) โทร.๒๘๓๖
ที่ อว ๘๑๐๖/๑๒๔๙ **วันที่** ๑๒ มิถุนายน พ.ศ. ๒๕๖๓
เรื่อง ขอเรียนเชิญเป็นผู้ทรงคุณวุฒิในการแปลเครื่องมือเพื่อการวิจัย

เรียน อาจารย์ ดร.วะนิดา น้อยมนตรี

ด้วย ร้อยเอกหญิงพัทธ์ชนก วิถีธรรมศักดิ์ รหัสประจำตัว ๖๐๘๑๐๐๐๘ นิสิตหลักสูตรปรัชญาดุษฎีบัณฑิต สาขาวิชาพยาบาลศาสตร์ (หลักสูตรนานาชาติ) คณะพยาบาลศาสตร์ มหาวิทยาลัยบูรพา ได้รับอนุมัติเค้าโครงดุษฎีนิพนธ์ เรื่อง "A CAUSAL MODEL OF ASTHMA CONTROL IN ADULT PERSONS WITH ASTHMA" โดยมี รองศาสตราจารย์ ดร.อาภรณ์ ดีนาน เป็นประธานกรรมการควบคุมดุษฎีนิพนธ์ ซึ่งอยู่ในขั้นตอนการเตรียมเครื่องมือเพื่อการเก็บรวบรวมข้อมูล

เนื่องจากท่านเป็นผู้มีความเชี่ยวชาญ และประสบการณ์สูง ในการนี้ คณะฯ จึงขออนุญาตเชิญเป็นผู้ทรงคุณวุฒิในการแปลเครื่องมือกลับเพื่อการวิจัยจากภาษาอังกฤษเป็นภาษาไทยของนิสิต จำนวน ๑ เครื่องมือ คือ The Self-efficacy Subscale of the Knowledge, Attitude, and Self-efficacy Asthma Questionnaire (KASE-AQ) ทั้งนี้ หากท่านมีปัญหาหรือต้องการข้อมูลเพิ่มเติม โปรดติดต่อผู้วิจัยได้ที่ โทร ๐๘ ๖๕๘๒ ๕๒๑๒

จึงเรียนมาเพื่อโปรดพิจารณาดำเนินการด้วย จะเป็นพระคุณยิ่ง

(ผู้ช่วยศาสตราจารย์ ดร.พรชัย จูลเมตต์)
คณบดีคณะพยาบาลศาสตร์

ที่เนา

บันทึกข้อความ

ส่วนงาน มหาวิทยาลัยบูรพา คณะพยาบาลศาสตร์ งานบริการการศึกษา (บัณฑิตศึกษา) โทร.๒๘๓๖
ที่ อว ๘๑๐๖/๑๒๔๗ **วันที่** ๑๒ มิถุนายน พ.ศ. ๒๕๖๓
เรื่อง ขอเรียนเชิญเป็นผู้ทรงคุณวุฒิในการแปลเครื่องมือเพื่อการวิจัย

เรียน อาจารย์ ดร.จันทนา เกิดบางแขม

ด้วย ร้อยเอกหญิงพัทธ์ชนก วิถีธรรมศักดิ์ รหัสประจำตัว ๖๐๘๑๐๐๐๘ นิสิตหลักสูตรปรัชญาดุษฎีบัณฑิต สาขาวิชาพยาบาลศาสตร์ (หลักสูตรนานาชาติ) คณะพยาบาลศาสตร์ มหาวิทยาลัยบูรพา ได้รับอนุมัติเค้าโครงดุษฎีนิพนธ์ เรื่อง "A CAUSAL MODEL OF ASTHMA CONTROL IN ADULT PERSONS WITH ASTHMA" โดยมี รองศาสตราจารย์ ดร.อาภรณ์ ดีนาน เป็นประธานกรรมการควบคุมดุษฎีนิพนธ์ ซึ่งอยู่ในขั้นตอนการเตรียมเครื่องมือเพื่อการเก็บรวบรวมข้อมูล

เนื่องจากท่านเป็นผู้มีความเชี่ยวชาญ และประสบการณ์สูง ในการนี้ คณะฯ จึงขออนุญาตเชิญเป็นผู้ทรงคุณวุฒิในการแปลเครื่องมือกลับเพื่อการวิจัยจากภาษาอังกฤษเป็นภาษาไทยของนิสิต จำนวน ๑ เครื่องมือ คือ The Self-efficacy Subscale of the Knowledge, Attitude, and Self-efficacy Asthma Questionnaire (KASE-AQ) ทั้งนี้ หากท่านมีปัญหาหรือต้องการข้อมูลเพิ่มเติม โปรดติดต่อผู้วิจัยได้ที่ โทร ๐๘ ๖๕๘๒ ๕๒๑๒

จึงเรียนมาเพื่อโปรดพิจารณาดำเนินการด้วย จะเป็นพระคุณยิ่ง

(ผู้ช่วยศาสตราจารย์ ดร.พรชัย จูลเมตต์)
คณบดีคณะพยาบาลศาสตร์

-สำเนา-

ที่ อว ๘๓๐๖/ ๐๐๕๓๖

มหาวิทยาลัยบูรพา คณะพยาบาลศาสตร์
๑๖๙ ถนนลงหาดบางแสน ตำบลแสนสุข
อำเภอเมือง จังหวัดชลบุรี ๒๐๓๓๑

๑๒ มิถุนายน ๒๕๖๓

เรื่อง ขอเรียนเชิญเป็นผู้ทรงคุณวุฒิในการแปลเครื่องมือเพื่อการวิจัย

เรียน พ.ท.หญิง ดร.ศศิพร อุ่นใจชน

สิ่งที่ส่งมาด้วย เครื่องมือที่ใช้ในการวิจัย จำนวน ๑ ชุด

ด้วย ร้อยเอกหญิงพัทธ์ชนก วิถีธรรมศักดิ์ รหัสประจำตัว ๖๐๘๑๐๐๐๘ นิสิตหลักสูตรปรัชญา-ดุษฎีบัณฑิต สาขาวิชาพยาบาลศาสตร์ (หลักสูตรนานาชาติ) คณะพยาบาลศาสตร์ มหาวิทยาลัยบูรพา ได้รับอนุมัติเค้าโครงดุษฎีนิพนธ์ เรื่อง "A CAUSAL MODEL OF ASTHMA CONTROL IN ADULT PERSONS WITH ASTHMA" โดยมี รองศาสตราจารย์ ดร.อาภรณ์ ดีนาน เป็นประธานกรรมการควบคุมดุษฎีนิพนธ์ ซึ่งอยู่ในขั้นตอนการเตรียมเครื่องมือเพื่อการเก็บรวบรวมข้อมูล

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จึงเรียนมาเพื่อโปรดพิจารณาดำเนินการด้วย จักเป็นพระคุณยิ่ง

ขอแสดงความนับถือ

(ผู้ช่วยศาสตราจารย์ ดร.พรชัย จูลเมตต์)
คณบดีคณะพยาบาลศาสตร์ ปฏิบัติการแทน
ผู้รักษาการแทนอธิการบดีมหาวิทยาลัยบูรพา

APPENDIX F

Evaluation of assumptions

Evaluation of assumptions

Test of missing data in the study variables (n = 336)

Variables	Cases					
	Valid		Missing		Total	
	n	%	n	%	n	%
Illness perception	336	100.0%	0	0.0%	336	100.0%
Depression	336	100.0%	0	0.0%	336	100.0%
Job stress	336	100.0%	0	0.0%	336	100.0%
Health literacy	336	100.0%	0	0.0%	336	100.0%
Asthma self-efficacy	336	100.0%	0	0.0%	336	100.0%
Social support	336	100.0%	0	0.0%	336	100.0%
Asthma self-management behaviors	336	100.0%	0	0.0%	336	100.0%
Asthma control	336	100.0%	0	0.0%	336	100.0%

The results showed that there were no missing data.

Test of outliers by Z-score in the study variables (n = 336)

Variables	*n*	Minimum	Maximum	Conclusion
Illness perception	336	-2.66	2.76	No outlier
Depression	336	-1.44	4.24	Outlier
Job stress	336	-2.04	2.87	No outlier
Health literacy	336	-3.56	1.93	Outlier
Asthma self-efficacy	336	-3.65	2.10	Outlier
Social support	336	-4.49	1.66	Outlier
Asthma self-management behaviors	336	-2.61	2.63	No outlier
Asthma control	336	-1.65	2.67	No outlier

If Z-score of each variable < -3.29 or > +3.29 = outlier

The results showed that there were four univariate outliers, including depression (#96 and #144 had z-scores was 4.24 and 3.83 respectively), health

literacy (#25 and #32 had z-scores was -3.56), asthma self-efficacy (#31 had z-scores was -3.65), and social support (#108 had z-scores was -4.49). Then, take note of six cases with outliers to see in the next step of multivariate assessments.

Test of multivariate outliers of the study variables (n = 336)

	n	**Minimum**	**Maximum**
Probability of mah_1	336	.000	1.00
Valid N (listwise)	336		

Test of multivariate outliers of study variables after eliminated (n = 330)

	n	**Minimum**	**Maximum**
Probability of mah_2	330	.001	1.00
Valid N (listwise)	330		

Test by the probability of Mahalanobis (Probability of mah_1) < .001, found that three outliers, including #31 = .000, #96 = .000,and #108 = .000. All of outliers had been detected in earlier univariate analyses. Therefore, six cases with outliers were eliminated from further analysis. Consequently, 330 cases were used to test for multivariate normal distribution, linearity, and multicollinearity.

Test of normality of the study variables (n = 330)

Variables	Skewness		Kurtosis	
	Statistic	Std. Error	Statistic	Std. Error
Illness perception	-.376	.134	-.006	.268
Depression	.385	.134	-.467	.268
Job stress	.060	.134	-.068	.268
Health literacy	-.353	.134	.102	.268
Asthma self-efficacy	-.154	.134	-.341	.268
Social support	-.350	.134	-.410	.268
Asthma self-management behaviors	-.068	.134	.064	.268
Asthma control	.227	.134	-.218	.268

Asymmetric distribution of skewness and peakedness of kurtosis was zero, and the critical ratios were between -1.96 and 1.96, indicating a normal distribution (Hair et al., 2010; Tabachnick & Fidell,2013). The findings indicated the job stress, asthma self-efficacy, asthma self-management behaviors, and asthma control met both criteria of normal distribution. However, Hair, Black, Babin, and Anderson (2019) indicate that a problem exists if the skewness index is extremely skewed (value > 3) and kurtosis index is > 10. No problems with skewness and kurtosis were detected for the eight variables, indicating they met the assumptions of normal distributions.

Testing for multicollinearity of the study variables (n = 330)

Variables	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	11.32	2.78		4.07	.000		
Illness perception	.03	.03	.07	1.30	.19	.66	1.51
Depression	.32	.14	.13	2.28	.02	.57	1.75
Job stress	.15	.03	.27	5.48	.00	.78	1.28
Health literacy	.03	.04	.03	.71	.48	.86	1.17
Asthma self-efficacy	-.01	.02	-.03	-.55	.59	.71	1.41
Social support	-.02	.03	-.04	-.74	.46	.65	1.54
Asthma self-management behaviors	-.07	.01	-.40	-6.09	.00	.44	2.29

Dependent Variable: Asthma control

The test results showed that the tolerance values ranged from .44 to.86 that no tolerance values less than .20. The VIF values were between 1.17 and 2.29 which no higher than 4. Consequently, no evidence of multicollinearity had found among the study variables.

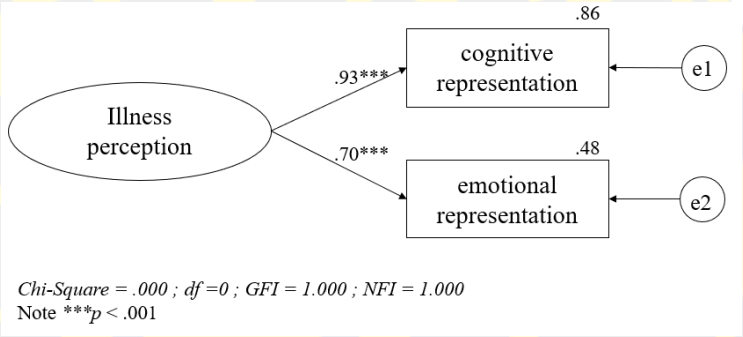
APPENDIX G

The measurement model assessment

The measurement model assessment

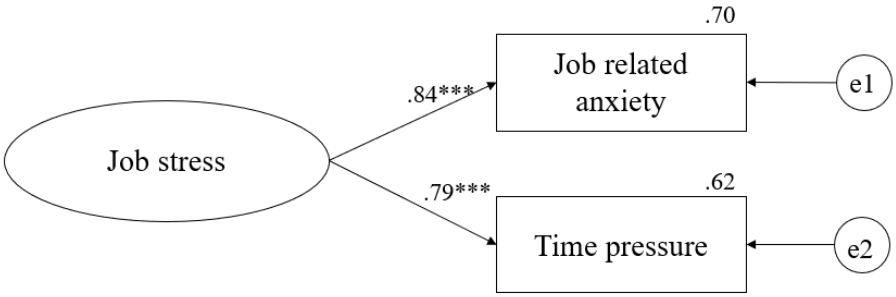
The measurement models were examined for construct validity of the measurement (Schumacker & Lomax, 2010; Hair et al., 2010). The measurement model had evaluated by using confirmatory factor analysis [CFA]. Eight constructs including illness perception, depression, job stress, health literacy, asthma self-efficacy, social support, asthma self-management behaviors, and asthma control evaluated for their measurement model by using CFA.

1. The measurement model of illness perception



Illness perception had two dimensions that include cognitive and emotional representation. The model of illness perception had a construct validity and perfect fit to empirical data at Chi-Square = .000, *df* = 0, GFI = 1.00, NFI = 1.00. Two factors loading were statistical significance at $p < .001$, the value of standard factor loading from .70 to .93. Cognitive representation. had maximum values of standard factor as .93 and emotional representation. had minimum values of standard factor loading as .70. All indicators had positive values of standard factor loading and greater than .30 that acceptable level (Kim & Whitely, 1978). Consequently, cognitive and emotional representation dimensions were indicators of illness perception.

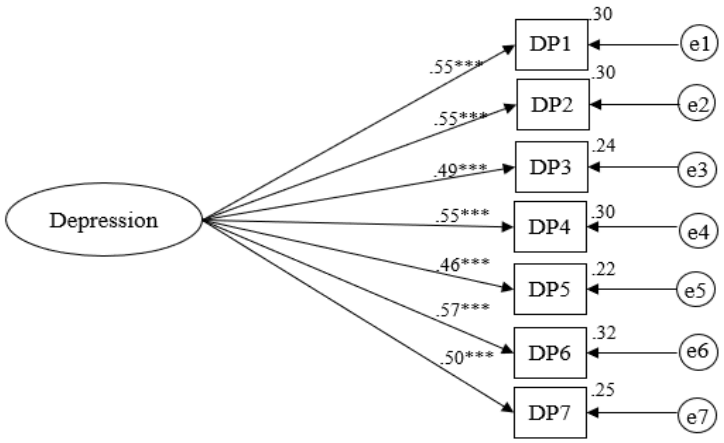
2. The measurement model of job stress



Chi-Square = .000 ; df =0 ; GFI = 1.000 ; NFI = 1.000
Note ***$p < .001$

Job stress had two dimensions that include time pressure and job related anxiety. The model of job stress had a construct validity and perfect fit to empirical data at Chi-Square = .000, df = 0, GFI = 1.00, NFI = 1.00. Two factors loading were statistical significance at $p < .001$, the value of standard factor loading from .79 to .84. Job related anxiety had maximum values of standard factor as .84 and time pressure had minimum values of standard factor loading as .79. All indicators had positive values of standard factor loading and greater than .30 that acceptable level (Kim & Whitely, 1978). Consequently, time pressure and job related anxiety dimensions were indicators of job stress.

3. The measurement model of depression

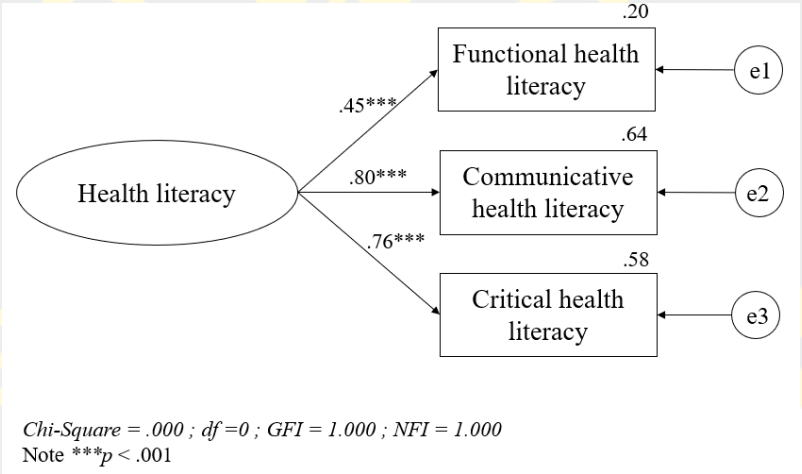


Chi-Square = 23.015 ; df =14 ; Relative Chi-Square = 1.644 ; p-value = .06;
GFI = .982 ; NFI = .932 ; CFI = .972 ; AGFI =.964
Note ***$p < .001$

Depression had seven dimensions that include DP1 (I still enjoy the things I used to enjoy), DP2 (I can laugh and see the funny side of things), DP3 (I feel

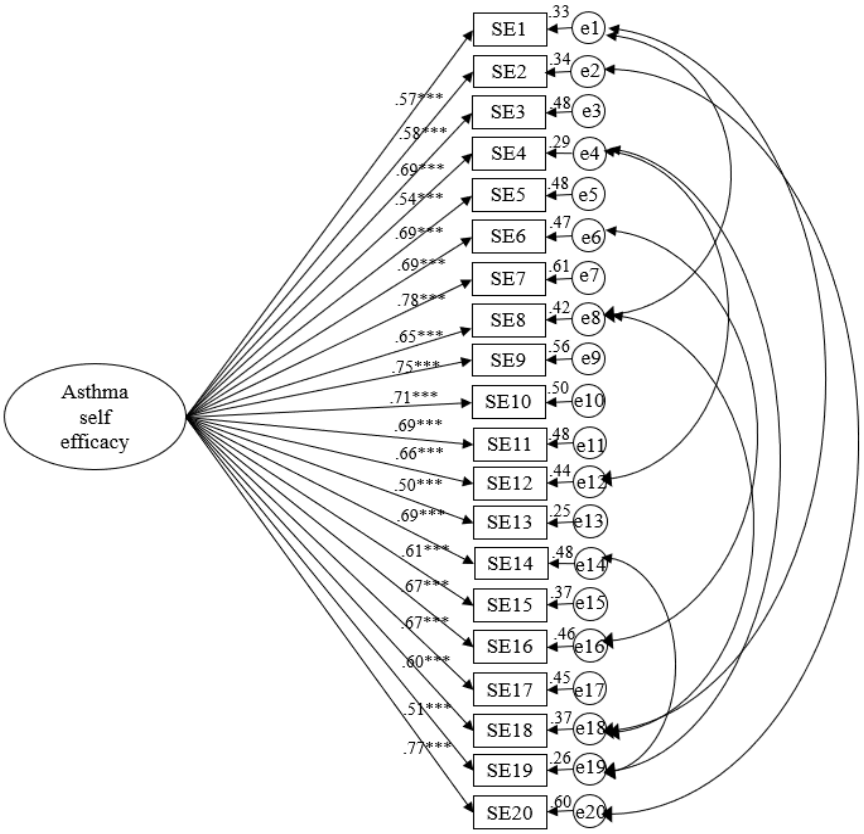
cheerful), DP4 (I feel as if I am slowed down), DP5 (I have lost interest in my appearance) , DP6 (I look forward with enjoyment to things), DP7 (I can enjoy a good book or radio or TV program). The model of depression had construct validity and fit to empirical data at CMIN = 23.02, df = 14, $p > .05$, CMIN/df = 1.644, GFI = .982, AGFI = .964, NFI = .932, and CFI = .972. Seven factors loading were statistical significance at $p < .001$, the value of standard factor loading from .46 to .57. DP6 had maximum values of standard factor as .57 and DP5 had minimum values of standard factor loading as .46. All indicators had positive values of standard factor loading and greater than .30 that acceptable level (Kim & Whitely, 1978). Consequently, DP1, DP2, DP3, DP4, DP5, DP6, and DP7 dimensions were indicators of spirituality.

4. The measurement model of health literacy



Health literacy had three dimensions that include functional health literacy, communicative health literacy, and critical health literacy. The model of health literacy had a construct validity and perfect fit to empirical data at Chi-Square = .000, df = 0, GFI = 1.00, NFI = 1.00. Three factors loading were statistical significance at $p < .001$, the value of standard factor loading from .45 to .80. Communicative health literacy had maximum values of standard factor as .80 and functional health literacy had minimum values of standard factor loading as .45. All indicators had positive values of standard factor loading and greater than .30 that acceptable level (Kim & Whitely, 1978). Consequently, functional health literacy, communicative health literacy, and critical health literacy dimensions were indicators of health literacy.

5. The measurement model of asthma self-efficacy

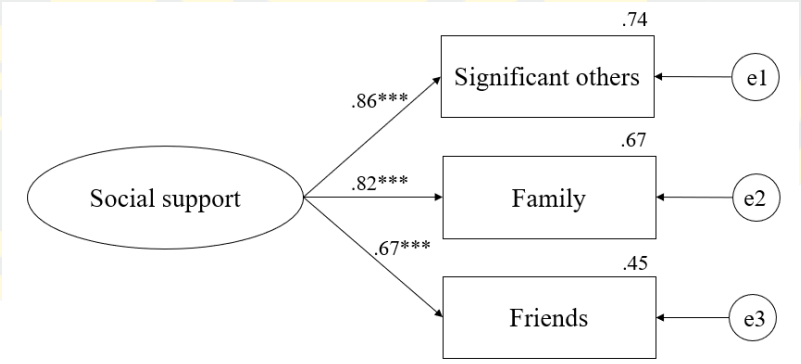


Chi-Square = 316.41 ; df =158 ; Relative Chi-Square = 2.00 ; GFI = .911 ; NFI = .912 ; CFI = .954
Note ***$p < .001$

Asthma self-efficacy had twenty dimensions that include SE1 (I can recognize the changes that occur in my lung before an asthma attack), SE2 (I can do a great deal to solve the problems that asthma can cause), SE3 (When it comes to my asthma, I feel that I can avoid having to miss work or other daily responsibilities), SE4 (I can prevent asthma in almost all situations), SE5 (I have confidence in my ability to keep my asthma under control when I am in a different city on vacation or on a business trip), SE6 (I can take the necessary steps to avoid or to manage an asthma attack effectively), SE7 (I feel confident in my ability to exercise without having an asthma attack), SE8 (I do very well at perceiving the level of my asthma at all times), SE9 (I have confidence in my ability to keep my asthma under control when problems arise in my family), SE10 (I can handle the problems that asthma may cause), SE11 (I can learn to be an effective asthma self-manager), SE12 (If cigarette smoke is bothering me, I feel that I can ask the person to stop smoking), SE13 (I feel that I can take my asthma medications as prescribed by my doctor), SE14 (During an

asthma episode, I can refrain from panicking in order to better manage the attack), SE15 (I have confidence in my ability to avoid frequent trips to the emergency room because of my asthma), SE16 (I don't have a lot of confidence in my ability to manage my asthma), SE17 (Once an attack starts, I am not capable of stopping it; I just have to wait until it subsides), SE18 (I have a lot of confidence in my ability to detect the early warning signs of my asthma), SE19 (I can avoid or minimize most of my asthma triggers), SE20 (I can use positive self-talk to help control my asthma). The model of asthma self-efficacy had construct validity and fit to empirical data at CMIN = 316.41, df = 158, CMIN/df = 2.00, GFI = .91, NFI = .91, and CFI = .95. Twenty factors loading were statistical significance at $p < .001$, the value of standard factor loading from .50 to .78. SE7 had maximum values of standard factor as .78 and SE13 had minimum values of standard factor loading as .50. All indicators had positive values of standard factor loading and greater than .30 that acceptable level (Kim & Whitely, 1978). Consequently, SE1 to SE20 dimensions were indicators of spirituality.

6. The measurement model of social support

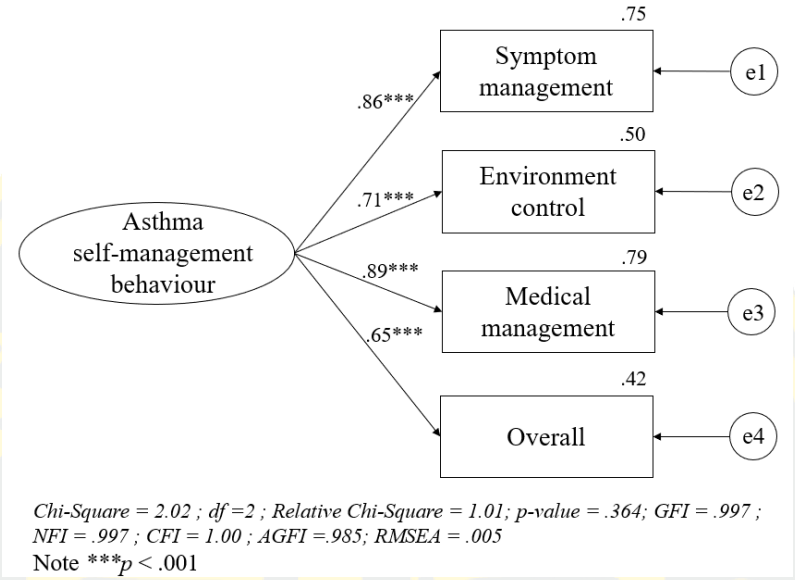


Chi-Square = .000 ; df =0 ; GFI = 1.000 ; NFI = 1.000
Note ***$p < .001$

Social support had three dimensions that family, friends, and significant others. The model of social support had a construct validity and perfect fit to empirical data at Chi-Square = .000, df = 0, GFI = 1.00, NFI = 1.00. Three factors loading were statistical significance at $p < .001$, the value of standard factor loading from .67 to .86. Significant others had maximum values of standard factor as .86 and friends had minimum values of standard factor loading as .67. All indicators had positive values of standard factor loading and greater than .30 that acceptable level

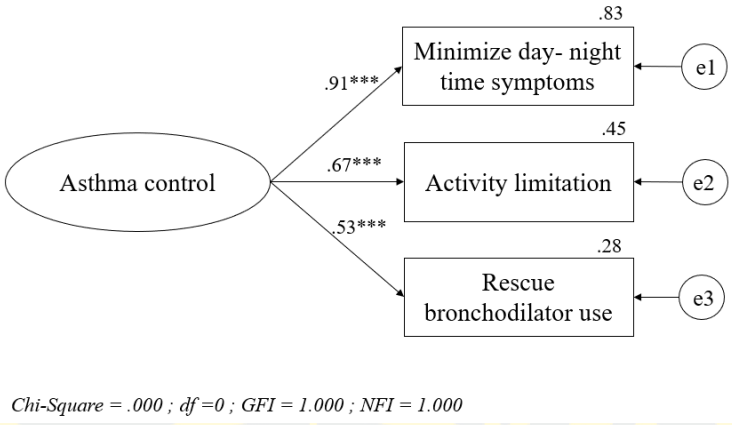
(Kim & Whitely, 1978). Consequently, family, friends, and significant others dimensions were indicators of social support.

7. The measurement model of asthma self-management behaviors



Asthma self-management behavior had four dimensions that include symptom management, medical management, environment control, and overall of asthma self-management behavior. The model of asthma self-management behavior had construct validity and fit to empirical data at CMIN = 2.02, $df = 2$, $p > .05$, CMIN/df = 1.01, GFI = .997, AGFI = .985, NFI = .997, CFI = 1.00, and RMSEA= .005. Four factors loading were statistical significance at $p < .001$, the value of standard factor loading from .65 to .89. Medical management had maximum values of standard factor as .89 and overall of asthma self-management behavior had minimum values of standard factor loading as .65. All indicators had positive values of standard factor loading and greater than .30 that acceptable level (Kim & Whitely, 1978). Consequently, symptom management, medical management, environment control, and overall of asthma self-management behavior dimensions were indicators of asthma self-management behavior.

8. The measurement model of asthma control



Asthma control had three dimensions that include minimize day-nighttime symptoms, activity limitation, and rescue bronchodilator use. The model of asthma control had a construct validity and perfect fit to empirical data at Chi-Square = .000, df = 0, GFI = 1.00, NFI = 1.00. Three factors loading were statistical significance at $p < .001$, the value of standard factor loading from .53 to .91. Minimize day-nighttime symptoms had maximum values of standard factor as .91 and rescue bronchodilator use had minimum values of standard factor loading as .53. All indicators had positive values of standard factor loading and greater than .30 that acceptable level (Kim & Whitely, 1978). Consequently, minimize day-nighttime symptoms, activity limitation, and rescue bronchodilator use were indicators of asthma control.

BIOGRAPHY

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