Development and Evaluation of the Adherence to Preventive Behavior Scale for Thai Persons with Prehypertension

Siriwan Chukumnird

A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy in Nursing (International Program)
Prince of Songkla University
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I hereby certify that this work has not been accepted in substance for any degree, and is not being currently submitted in candidature for any degree.

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ชื่อวิทยานิพนธ์ การพัฒนาและทดสอบคุณภาพแบบประเมินการยึดมั่นในพฤติกรรมการป้องกันโรคสำหรับคนไทยที่มีภาวะเสี่ยงสูงต่อความดันโลหิตสูง
ผู้เขียน นาง ศิริวรรณ ชูกำเนิด
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บทคัดย่อ

วัตถุประสงค์ในการศึกษาครั้งนี้เพื่อพัฒนาและทดสอบคุณสมบัติการวัดทางจิตวิทยาของแบบประเมินการยึดมั่นในพฤติกรรมป้องกันโรคที่เฉพาะเจาะจงกับบุคคลที่มีภาวะเสี่ยงสูงต่อความดันโลหิตสูง (APBS) กระบวนการพัฒนาแบบประเมินมี 2 ระยะ คือ ระยะที่ 1 การพัฒนาแบบประเมิน โดย 93 ข้อคำถามได้พัฒนามาจากการวิเคราะห์เนื้อหาจากการทบทวนวรรณกรรม การวิเคราะห์มโนทัศน์และการสัมภาษณ์เชิงลึกบุคคลที่มีความเสี่ยงสูงต่อความดันโลหิตสูง กำหนดมาตรวัดโดยใช้ลิเคริตสเกล 5 ระดับ ระยะที่ 2 การทดสอบคุณสมบัติการวัดทางจิตวิทยาของ APBS การตรวจสอบความตรงเชิงเนื้อหาประเมินโดยผู้เชี่ยวชาญจำนวน 3 คน และตรวจสอบความยากง่ายและความเข้าใจในข้อคำถามโดยบุคคลที่มีความเสี่ยงสูงต่อความดันโลหิตสูง พบว่าค่าดัชนีความตรงเชิงเนื้อหาค่อนข้างสูงโดย ได้ค่าความตรงเชิงเนื้อหารายข้อ เท่ากับ 1.0 และ ทั้งฉบับเท่ากับ 0.95 ภายหลังการทดสอบคุณภาพเบื้องต้นแบบประเมินนี้ประกอบด้วยข้อคำถามจำนวน 83 คำถาม โดยมีค่าอัลฟาของครอนบราคเท่ากับ 0.98

แบบประเมินนี้ได้รับการตรวจสอบคุณสมบัติการวัดทางจิตวิทยาโดยเก็บข้อมูลในผู้ที่มีความเสี่ยงสูงต่อความดันโลหิตสูงที่อาศัยอยู่ในพื้นที่ภาคใต้ของประเทศไทยจำนวน 661 ราย มีการทดสอบความตรงเชิงโครงสร้างด้วยการวิเคราะห์องค์ประกอบ การทดสอบสมมุติฐาน และการเปรียบเทียบกลุ่มที่มีความแตกต่างกัน ผลการวิเคราะห์พบว่าแบบประเมินการยึดมั่นในพฤติกรรมป้องกันโรคมีจำนวน 61 ข้อและประกอบด้วยสามคุณลักษณะคือ 1) มีความตั้งใจและความมุ่งมั่นในการปฏิบัติพฤติกรรมการป้องกันโรค 2) มีความขยันหมั่นเพียรในการปฏิบัติพฤติกรรมการป้องกันโรค และ 3) มีการคงไว้ซึ่งพฤติกรรมป้องกันโรค ซึ่งสามารถอธิบายความแปรปรวนได้ร้อยละ 62.27 ผลการทดสอบสมมติฐานพบว่าระดับความดันโลหิตมีความสัมพันธ์ทางลบกับระดับการยึดมั่นในพฤติกรรมป้องกันโรค ผลการเปรียบเทียบกับกลุ่มที่มีความแตกต่างกันยืนยันว่าแบบประเมินที่ได้พัฒนาขึ้นมีความตรงเชิงโครงสร้าง โดยสามารถจำแนกบุคคลที่มีความเสี่ยงสูงต่อความดันโลหิตสูงที่ยึดมั่นต่อพฤติกรรมป้องกันโรค กับบุคคลที่มีความเสี่ยงสูงต่อโรคความดันโลหิตสูงที่ไม่

มีพฤติกรรมป้องกันโรค ($t = 3.0$, $p < .005$) นอกจากนี้นี้มีความเชื่อมั่นชนิดความสอดคล้องภายในของแต่ละองค์ประกอบย่อยเท่ากับ 0.98 ค่าความเชื่อมั่นด้วยการทดสอบซ้ำมีค่าสัมประสิทธ์สหสัมพันธ์ เท่ากับ 0.96

ดังนั้นแบบประเมินที่พัฒนาใหม่นี้มีคุณสมบัติการวัดเชิงจิตวิทยาที่เหมาะสม จึงสามารถนำไปประเมินระดับการยึดมั่นในพฤติกรรมการป้องกันโรคในบุคคลที่มีความเสี่ยงสูงต่อความดันโลหิตสูง แบบประเมินนี้ควรมีการพัฒนาต่อไปเพื่อลดจำนวนข้อคำถาม

Thesis Title Development and Evaluation of Adherence to Preventive Behavior Scale for Thai Persons with Prehypertension

Author Mrs. Siriwan Chukumnird

Major Program Nursing (International Program)

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ABSTRACT

The purpose of this study was to develop and test the psychometric properties of a new instrument for measuring adherence to preventive behaviors for Thai persons with prehypertension (APBS). The instrument development process involved two phases: 1) development of the APBS. The 93 items generated for the instrument were drawn from literature reviews, concept analysis and in-depth interviews. Scaling responses were determined using a 5 point Likert-scale; 2) psychometric evaluation of the APBS. Content validity was evaluated by three healthcare professionals and examined on its face validity using 12 Thais with prehypertension. The content validity index showed a high validity with an I-CVI of 1.00 and S-CVI of 0.9. After pretesting, the APBS consisted of 83 items with a Cronbach's alpha coefficient of 0.98.

Data collection for psychometric evaluation was conducted by a convenience sampling of 661 persons with prehypertension from southern Thailand. Construct validity was assessed by measuring exploratory factor analysis, hypothesis testing, and known group technique. The APBS consisted of 61 items with three attributes 1) intention and engagement in practicing preventive behavior; 2) perseverance in practicing preventive behaviors; and 3) maintenance of practicing

preventive behaviors which explained 62.27% of the total variance. Hypothesis testing reported a negative correlation between the blood pressure levels and the total scores. Known group comparison was confirmed by construct validity of the scale when the results indicated that the APBS was able to differentiate members of one group from the other by yielding a significant difference ($t = 3.0$, $p < 0.005$) between the mean APBS scores of two groups of persons with prehypertension. Cronbach's α of the overall questionnaire was 0.98 and 0.96 for test–retest reliability.

Based on these analyses, the APBS demonstrated sound psychometric properties and should be used to determine adherence to preventive behaviors of Thai persons with prehypertension. This instrument should undergo further analysis to reduce the number of items.

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I am truly grateful to my parents and my family for loving me as deeply as they have throughout my life.

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Siriwan Chukumnird

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CHAPTER 1

INTRODUCTION

Background and Significance of the Study

High blood pressure is a significant worldwide public health challenge because of its high prevalence and concomitant risks of heart disease, stroke, and kidney disease (Cutler et al., 2008; Habib, Virani, & Jneid, 2015; Olives, Myerson, Mokdad, Murray, & Lim, 2013). The World Health Organization reported that the overall prevalence of raised blood pressure in adults aged 25 and over was around 40% in 2008 (Mendis, Puska, & Norrving, 2011). In Thailand, the results from the fourth National Health and Nutrition Examination Survey (NHANES IV) showed that more than 21.4% of Thais over 15 years of age have been diagnosed with high blood pressure and prehypertension has become a major public health concern because of its high prevalence and association with other cardiovascular risk factors, especially obesity and diabetes (Aekplakorn et al., 2012). Furthermore, individuals with prehypertension have been associated with lower educational attainment. Undoubtedly, prehypertension is being targeted for integrated prevention and control under the draft of the Thailand Healthy Lifestyle Strategic Plan (2007-2011 & 2011–2020).

Prehypertension indicates a significantly greater risk of developing hypertension and cardiovascular disease. Several studies have investigated the short-term and long-term progression rates from the non-hypertensive category to

hypertension and have shown that individuals with prehypertension are at a greater risk of progression to hypertension and cardiovascular disease than those individuals who are normotensive (Gu et al., 2008; Habib et al., 2015; Hsia et al., 2007; Huang et al., 2014; Kshirsagar, Carpenter, Bang, Wyatt, & Colindres, 2006; Qureshi, Suri, Kirmani, Divani, & Mohammad, 2005; Zhang et al., 2006). Moreover, the rate of progression from prehypertension to hypertension can be rapid. The results of the Trial of Preventing Hypertension (TROPHY) revealed that 40% of individuals in the prehypertensive range developed to hypertension within two years of their follow-up (Julius et al., 2004; Julius et al., 2006). Furthermore, the risk of cardiovascular mortality appears to be increased in both men and women with prehypertension (Hsia et al., 2007; Mainous, Everett, Liszka, King, & Egan, 2004). As a result, prehypertension serves to emphasize not only the role of the individual with prehypertension but also the role of health care providers in its management before levels reach the classification of hypertension.

Health promotion and disease prevention are emphasized as important in the prevention and control of high blood pressure in the worldwide population. The Seventh and Report of the Joint National Committee (JNC VII) on the prevention, detection, evaluation, and treatment of high blood pressure recommends lifestyle modifications and control of cardiovascular risk factors for patients with prehypertension (Chobanian et al., 2003; Svetkey, 2005). In Thailand, prehypertension is being targeted for integrated prevention and control under the draft of the Thailand Healthy Lifestyle Strategic Plan (2007-2011 & 2011–2020). Management of prehypertension has become an important concern in primary care by nurse in a variety of practice settings given it’s important implications for public

health promotion and disease prevention. Despite screening and promoting lifestyle modifications for people who are at risk of hypertension and have thus become routine frameworks for a primary care unit, a recent 2-year study between 2008 and 2009 found that the incidence of prehypertensive patients in primary care units was high and became lower in the second follow-up (Sookaneknun, Pankhoomkao, Thowanna, & Janhan, 2012).

The most important challenge for nurses is how to increase the effectiveness of health promotion and disease prevention treatment for controlling high blood pressure. Therefore, adherence to preventive behaviors is a vital concept. This concept promotes the ability of patients to follow treatment plans in an optimal manner (Martin, Williams, Haskard, & DiMatteo, 2005; World Health Organization, 2003). Adherence to preventive behaviors is the concept of promoting the maintenance of a healthier lifestyle with improved health outcomes. Likewise, poor adherence to preventive behaviors is responsible for increasing healthcare spending and premature progression of non-communicative diseases (World Health Organization, 2003).

Adherence to preventive behaviors is described as the dynamic interaction of a prescribed treatment regimen and the patient's behaviors (Bissonnette, 2008; Cohen, 2009; Johnson, 2002; World Health Organization, 2003). There were limitations in the studies on the concept of adherence to preventive behaviors that were reviewed. One was that the conceptual definitions for terms vary, and partly overlap, resulting in conceptual confusion. No definition of adherence was reflected in a patient-centered approach or in the power issues underpinning it (Bissonnette, 2008; Cramer et al., 2008) Moreover, similar concepts such as compliance and

concordance are often used interchangeably with adherence (Bissonnette, 2008; Cohen, 2009; Landier, 2011; Shay, 2008). Furthermore, adherence is defined differently by healthcare providers and patients (Ingadóttir, 2006; Sandman, Granger, Ekman, & Munthe, 2012). A lack of consensus in regard to conceptual definitions and operational definitions has contributed to the problems of development and selection of instruments to measure the attributes of the concept.

While there are several methods for measuring adherence behavior, there is no "gold standard" for measuring adherence to preventive behaviors (Bollen, Dean, Siegert, Howe, & Goodwin, 2014; World Health Organization, 2003). The current measurement approach is based on indirect measurement using biological or physical criteria, theoretical frameworks and self-reporting. Although biological and physical indicator criteria are a valid measure of adherence to preventive behaviors, they only measure adherence to preventive behaviors at one point in time that may not be appropriate for chronic disease with complex regimens. Typical strategies using theoretical frameworks to identify concepts that influence adherence to preventive behaviors are useful in looking at factors which affect adherence to preventive behaviors. However, no one theory explains the whole of adherence to preventive behaviors (World Health Organization, 2003). Self-reporting has taken various forms including interviews, structured questionnaires and daily diaries. Although adherence to preventive behavior levels reported by patients tends to over-estimate the level of adherence, an attractive aspect of using self-report measures is that there are a variety of variables that can be measured from the subject that may not be available from other sources. For example, self-report can assess the patterns and timing of an activity as well as the efforts and barriers involved in the activity (Levensky &

O'Donohue, 2006). Self-report measures are also having the advantages of being the most economical and simplest way for assessing adherence behavior (Levensky & O'Donohue, 2006; Vitolins, Rand, Rapp, Ribisl, & Sevick, 2000).

Currently, several studies have developed self-assessment tools examining adherence to treatment related to medication and the healthy lifestyle of hypertensive persons. Although adherence to preventive behaviors is a multidimensional concept, the majority of researchers measure the elements of this concept differently. Some scales have been constructed to measure individuals' frequency and ability to follow exactly the suggestions of healthcare providers (Kim, Hill, Bone, & Levine, 2000; Ma, Chen, You, Luo, & Xing, 2012). Wright & Kyngäs (2003) measured the compliance of hypertensive patients in five aspects that include lifestyle, intention, attitude, responsibility and smoking. Other self-assessment scales are conceptualized using cognitive theoretical frameworks predicting adherence to preventive behaviors (Bentley, Lennie, Biddle, Chung, & Moser, 2009) but indirect measures do not fully address the attributes of adherence to preventive behaviors. Despite these instruments being related to attributes of lifestyle modification, no scale has been developed which is able to make a comprehensive evaluation of the attributes of adherence to preventive behaviors for persons with prehypertension. Therefore, additional study is needed to develop an instrument that more fully captures the adherence to preventive behavior attributes of prehypertension and is more perceptive of issues associated with non-adherence.

Adherence to preventive behaviors has had a variety of definitions and a wide variation in the operational definition within the literature. To measure adherence to preventive behaviors of Thai individuals, it is important to understand

the concept of adherence to preventive behaviors from the perspective of Thai people because "adherence to preventive behaviors" is a term which has not been clearly defined in the Thai language and is not generally accepted. Since the East and the West have cultural differences in the ways individuals communicate, behave and interpret information and their beliefs and problem solving (Martin et al., 2005; Mihalko et al., 2004), understanding the concept of adherence to preventive behaviors from the perception of Thai persons with prehypertension will increase the validity and cultural sensitivity of the measure.

In Thailand, no research has been done on an adherence to preventive behavior assessment scale for prehypertension. One study has developed an adherence to therapeutic regimens scale which was used to measure the extent of agreement and performance for the recommended behaviors dispensed by healthcare providers of hypertension but this scale did not go through the steps in scale development which are essential for the evaluation of the effectiveness of a measure (Pinprapapan, Panuthai, Vannarit, & Srisuphan, 2013). Additionally, the attributes of adherence concept are based on literature primarily from western countries which may have some limitations when generalized in a Thai context since literature reviews suggest that social and cultural factors influence virtually all aspects of human behaviors, including adherence to preventive behaviors (Mihalko et al., 2004; Naemiratch & Manderson, 2006). Thus, clarifying the concept of adherence to preventive behaviors in the Thai cultural context and from the Thai perspective is an essential preliminary step towards achieving a definition and attributes for use in instrument development. A standard and culturally sensitive instrument, which covers diverse attributes of adherence to preventive behaviors for Thai persons with prehypertension

needs to be established, and to allow this information to be used as a scientific basis for systematic assessment and interventions designed to enhance the health of Thai persons with prehypertension.

In developing the adherence to preventive behavior scale (APBS), the researcher will examine the definition, describe the concept and attributes, depict its psychometric properties, and elicit a proper adherence to preventive behaviors measuring tool for utilization in the Thai context. As the adherence to preventive behaviors concept is more fully understood, its utilization may be beneficial in many areas of nursing and healthcare disciplines in the near future.

Objectives of the Study

To develop an adherence to preventive behavior scale for Thai persons with prehypertension and determine its psychometric properties.

Research Questions

1. What are the attributes of an adherence to preventive behavior scale for persons with prehypertension in Thailand?
2. How valid and reliable is this newly developed adherence to preventive behavior scale for persons with prehypertension in Thailand?

Scope of the Study

This study was developed and tested the psychometric properties of the APBS, an instrument for assessing adherence to preventive behaviors in Thai persons with prehypertension aged 35 and older with blood pressure between 120 to 129

mmHg and/or diastolic blood pressure 80 to 84 mmHg and who reported no known hypertension or cardiovascular diseases such as coronary heart disease or stroke. All subjects received personal hypertension risk-factor information (i.e., age, obesity, and lipid panel numbers), in addition to general health information on hypertension risk-factors. For this research, adherence to preventive behaviors are extended to lifestyle modification which includes three non-pharmacological treatments; healthy eating, exercise and stress management. The study was based on data generated from a sample group of adults from only the southern region of Thailand from June 2014 to August 2014.

Conceptual Framework of the Study

The conceptual framework of this research study is composed of three main aspects: (1) a concept of adherence to preventive behaviors, (2) a norm-referenced framework, and (3) Thai cultural context**.**

A concept of adherence to preventive behaviors

A concept of adherence to preventive behaviors in a Thai context has rarely been reviewed nor research conducted as comprehensively as in western cultures. Hence, the concept of adherence to preventive behaviors started with a review of the literature and concept analysis that will be used as a guide to develop key questions for conducting the interviews for the study. The concept analysis provides a definition of adherence to preventive behaviors as “a voluntary process of participation, in which patients make efforts to follow preventive behavioral recommendations that are mutually agreed upon”(Cohen, 2009; Robinson, Callister,

Berry, & Dearing, 2008). This definition refers to the characteristic of patients as independent and autonomous people as to whether to adhere to the prescriber's recommendations, and an action that is regular and sustained in practicing preventive behaviors for a long-term (Bissonnette, 2008; Cohen, 2009; Hearnshaw & Lindenmeyer, 2006; Shay, 2008).

The attributes of adherence to preventive behaviors are based on adherence to preventive behavior concept analysis in conjunction with interviews conducted by the researcher. Three attributes of adherence to preventive behaviors were proposed for this study.

1. Commitment to active participation. The commitment to active participation regarding preventive behaviors is the cognitive process that facilitates being adherent to preventive behaviors. Participation in a preventive behavior program reinforced prehypertensive persons to change their behavior and incorporate these preventive activities into their daily life. Commitment to active participation can view as a force that binds a prehypertensive person to a behavior program deemed necessary for the successful implementation of a change initiative and a goal (Amrhein, 2004; Armitage & Conner, 2001; Wilson et al., 2004). Commitment to active participation can be reflected by1) intention or desire to participate in preventive behaviors based on the patients' experiences of hypertension, and their experiences of preventive behavior participation; 2) expected success; and 3) self-discipline.

1.1 Intention or desire to participate in preventive behaviors. It refers to the perception of willingness to follow preventive behavior treatment without interference from others, and freedom to make one's own choices or decisions to

follow preventive behaviors without interference from healthcare providers. Most participants indicated that they will follow and maintain the prescribed treatments depending on their experiences, feelings and perceptions.

1.2 Expected success. It refers to the perception of mastery, confidence, and courage to organize or adjust the preventive treatment in various situations. Adherence to preventive behavior experiences helped Thais with prehypertension to learn to be organized and to do preventive behaviors. The Majority of the participants felt that it was less difficult to incorporate the preventive behavior activities into their daily life.

1.3 Self-discipline. It refers to the perception of having enough control over engaging in behavior change. Self-discipline was viewed as a prerequisite for success in preventive behavior adherence and well-being of Thais. Clients followed the prescribed treatment strictly when they believed that disease impacted on their lives or had power over them.

2. Persistence in practicing preventive behaviors. Persistence in practicing preventive behaviors is an ability of prehypertensive persons to continue in practicing preventive behavior despite of difficulty or perceived barriers. They need to have abilities to translate their intentions into actions because there are numerous ways that their resources and environment may be inadequate for carrying out the preventive activities (McArthur, Dumas, Woodend, Beach, & Stacey, 2014). When persons are persistent, they have continually met a high standard of preventive behaviors. Persistence in practicing preventive behaviors can be reflected by1) repeated action; and 2) regular pattern.

2.1 Repeated action. It refers to an ability of individuals to practice in preventive behaviors as prescribed. Repeated action provides a test of whether the individuals' resources and environment are adequate for carrying out the preventive activities.

2.2 Regular pattern. It refers to an ability of participants to establish an automatic or a regular pattern of preventive behaviors. Participants indicated that this pattern, which was developed over time, allows them to easily move through the day while integrating the preventive behaviors around other activities of daily living

3. Maintenance of desired preventive behaviors. Maintenance of desired preventive behaviors is the perception of achievement of Thais with prehypertension in the desired preventive behavior change and is practicing to sustain to the change. Since adherence to preventive behaviors might vary over a period of time, prehypertensive persons may be impressively adherent in the beginning of their treatment, but they may then suddenly become nonadherent. Adherence to preventive behavior requires time before it is successfully integrated in everyday life for promoting health and preventing hypertension (Shay, 2008). Maintenance of desired preventive behaviors can be reflected by 1) a long period of preventive activity routine and 2) an experience of sensations of well-being.

3.1 A long period of preventive activity routine. It refers to an ability of individuals to achieve of desired preventive behavior change over a long-term. Long-term behavior change is an important indicator of adherence to preventive behaviors where adopting regular preventive behavior patterns does not automatically lead to sustained preventive behavioral change (Prochaska, Redding, & Evers, 2005).

3.2 An experience of sensations of well-being. It refers to the perception of physical and psychosocial well-being. Generally, Thais sense of well-being is deeply rooted in Thai values and norms which affect behaviors in daily life. Majority of the participants used the sensations of physical and psychosocial well-being to identify that the desired preventive behavior had been maintained.

The attributes from the literature review were developed into questions for conducting interviews. Then, the combined data from both literature review and interviews will be integrated into tool's attributes. Three attributes of an adherence to preventive behavior scale are developed because they were the most mentioned in literature review and interview data and will be proposed for this study.

Thai cultural context

In conducting the APBS, there is a possibility of difference in attributes and items of measures from Western countries since Asian values, attitudes, and behaviors do not affect adherence to preventive behaviors in the same ways as in the west (Martin et al., 2005; Mihalko et al., 2004). Therefore, it is essential to include the Thai cultural aspect in developing the tool which is derived from the literature review and interviews with Thai persons. Thai perspectives on adherence to preventive behaviors determinants which have been found from the literature reviews of the existing studies are: (1) perception of disease and treatment is the understanding of the disease and the benefit and difficulty of making lifestyle changes (Panpakdee, Sritanyarat, & Tanomsup, 2003); (2) Religion is the entirety of the linguistic expressions, emotions and, actions and signs that refer to a supernatural being or supernatural beings (Vergote, 1996). (3) collectivism is actions or feelings involving

every member of the group (Sinclair, 2006); (4) individual freedom is the freedom to exhibit a variety of behavior patterns in different social contexts (Stewart, 1972); (5) social hierarchies is an implicit or explicit rank order of individuals or groups with respect to a valued social dimension (Komin, 1991); (6) flexibility and adjustment orientation is an ability to balance ego, power, and a situation (Komin, 1991); and (7) achievement task orientation is an attitude characterized by the motivation of an achievement need emphasizing an internal drive towards achievement through hard work (Komin, 1991). These cultural practices have an influence over the tool's attributes; and yet, the reflection of them is demonstrated in item development.

A norm-reference framework

To construct an adherence to preventive behavior scale, it is important to identify and employ a measurement framework to identify and interpret the scale of the design. It is quite common for researchers and health care providers to dichotomize patients' adherence behaviors into "good" versus "poor" or "adherent" versus "nonadherent." However, it is difficult to be clear about what level of adherence to preventive behaviors is required to obtain therapeutic benefit. The loss of information that results from the unnecessary truncation of adherence, dichotomization of adherence is problematic because it demands that the researcher or health care provider applies cutoff scores that may not make practical sense. Therefore, a norm-referenced framework will be used in this study. Norms are not standards or goals. The purpose of a norm-referenced measure is to compare the scores of a person with the scores of other people in some well-defined reference group. This reference group might be other members of the same sample, or it might

be subjects nationwide to whom the same measure was administered (Waltz, Strickland, & Lens, 2005). A norm group is used to interpret the APBS score of an individual by comparing it with the scores of others. In constructing a norm-referenced measure, steps are usually taken to maximize variability in the score. This is in order to discriminate among individuals as much as possible (Goodwin, 1996). The conceptual framework for the APBS is demonstrated in Figure 1.

Definition of Terms

Adherence to preventive behaviors is defined as "a voluntary process of participation, in which patients make efforts to follow preventive behavior recommendations that are mutually agreed upon" (Cohen, 2009; Robinson et al., 2008). This adherence to preventive behaviors was evaluated by the Adherence to Preventive Behaviors Scale for Thai Persons with Prehypertension (APBS) developed by the researcher based on the literature review, interviews, norm referenced, and DeVellis's Theory of Scale Development. It consists of three attributes: 1) commitment to active participation, 2) persistence in practicing preventive behaviors, and 3) Maintenance of desired preventive behaviors. The definitions of each attribute are as follows:

1. Commitment to active participation in preventive behavior practices is defined as the willingness to change a risk behavior and incorporate preventive activities into daily lives. This consisted of intentional action, expected success, and self-discipline

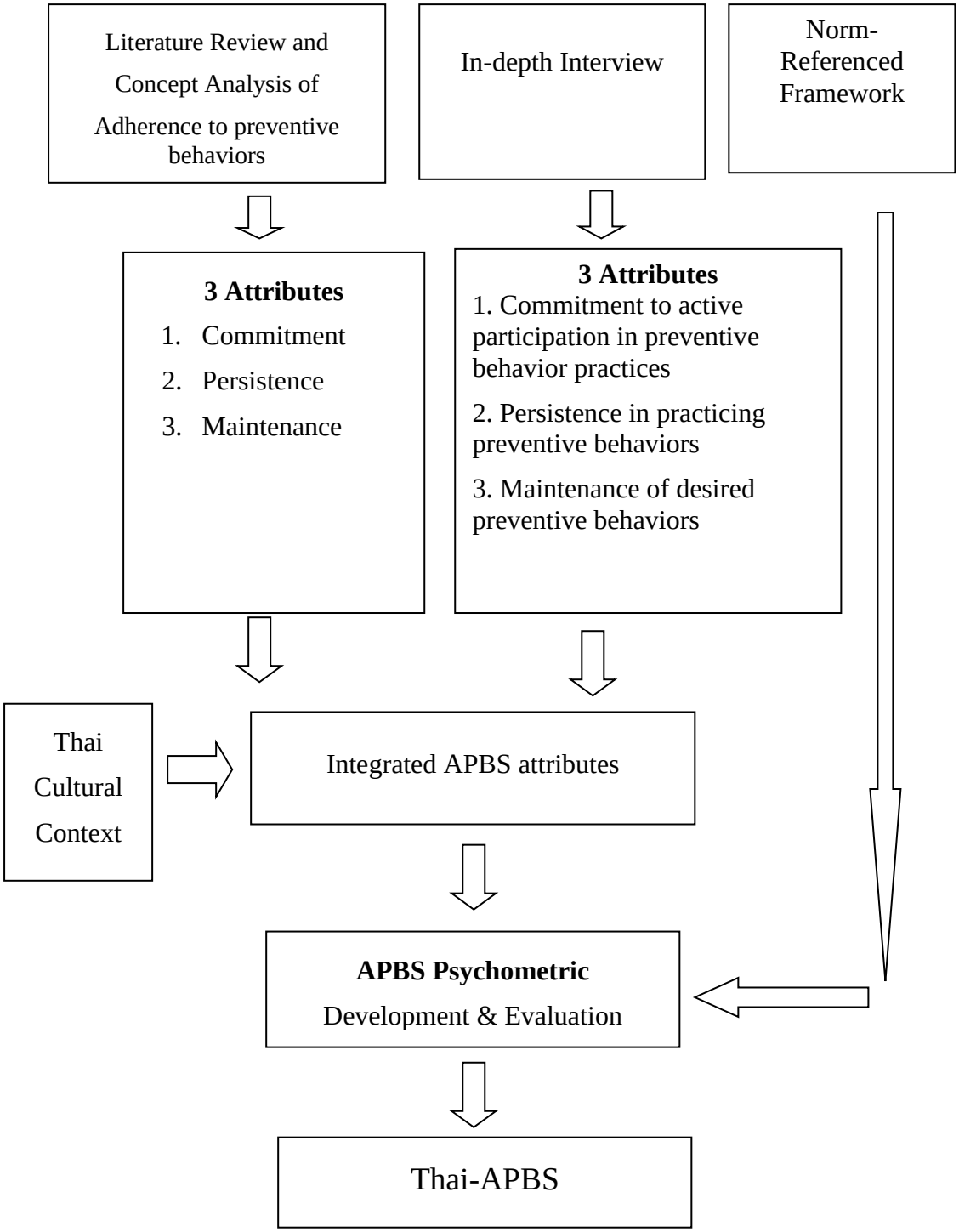

Figure 1. Conceptual framework of the APBS

2. Persistence in practicing preventive behaviors is defined as an ability of persons with prehypertension to continue in practicing preventive behavior in spite of difficulty or perceived barriers. This involved repeated action and being regular pattern.

3. Maintenance of desired preventive behaviors is defined as the perception of achievement of Thais with prehypertension in the desired preventive behavior change and is practicing to sustain to the change. This include experience of sensations of well-being and the long-term of preventive activity routine.

4. Preventive behaviors are defined as the activities of illness prevention or lifestyle modification including healthy eating, exercise, and stress management. The three preventive behaviors are important attributes of the current national health care policy and are highlighted in the Thailand Healthy Lifestyle Strategic Plan (Bureau of Policy and Straegy, 2011). However, moderation of alcohol intake and smoking cessation behaviors did not include in this study because alcohol consumption is inconsistent with the Thai social norms and health policies. Additionally, it is difficult to determine individuals' moderate alcohol intake. Smoking cessation is not included in the prehypertension treatment guidelines of the JNC VII because there is currently no evidence that smoking cessation directly reduces blood pressure in people with hypertension (Chobanian et al., 2003).

5. Development and evaluation of the APBS is defined as an establishment of the APBS based on the literature review, concept analysis, interviews, and norm referenced; expert panel evaluation; and two phase with eight steps according to DeVellis's procedure for scale development (DeVellis, 2012). The validity of the scale was determined by content validity index (CVI) using rating of

item relevance by three panel experts. The reliability was determined by internal consistency using Cronbanch's alpha, and stability using the test-retest approach. The construct validity was determined by an exploratory factor analysis (EFA), a hypothesis testing and a contrasted group approach.

Significance of the Study

A review of the literature demonstrated that there is a need for the development of an adherence to preventive behavior scale (APBS), especially for Thai persons with prehypertension. The ABPS instrument, a culturally-based measure, can assess the extent of adherence, which in turn will provide objective data that will impact on the health behaviors of Thai persons with prehypertension. The information can enable health care providers, particularly nurses, to assess the levels of adherence in order to promote prehypertensive personal health. The adherence to preventive behavior instrument can be a valuable tool, which may be applied in other related fields, such as nursing practice, nursing education, nursing administration, nursing research, and theory development. For instance, instructors of nursing will be able to provide a precise demonstration to student nurses to help assess the adherence level regarding the health of prehypertensive patients in primary health care. Similarly in nursing practice, nursing administration, and nursing research, the APBS can provide information that enables nurses, nurse administrators, and nurse researchers to plan for nursing interventions. On the other hand, accurate and reliable measures of adherence to preventive behaviors are needed; to help clinicians identify pre-hypertensive individuals who need assistance with their lifestyle modifications and the reduction of risk factors, to design and evaluate effective interventions to enhance

adherence, and to interpret the role of adherence in evaluating clinical outcomes and making treatment decisions. Additionally, the findings will provide a knowledge base of adherence to a preventive behavior model with policy implications to promote appropriate strategies for enhancing the quality of life among Thai people with chronic diseases.

CHAPTER 2

LITERATURE REVIEW

To develop an adherence to preventive behaviors scale for persons with prehypertension, a literature review was carried out on four important topics: (1) the current situation and health policy related to prehypertension, (2) treatment of prehypertension, (3) a concept of adherence to preventive behaviors and related concepts, and (4) adherence to a preventive behaviors measurement. The approach used for the literature review included a complete electronic search of several databases; such as: Medline, PubMed, CINAHL, Science Direct, and Proquest.

1. Current Situation and Health Policies Related to Prehypertension
    - 1.1 Current Situation on Prehypertension
    - 1.2 Current Health Policies Related to Prehypertension
2. Preventive Behavior Treatment of Prehypertension
    - 2.1 Dietary modification
    - 2.2 Weight Reduction
    - 2.3 Increased Physical Activity
    - 2.4 Moderation of Alcohol Intake
    - 2.5 Smoking Cessation
    - 2.6 Relaxation Response and Stress Management
3. A concept of Adherence to Preventive Behaviors and Related Concepts
    - 3.1 Definition of Adherence to Preventive Behaviors

Summary of the Situation and Health Policies Related to Prehypertension

Summary situation on prehypertension

In 1939, a study by Robinson and Brucer increased the understanding that adult blood pressure increases slightly during one's lifespan. This study also discovered that hypertension has also evolved from adults with a slightly elevated blood pressure range. Those adults with slightly elevated blood pressure had double the mortality rate through a sudden risk of death from major cardiovascular diseases when compared to normotensive adults. For this phenomenon, the two researchers

first used the term “prehypertension” in their literature which means a state of slightly elevated blood pressure in an adult (Selassie et al., 2011).

In 2003 a panel of experts from the Joint National Committee on the Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC) proposed a new blood pressure (BP) category termed “prehypertension” to describe individuals with systolic BP between 120 and 139 mmHg and/or diastolic BP between 80-89 mmHg (Chobanian et al., 2003) This categorization is based on research findings that the risk of cardiovascular events start at blood pressure values as low as 115/75 mmHg, Furthermore, each 20 mm Hg increment doubles the risk of end organ damage (Lewington, 2002; Vasan, Larson, Leip, Kannel, & Levy, 2001). This solid evidence illustrates that damage of blood vessels begins at lower pressure levels.

Although prehypertension is not currently categorized as a disease, it is a strong predictor of the development of hypertension (Qureshi et al., 2005; Sun et al., 2010; Vasan et al., 2001; Winegarden, 2005). Based on the Framingham Heart Study data, Vasan and colleagues (2005) reported that, within 4 years, hypertension will develop in approximately 37% of 35–64 year old people for those with baseline BP in the high normal range of (130–139/85–89 mmHg), and in 18% for those with baseline BP in the range 120–129/80–84 mmHg, while people with normal BP were 5 %. Results also reported that adults aged 65 years and older were 26% and 50% in the lower prehypertensive range and upper prehypertensive range, respectively (Vasan et al., 2001). More recently, Qureshi and colleagues (2005) classified BP readings from the Framingham Study based upon the JNC VII categories and found that prehypertension was associated with a twofold risk of developing hypertension compared with normotensive individuals. Similar results were observed in a

longitudinal study of over 2,000 British adults, which noted that the risk of progressing hypertension over a 7 year follow up period was two times greater for those in the lower prehypertensive range (120-129 mmHg/80-84 mmHg) and 2.9 times higher for those in the upper prehypertensive range (130-139 mmHg/85-89 mmHg) compared with normotensive adults (Winegarden, 2005). All of these studies also support the fact that prehypertensive adults are more likely to become hypertensive than normotensive adults, and particularly for those people whose systolic blood pressure lies in the upper prehypertensive range and for the elderly.

In addition to the increased risk of developing hypertension, a large body of evidence has demonstrated that individuals with prehypertension have an increased risk of cardiovascular disease (CVD) which is independent of other coexistent cardiovascular risk factors. In the Framingham Heart Study, results indicated that individuals in the high normal BP (i.e., 130-139/85-90 mm Hg; from the JNC VI guidelines) are more likely to develop cardiovascular events, including myocardial infarction, stroke, and congestive heart failure (Vasan et al., 2001). Furthermore, Quershi and colleagues (2005) found that, after a ten-year follow-up period, prehypertension is associated with increased risk of myocardial infarction (relative risk [RR]: 3.5) and risk of coronary heart disease (RR: 1.7). Along with the research from the Framingham Heart Study, NHANES data have been used for secondary analysis to evaluate the impact of prehypertension. Results indicated that development of cardiovascular disease was more prevalent in the higher prehypertensive category of 130 to 139 mmHg systolic and 85 to 89 mmHg diastolic. After adjustment for concomitant risk factors, as defined by JNC VII, individuals with prehypertension had a 32% higher risk of major CVD events compared with those with normal blood

pressure (Liszka, Mainous, King, Everett, & Egan, 2005). Additionally, Shen and colleagues (2013) recently published data from their meta-analysis study indicating that the hazard ratio for coronary heart disease after controlling for other cardiovascular risk factors among those with prehypertension as compared with normotensive individuals was 1.36 (95% CI 1.22 to 1.53). The association was stronger among those whose prehypertension was in the higher range (130 to 139/85 to 89 mmHg; hazard ratio 1.53, 95% CI 1.19 to 1.97) than those whose prehypertension was in the lower range (120 to 129/80 to 84 mmHg; hazard ratio 1.16, 95% CI 0.96 to 1.42) (Shen, Ma, Xiang, & Wang, 2013).

Individuals with prehypertension are more likely to have one or more additional risk factors for cardiovascular disease and hypertension such as smoking, diabetes, obesity and dyslipidemia compared to the normotensive population. (Greenlund, Croft, & Mensah, 2004; Liszka et al., 2005; Vasan et al., 2001; Wang & Wang, 2004). According to NHANES 1999-2000 data, approximately 88% of US individuals with blood pressure readings in the prehypertensive category had at least one cardiovascular risk factor (Greenlund et al., 2005). Three-fifths of people with prehypertension have serum cholesterol levels over 200 mg/dl and around a fifth have levels exceeding 240 mg/dl (Greenlund et al., 2005). Wang and Wang (2004) reported that obesity is a significant associate of prehypertension, being present in about a third of individuals with the condition. The prevalence of diabetes and smoking in prehypertension were 4 and 27%, respectively (Wang & Wang, 2004). Study findings were correlated by data from NHANES I and the National Health Examination and Follow-up Study (NHEFS), which found individuals with prehypertension also appear

to have a greater prevalence of cardiovascular risk factors than those with normal blood pressures (Liszka et al., 2005).

Prehypertension has become a major public health concern because this state of morbidity is affecting millions of adults in developed and developing countries. There are a few reports of national prevalence estimates for prehypertension, with estimates ranging from 14.5% to 59.6% (Aekplakorn et al., 2008; Aekplakorn et al., 2012; Choi et al., 2006; Erem, Hacihasanoglu, Kocak, Deger, & Topbas, 2009; Grotto, Grossman, Huerta, & Sharabi, 2006; Janghorbani et al., 2008; Tsai et al., 2005; Yu et al., 2008). In an analysis of Thailand, based on NHANES III and IV, the prevalence of prehypertension among adults aged 15 years or over was approximately 32.8% in 2004 with more men affected than women, 38% versus 26.9 % in 2009 (Aekplakorn et al., 2008; Aekplakorn et al., 2012). The prevalence of prehypertension in Thailand is similar to rates seen in Japan and the Netherlands, where rates ranged from 32.8% and 33%, respectively (Guo et al., 2011). In the United States and China, prevalence among adults was 36.3% and 47%, respectively (Guo et al., 2011). Results from NHANES IV indicated that the prevalence of prehypertension decreased with age and was higher in rural areas than in urban areas. Consistent with the majority of the NHANES III studies, male sex, lower educational attainment and BMI were all associated with prehypertension. The prevalence of prehypertension was a warning for increased education and lifestyle changes, emphasizing the need for effective health promotion and disease prevention in primary care.

In conclusion, the establishment of a “prehypertension” category in the guidelines set forth by the JNC VII identifies a new population of individuals at a

higher risk for developing hypertension and CVD. In a majority of epidemiological studies, individuals with prehypertension are more likely to have one or more cardiovascular risk factors. Because of the high rates of progression, the researchers support the classification established in JNC VII and endorse the recommendations of controlling all vascular risk factors in persons with this category to prevent the development of hypertension. Furthermore, many population-based surveys of the US and other countries have shown that the number of people with prehypertension is substantial and this is increasing worldwide. In Thailand, the prevalence of prehypertension demonstrated a significant increase and prehypertension control was relatively poor.

Health policies relating to prehypertension

At present, public health offices in all countries realize the significance of hypertension and try to decrease the morbidity and mortality associated with this health problem. The World Health Organization emphasized the pressing need for health promotion and disease prevention to respond adequately to chronic disease concerns (World Health Organization, 2013). Greater public health benefits can be achieved if risk factors are identified and mitigated through appropriate interventions. In identifying and managing prehypertension it is essential to stress the importance of health promotion and disease as major factors in meeting the challenges of reducing morbidity and mortality, and improving the quality of life over the lifespan.

In the USA, the importance of health promotion and disease prevention concepts are recognized as important factors in the current national health care policy as highlighted in Healthy People 2010 and Healthy People 2020. This initiative

represents the national disease prevention agenda of the U.S. Department of Health and Human Services (HHS), provides a framework for identifying the most significant preventable threats to national health and establishes goals to prevent these threats. The overall goal is to increase lifespan and quality of life by focusing on areas such as health communication, educational and community based programs, physical fitness, nutrition, obesity and overweight (Healthy People 2010, 2009; Healthy People 2020,2010). Under Healthy People 2020, one of the proposed objectives is to "increase the proportion of adults with prehypertension who meet the guidelines for body mass index, saturated fat consumption, sodium intake, physical activity, and moderate alcohol consumption from a baseline of 92.9% to 94.9%" (U.S. Department of Health Human Services, 2012).

In Thailand, the designation of prehypertension serves as a warning to public health and patients to emphasize early intervention and prevention. The Ministry of Public Health identifies the control and prevention of prehypertension as a public health priority, further highlighting the need to address prehypertension in primary care. In regards to the management of prehypertension in Thailand posted by both the Thai Ministry of Public Health and Thai Hypertension Society, the guidelines consist of 1) all patients should be managed with non-pharmacologic interventions or lifestyle modifications to lower blood pressure, 2) there should be yearly follow-ups in patients with prehypertension to detect and treat hypertension as early as possible, 3) decisions regarding pharmacological treatment should be based on the individual patient's global CVD risk. Identifying people who are unaware of the elevated risk associated with prehypertension and providing them with appropriate interventions

can help prevent hypertension and cardiovascular disease (CVD) (Ministry of Public Health, 2011; Thai Hypertension Society, 2012).

Thailand has recently established the Thailand Healthy Lifestyle Strategic Plan (2011-2020), endorsed by the Ministry of Public Health. These guidelines and goals provide a framework to advance coordinated and unified efforts of program implementation at all levels. The ultimate goal is that people, communities, societies and country have immunity and capacity to prevent health threats from the major lifestyle diseases. Prehypertension is identified as a major lifestyle disease which requires health promotion, disease prevention and control rather than treatment. The strategies employed include: proactive health promotion to improve lifestyle and health behavior, reduce risk factors and enhance health promotion factors, along with screening and early detection of prehypertension cases in the community (Ministry of Public Health, 2011).

In Thailand, management of prehypertension has become an important concern of primary care nurses in a variety of practice settings given its important implications for public health promotion and disease prevention. Despite screening and promoting lifestyle modifications for people who are at risk of hypertension and have thus become routine frameworks for a primary care unit, one of the biggest challenges facing public health authorities and health care providers is the prehypertensive person’s resistance to recommended lifestyle modifications (Sookaneknun et al., 2012).

Preventive Behavior Treatment of Prehypertension

The objective of managing prehypertension is to lower blood pressure to a normal range, prevent a rise in blood pressure with age, and prevent blood pressure-related cardiovascular disease events. According to the recommendation of the American and International Societies of Hypertension (ASH/ISH) guidelines, persons with prehypertension who do not have diabetes, chronic kidney disease, end-organ damage, or clinical evidence of cardiovascular disease are generally treated with non-pharmacological therapies (Weber et al., 2014). Non-pharmacological therapies, more recently referred to as lifestyle modifications, include maintaining or achieving appropriate body weight through increased physical activity, alcohol moderation, and dietary modifications such as sodium restriction and following the Dietary Approaches to Stop Hypertension (DASH) diet combined with annual follow-up visits (see table 1) (Gupta, Nagaraju, Gupta, & Mandya Chikkalingaiah, 2012).

There have been several clinical trials exploring the efficacy of lifestyle modifications to reduce blood pressure. In this present study, evidence supporting the blood pressure lowering effect of the following non-pharmacological interventions will be reviewed: (1) dietary modification; (2) weight reduction; (3) increase physical activity; (4) moderation of alcohol intake; (5) smoking cessation; and (6) relaxation response and stress management.

Table 1

Nonpharmacological Management of Prehypertension

Strategy	Recommendation	Decrease in SBP effect in PHT	Effect on decrease in incidence or prevalence of HT
DASH diet	Diet rich in potassium (fruits and vegetables)	3.5 mm Hg	62% (prevalence)
Decrease sodium intake	<24000 mg/day	2 mm Hg/76 mol/L/day	42% (incidence)
Weight loss		1 mmHg/ kg wt. loss	38% (incidence)
Moderation Of alcohol intake	<2 oz/day (men) <1 oz/dy (women)	3-3.5 mm Hg	N/Ag
Physical activity	>30 min/day	3-4 mm Hg	N/A

SBP: systolic blood pressure, PHT: prehypertension, N/A: not available.

Note. Adapted from Gupta and colleague (2012)

Dietary modification

Several studies have demonstrated the efficacy of dietary modifications to reduce blood pressure in both prehypertensive and hypertensive individuals. Appropriate foods for individuals with prehypertension, or hypertension, include a diet rich in fruits and vegetables, and low in snacks, sweets, meats, and saturated and total fat, as well as low in salt (Chobanian et al., 2003). Otherwise, they can have dietary approaches to stop hypertension (DASH) with sodium restriction. DASH is an eating model, widely accepted and supported by many institutes, which focuses on

fruits, vegetables, and low-fat dairy products without saturated fats. Therefore, it is rich in potassium, magnesium, calcium, and fiber, has reduced total fat, saturated fat, and cholesterol and slightly increased protein (Karanja et al., 1999). Evidence from a clinical trial indicated that the consumption of a DASH diet causes a reduction in systolic blood pressure (SBP) of (-5.5 mmHg) and also diastolic blood pressure (DBP) of (-3.0 mmHg) in adults with mean baseline systolic and diastolic blood pressures of 131.3 ±10.8 and 84.7 ± 4.7, respectively within eight weeks, regardless of weight loss (Appel et al., 1997). Similarly, Sacks and colleagues (2001) tested the effectiveness of combining a DASH diet with a sodium control diet to reduce blood pressure. Using eligibility criteria similar to the original DASH study, participant groups consumed a DASH diet with three different levels of sodium intake: 150 mmol per day at the highest level, 100 mmol per day at a medium level, and 50 mmol per day at the lowest level. Findings indicated that the consumption of a DASH diet with the lowest level of sodium was effective in reducing the systolic BP of (-11.5 mmHg) and the diastolic BP (-7.1 mmHg) in hypertensive participants and participants without hypertension, respectively. The systolic BP and diastolic BP levels of the participants who consumed the low-sodium DASH diet were lower than the participants who had only followed a DASH diet or only a sodium reduction diet (Sacks et al., 2001). Finally, the benefits of reducing sodium intake are well-supported; one of the most recent meta-analyses concluded that restricting salt consumption to within the daily intake range of 3 to 12 gm/day lowered the systolic BP and the diastolic BP by 2.0 and 1.0 mm Hg in adults with normal blood pressure and by 5.0 and 2.7 mm Hg in adults with elevated blood pressure levels (He & MacGregor, 2004). Although a low sodium diet may have adverse cardiovascular

effects, the World Health Organization has set a global target for a maximum intake of salt for adults at 5 g/day (i.e., 2,000 mg/day of sodium) or lower if specified by national targets, such as the recommendation in the United States (Elliot & Brown, 2006).

Weight reduction

Weight reduction is also important for the prevention and treatment of prehypertension. There is a substantial body of evidence from clinical trials documents to support the belief that weight is directly associated with blood pressure. The Trials of Hypertension Prevention, phase 1 (TOHP-1) examined the efficacy of three lifestyle interventions; weight loss, sodium reduction, and stress management (Trials of Hypertension Prevention, 1992). The findings indicated that weight reduction was the most effective strategy, producing a net weight loss of 3.9 kg and a BP change of -2.3/-2.9mmHg ($P<0.01$). Moreover, results of the TOHP phase II indicated that modest weight loss, with or without sodium reduction, can prevent hypertension by approximately 20% among overweight, prehypertensive individuals (Trials of Hypertension Prevention, 1997). Furthermore, one meta-analysis of 25 randomized controlled trials reported that mean systolic and diastolic BP reductions from an average weight loss of 5.1 kg were 4.4 and 3.6 mm Hg, respectively (Neter, Stam, Kok, Grobbee, & Geleijnse, 2003). Blood pressure reductions were approximately 1 mmHg SBP and DBP when expressed per kilogram of weight loss. Significantly larger reductions in blood pressure were observed among populations with an average weight loss > 5 kg than in populations with less weight loss (Neter et

al., 2003). Thus, reducing or controlling weight is one attribute of a program to control blood pressure.

Increased physical activity

Numerous studies have found a negative correlation between habitual physical activity and the development of hypertension. Increasing physical activity can lower blood pressure, and this correlation is independent of weight reduction (Whelton, Chin, Xin, & He, 2002). Physical activities used to reduce blood pressure are aerobic exercise, yoga, tai chi, and brisk walking (Khui-apai, 2005; McCaffrey, Ruknui, Hatthakit, & Kasetsomboon, 2005; Thuree, 2004; Whelton et al., 2002; Young, Appel, Jee, & Miller, 1999). Resistance exercise is not a recommended mode to control blood pressure due to the pressure effect (Wallace, 2003). The exercise prescription for those who are overweight or hypertensive is composed of more than 30 minutes of continuous or accumulated endurance activity (40 to 60% of maximal oxygen uptake, VO2max) on most, preferably all, days of the week (Chobanian et al., 2003; Pescatello et al., 2004). Two meta-analyses found that moderate intensity exercise (30 minutes, at least 4 days per week) led to a 3 to 4 mm Hg reduction in systolic blood pressure in hypertensive, prehypertensive, and normotensive individuals (Kelley & Kelley, 2000; Whelton et al., 2002). Continuation of the exercise program is suggested as an important contributor to chronic adaptations of resting blood pressure, which may prevent or delay the development of hypertension (Cornelissen & Fagard, 2005; Somers, Conway, Johnston, & Sleight, 1991).

Moderation of alcohol intake

Alcohol consumption has been associated with elevated blood pressure. A recent meta-analysis of 15 randomized control trials demonstrated a dose-dependent relationship between alcohol intake and BP. Results of this study showed that reduction of alcohol intake can lead to a decrease of 3 mm Hg in systolic and 2 mm Hg in diastolic blood pressure. The baseline alcohol consumption in these studies was 3 to 6 drinks per day with a 67 percent reduction on average (Xin et al., 2001). Overall, the evidence favors the moderation of alcohol intake to the currently recommended limits (2 ounces per day for men and 1 ounce per day for women) in the management of prehypertension.

Smoking cessation

Although smoking cessation is not included in the prehypertension treatment guidelines, there is overwhelming evidence that reveals the impact of smoking on the cardiovascular system. Smoking affects blood pressure by damaging the walls of blood vessels and accelerates atherosclerosis, which may lead to impaired blood clots and reduced oxygenated blood flow to organs, including the heart (NHLBI, 2010). Furthermore, smoking impacts on the cardiovascular system by stimulating the release of epinephrine, which causes an immediate increase in blood pressure, heart rate and myocardial contractility (Najem et al., 2006; Prasad, Kabir, Dash, & Das, 2009). Therefore, it is essential to provide smoking cessation counseling to smokers who present prehypertension. Additionally, smokers as a group tend to have more behavioral risk factors such as having a sedentary/stressful lifestyle or

eating unhealthy food. Their higher cardiovascular disease risk profile results in increased risks of developing hypertension and more severe forms of hypertension in the later stages of their lives (Virdis et al., 2010).

Relaxation response and stress management

Long-term psychosocial stress is associated with prehypertension (Player, King, Mainous, & Geesey, 2007). Many studies have demonstrated that individuals who exhibited greater increases in systolic and diastolic blood pressure during certain stressor tasks were more likely to report hypertension events. One systematic review of cohort and case control studies reported that 5 out of 7 studies found a significant and positive association between measures of chronic stress and hypertension with a risk ratio ranging from 0.8 to 11.1 (Sparrenberger et al., 2009). Recently population-based longitudinal studies revealed that the incidence of hypertension was significantly related to perceived stress from racism (Cozier et al., 2006), life stress such as a fire accident (Dorn, Yzermans, Guijt, & van der Zee, 2007), and stress from financial strain (Steptoe, Brydon, & Kunz-Ebrecht, 2005).

Since stress has been associated with hypertension risk, consideration of stress management is a recommended intervention for hypertensive prevention. However, specific stress management approaches are not well validated for reducing blood pressure. Stress management interventions can be differentiated based on their approach and delivery: single-attribute or multiattribute approach. There are many techniques to elicit the physiology of relaxation responses involving autogenic training, breathing or Prana, progressive muscle relaxation, and mindfulness meditation. Two meta-analyses of stress management treatments for hypertension

indicated that multiattribute stress management treatments were more effective in reducing BP (13.5 mm Hg SBP and 3.4mm Hg DBP) than sham treatments, whereas single-attribute stress management therapies (e.g., relaxation alone) are less effective (Eisenberg et al., 1993; Linden & Chambers, 1994). The Ministry of Public Health, Thailand, has recommended multiattribute stress management be considered for prehypertensive individuals and those who are of high risk of chronic disease (Ministry of Public Health, 2011).

In conclusion, the goals of prehypertensive treatment are to optimize blood pressure into an acceptable range, prevent age related increases in blood pressure and prevent cardiovascular-related events. Lifestyle modification interventions for prehypertension include maintaining or achieving appropriate body weight through increased exercise, dietary modifications such as sodium restriction and following the DASH diet, along with alcohol moderation.

A Concept of Adherence to Preventive Behaviors and Related Concepts

Adherence is an abstract concept that has been found in literature regarding the disciplines of nursing, general medicine, pharmacy and psychology. Research provides support that adherence to preventive behaviors is a vital concept to promote a healthier lifestyle with improved health outcomes. Adherence can view as be used at individual and health system levels (World Health Organization, 2003) and is a process as well as an outcome the “healthy adherer” effect (Simpson et al., 2006).

Adherence to treatment is the dynamic interaction of a prescribed treatment regimen and the patient’s behavior (Cohen, 2009; Johnson, 2002; World Health Organization, 2003). Empirical evidence indicates that adherence is better

conceptualize as a variable behavior rather than a trait characteristic. Adherence has not been consistently linked to personality type or trait characteristics (McHorney, 2009). Additionally, adherence is not all or nothing phenomenon. The adherence rates vary between and within individuals over time and across treatment (Jimmy & Jose, 2011). The evidence clearly suggests that adherence is situational of patients following a treatment, diet and/or executing lifestyle changes that corresponds with agreed recommendations from a healthcare provider (Ahmed & Aslani, 2014; World Health Organization, 2003).

Several studies proposed that treatment adherence is dynamic process and requires health behavior change (Bissonnette, 2008; Vrijens et al., 2012; World Health Organization, 2003). The concept of adherence to preventive behaviors in this study involves more than behavioral correspondence with prescribed treatment, and it appears to be a multidimensional concept reflecting a process that adapts to the dynamic lifestyles and disease changes that occur in individual patients. The level of adherence to preventive behaviors is different among individuals depending on their personal motivation, ability to follow prescribed treatment over the long term, and cultural background. The following analysis is divided into five parts: (1) definition of adherence to preventive behaviors, (2) the construct of adherence to preventive behaviors, (3) concepts related to adherence, (4) influencing factors of adherence to preventive behaviors and (5) concepts related to adherence.

Definition of adherence to preventive behaviors

The adherence concept develops the definition of compliance referred to patients' efforts to follow medical advice by emphasizing the need for an agreement

between the health care prescriber and the patient (Horne, 2006; Vermeire, Hearnshaw, Van Royen, & Denekens, 2001; World Health Organization, 2003). It has been launched as an alternative to the compliance concept because the term adherence is intended to emphasize the fact that the patient has the right to choose whether or not to follow treatment recommendations (Robinson et al., 2008).

Adherence is mostly relevant in medical and health areas and has been variously defined. A widely accepted definition of adherence is "the extent to which a person's behavior in terms of taking medications, following diets or executing lifestyle changes corresponds with agreed recommendations from the health care provider" (World Health Organization, 2003, p 3). However, the literature does not indicate how agreement can be reached by both sides (Bissonnette, 2008). Other definitions cited in literature is "extent to which patients follow the instructions they are given for prescribed treatments"(Haynes, McDonald, Garg, & Montague, 2002), "patients' persistence in the practice and maintenance of desired health behaviors and is the result of active participation and agreement"(Cohen, 2009).

Adherence is defined differently by providers and patients. In terms of the healthcare provider paradigm, the definition of adherence assumes that prescribed treatment is correct, effective, and realistic, and that prescribed treatment will be followed by the patient (Conrad, 1987). Adherence to treatment implies patients' acceptation of their illness severity, belief in the efficacy of a treatment and having an ability to control their symptoms by utilizing this treatment (Cramer et al., 2008). Patients are considered adherent when they do what the healthcare provider recommends (DiMatteo, 2004). Healthcare providers consider themselves responsible for patients adhering to treatment recommendations (Brooks, 1986; Tarn, Mattimore,

Bell, Kravitz, & Wenger, 2012) while they believed that patients are ultimately responsible for treatment adherence (Tarn et al., 2012).

In terms of the patient paradigm, the definition of adherence is flexible. A review article related to live experience of adherence to treatment found that adherence is the result of a number of the subjective process in view of the evaluation of value, possible benefits and barriers in following prescription therapy (Springer, 2004) and patients give meaning to their disease (Naemiratch & Manderson, 2006; Panpakdee et al., 2003). Adherence is viewed as a dynamic process of self-management that needs time for integrating preventive behavior in the routine of everyday life (Brooks, 1986; Sarradon-Eck, 2007; Springer, 2004). Adherence experience is emphasized along with fear, desires and autonomy (Ingadóttir, 2006).

In summary, the definition of adherence to preventive behaviors in this study was formulated by comparing and contrasting the existing definitions with the researcher's tentative definition. Adherence to preventive behavior is a voluntary process of participation, in which patients make efforts to follow preventive behavioral recommendations that are mutually agreed upon (Robinson et al., 2008; Cohen, 2009). It means that adherence to preventive behavior leads to change of health habits and maintenance of desired preventive behavior and incorporates these preventive behaviors as part of the patients' daily life. These changed behaviors are consistent with medical advice.

The construct of adherence to preventive behaviors

Four articles on concept analysis were found that defined adherence as having a multidimensional concept (Bissonnette, 2008; Cohen, 2009; Landier, 2011;

Shay, 2008). Bissonnette (2008) found that characteristics associated with adherence behavior included six aspects: decisional conflict, predictability, personal experience, power, agreement and pervasiveness. In contrast, Cohen (2009) described adherence as a four dimensional concept: the alignment of patient behavior with health recommendations, mastery of a new behavior and health knowledge, ongoing collaborative relationships between the patient and healthcare provider, and their perceived ability to meet the outcome targets. Yet another definition was given by Landier (2011) who saw adherence as an eight dimensional concept that included motivation, persistence, collaboration, mindfulness, cognitive capacity, flexibility, active participation, and identification of key participants in the process. Finally, Shay (2008) described adherence as having compliance and maintenance aspects. Common to all of these descriptions of the concept are the notions of an agreement, compliance, persistence in practice and maintenance the desired behavior.

Models of adherence have been proposed to explicate the concept of adherence behavior (Hellman, 1997; Johnson, 2002; Pinprapapan et al., 2013; Roh, 2005; World Health Organization, 2003). The Medication Adherence Model interprets adherence as purposeful action, patterned behavior, and feedback (Johnson, 2002). Purposeful action and feedback describe the cognitive process while patterned behavior is a behavioral process. From this perspective, the term adherence includes the cognitive process to initiate and evaluate prescribed treatment as well as the behavioral process for establishing and maintaining patterns of treatment. According to a process-oriented model, perceived self-efficacy, perceived benefits of exercise, interpersonal support for exercise, and perceived barriers to exercise were significant predictors of exercise adherence (Hellman, 1997). In Thailand, Pinprapapan and

colleague (2013) found that social support, health belief, provider-patient communication and perceived self-efficacy factors influenced adherence to therapeutic regimens among Thais with hypertension.

The attributes of adherence were analyzed from the patient's perspective in some studies. However, most studies reviewed integrated adherence in the lived experience of chronic illness. Ingadóttir (2006) explored the perceptions of adherence among persons with diabetes using a phenomenological approach. Adherence was predominantly identified in terms of autonomy and self-management, fear, desire and relationship with healthcare professionals. Similarly, Sarradon-Eck (2007) studied the meaning of adherence to prescription as perceived by hypertensive patients in France. Adherence to prescription relies on a logic of imputation (about the instrumental cause of high blood pressure and about side effects), a logic of appropriation (related to loyalty to treatment, testing, and integration in everyday life), and a logic of self-regulation (continuity of treatment, body control and medication control). In contrast, Springer (2004) explored the perceptions of adherence to a program of physical activity and found six themes: processing through barriers to activity, dealing with a family history of heart disease and health-related issues, drawing logical conclusions, social support, importance of a regular routine with individual nuances, and ability to escape from daily pressures and roles through physical activity. In Thailand, Naemiratch & Manderson (2006) used an ethnographic approach to explore adherence in lay perceptions. It was found that the meaning of adherence depended on what their disease meant to individuals in terms of their everyday life. Adherence meant individuals exercised control strictly to prescribed treatment when they believed that

the disease had an impact on their lives while it meant adjustment when they believed that they had power over the disease.

In summary, adherence to preventive behaviors attributes has been identified as a multidimensional concept. The attributes of adherence to preventive behaviors necessary to consider are the active voluntary involvement of the participation in an ongoing, dynamic process and, consequently, motivation to continue investing the effort necessary to sustain the target behavior. Therefore, the behavior alone is not a complete element of adherence to preventive behaviors. This analysis, based on the literature review, resulted in the definition of adherence to preventive behaviors as "a voluntary process of participation, in which patients make efforts to follow preventive behavioral recommendations that are mutually agreed upon" (Cohen, 2009; Robinson et al., 2008). It means that adherence to preventive behavior leads to changes and maintenance of desired preventive behavior and incorporates these preventive behaviors as part of individuals' daily life. There are three attributes associated with adherence to preventive behaviors summarized from all uses of concepts found in this analysis. They are: (a) commitment (b) persistence; and (c) maintenance. Commitment refers to an agreement of the prevention's goals and values, a willingness to exert considerable effort to participate in the preventive behaviors, and perceived need (Amrhein, 2004; Armitage & Conner, 2001; Wilson et al., 2004). Persistence refers to the ability to continue with the preventive behaviors from the start of the therapy without a meaningful interruption. Lastly, the attribute of maintenance refers to sustaining of desired behavioral involvement over the long term after adoption. In addition, adherence to preventive behaviors is a multidimensional construct, which encompasses five attributes. These are: (1) dietary modification; (2)

weight reduction; (3) physical activity; (4) moderation of alcohol intake; and (5) relaxation response and stress management.

Concepts related to adherence

Terms commonly associated with patients following or not following treatment regimens include compliance, adherence, and concordance. All of these are key concepts for following treatment recommendations, especially for individuals with chronic disease. However, when examined closely they differ in some way such as they might not contain the same defining attributes that are discussed and defined in this section.

Compliance

In the earlier health care literature, compliance was commonly applied in terms of taking medication, following diet and exercise, modifying habits and attending a clinic. The term compliance was used to describe patient self-care behaviors almost exclusively from the health provider's perspective. Compliance was defined by Sackett and Haynes (1976) as "the extent to which a person's behavior (in terms of taking medications, following diets, or executing lifestyle changes) coincides with medical or health advice" (Lehane & McCarthy, 2009; Lutfey & Wishner, 1999). Inherent to this definition of compliance is the assumption that the healthcare advice is good for the patient because the health care professional always knows what treatment is best for them (Murphy & Canales, 2001; Vermeire et al., 2001).

The differences between compliance and adherence concepts were discussed in two entities as parts of a continuum that describes the nature of the

relationship between a patient and health care provider. Compliance implied that healthcare recommendations had to be obeyed, adherence stressed that patients willingly and voluntarily follow healthcare advice (Brannon, Feist, & Updegraff, 2014). While compliance to treatment is based on the fact that the patient participates in the process of making the decision to follow the regimen (Lehane & McCarthy, 2009), non-compliance implies disobedience, subversion, error, and blame (Vermeire et al., 2001; World Health Organization, 2003). The concept adherence indicates the patient has autonomy to choose to follow a health care regimen (Sandman et al., 2012) and refers to the level of participation achieved in a behavioral regimen once an individual has agreed to the regimen. Therefore, the concept of compliance is closely linked to the physician's dominance and carries with it the assumption that to comply with a provider's advice is essential for those receiving care.

Concordance

The recently developing concordance concept has been defined as a process of prescribing and medication-taking based on partnership and it has principles such as patients having enough knowledge to participate as partners, health professionals being prepared for partnership while prescribing consultations involving patients as partners and patients being supported in taking medicines (Lehane & McCarthy, 2009). The important basis of the recent concordance definition suggests how to communicate with and support the patient (Bell, Airaksinen, Lyles, Chen, & Aslani, 2007; Kaufman & Birks, 2009). Therefore, the common ideological attributes underpinning concordance reflect patients and healthcare providers sharing each other's knowledge, values, partnership and a supportive relationship through a

process of patient-centered communication toward collaborative treatment decisions (Lehane & McCarthy, 2009).

Concordance is basically a different approach to adherence or compliance which focuses on the consultation process rather than on specific patient behaviors. The term concordance is related to a patient-centered consultation process while the terms adherence and compliance reflect the degree to which patient's behavior matches the prescriber's advice (Horne, 2006). Concordance is based on the notion that the work of the prescriber and the patient in the consultation is a negotiation between equals and therefore, the aim is a therapeutic alliance between them (Lehane & McCarthy, 2009). However, achieving concordance may not improve the degree of adherence because adherence is a complex phenomenon. There are many factors affecting adherence behavior. Therefore, the term adherence is more reflective of what happens in practice than compliance and concordance.

Factors influencing adherence to preventive behaviors

The construct of adherence to preventive behaviors is relatively associated with preventive behavior recommendations. In the area of preventive behaviors, there are a number of studies which consider the relationship between related factors and adherence to physical activity, diet, and smoking cessation interventions. The factors identified from literature that are related to this inquiry can be classified as individual factors, interpersonal factors, and environmental factors.

Individual factors

Individual factors have frequently been reported to be a predictor of adherence to preventive behaviors because patients adhere well when the preventive regimen makes sense to them and seems effective, they believe the benefits exceed the costs, and when they feel they have the ability to succeed in controlling their illness (Delamater, 2006). Factors unique to an individual include perceived disease severity, perceived self-efficacy, and perceived satisfaction. When no signs and symptoms have been observed in prehypertension, people still consider themselves as healthy. Therefore perceived disease severity influences the intention to perform the preventive health behavior (DiMatteo, Haskard, & Williams, 2007). The one individual factor cited most frequently in the literature and known as a significant predictor of adherence to preventive behaviors is perceived self-efficacy (DuCharme & Brawley, 1995; Dunbar-Jacob, 1993; Fontaine & Shaw, 1995; Oman & King, 1998; Pinprapapan et al., 2013; Senecal, Nouwen, & White, 2000; Wilcox & Storandt, 1996). Perceived self-efficacy is an individual's confidence in his or her ability to perform a specific behavior (Bandura, 1997). If a person has high self-efficacy about preventive behavior participation, they are more likely to participate in it. Increasing perceived self-efficacy has been found to play an important role in predicting adherence to preventive behavior during challenging events such as attempting to integrate preventive behavior into daily life (Brassington, Atienza, Perczek, DiLorenzo, & King, 2002; Oman & King, 1998). Perceived satisfaction is an important intrinsic motivation to maintain a behavioral action (Rothman, 2000). Satisfaction is based on a variant of relative cost to benefits. This satisfaction is also

not directly related to health outcomes (Seguin et al., 2010) but may be achieved through preventive health behaviors. Examples may include personal appearance or group acceptance motivations.

Interpersonal factors

Interpersonal factors refer to the interpersonal processes, and primary groups including family, friends, peers and the health care providers, who provide social identity, support, and role definition. The two key factors for influencing adherence to preventive behaviors, are social support and communication (Garay-Sevilla et al., 1995; Kahn et al., 2002; Peterson et al., 2002; Pinprapapan et al., 2013). Social support has potential importance in helping patients positively initiate and maintain behavioral change (Pinprapapan et al., 2013). In addition, it also improves the ability of the individual to adapt to stress or to reduce the exposure to stress. At the same time, the interpersonal dynamics of the physician–patient relationship play an important role in determining adherence to preventive behaviors recommendations. A perception of good communication with physicians encourage patients to be involved in their own care and therefore they tend to be more motivated to adhere (Haskard Zolnierek & DiMatteo, 2009; Stavropoulou, 2011).

Environmental factors

The environmental factors including issues such as policy, economic and culture are important predictors of adherence to preventive behaviors. Public policies can increase opportunities for adherence to preventive behaviors by modifying environmental and contextual factors. They may also influence perceived barriers,

perceived self-efficacy, social norms, intrinsic motivation, and stimulus control (Dunton, Cousineau, & Reynolds, 2010).

Adherence to preventive behaviors may lessen if the individual with a chronic disease is on a fixed income. In this case, the individual may not be willing or able to participate in the prescribed regimen. Therefore, cost issues may also be an important predictor of adherence to treatment. For example, in the case of adherence to dietary interventions, since the cost of special diets (e.g., low-fat foods) may be more. Additionally, in Thailand, economic change has influenced women to move into the workforce, and these same changes have altered the composition of families and the way in which families deal with food selection and preparation.

Cultural factors also play a major role in determining adherence to preventive behaviors. Culture refers to a group of people who share similar sets of beliefs, values, customs, practices or behavior (Barksdale, 2009). In regard to health care systems, each cultural group is different in how it defines health and well-being, perceives the causes of disease, and identifies appropriate and effective treatment strategies to ensure the survival and well-being of its members. Studies consistently found that culture influences a patient's health behavior (Boonto, 2010; Harvey & Afful, 2011; Nilchaikovit, Hill, & Holland, 1993; Panpakdee et al., 2003; Samranbua, 2011).

Adherence to preventive behavior in a Thai cultural context

Cultural differences can influence patients' responses in their lifestyle and illnesses behavior. There are many different ways of perceiving, understanding, and approaching health and disease processes across cultural and ethnic groups. Since

Thais perception of disease and treatment, values, attitudes and behaviors do not influence adherence to preventive behaviors in the same way as in the West, the proposed APBS's attributes and items are possibly different from the West due to the Thai cultural context. Therefore, it is essential to understand how the Thai cultural context connects to the attributes which explain Thai peoples' thoughts and health behavioral actions. The perception of disease and treatment, religion and Thai cultural values will be discussed based on the literature reviews.

Perception of disease and treatment

Thai people's responses to high blood pressure treatment differ depending on their understanding of the disease. Previous studies have revealed that Thai people perceive hypertension as a symptomless condition which causes them to be unaware of their elevated blood pressure and the complications of hypertension (Panpakdee et al., 2003; Samranbua, 2011). Since Thai patients always define health by silent symptoms, the perception of the symptomless condition of hypertension could contribute to poorly controlled blood pressure and lessen adherence to treatment (Panpakdee et al., 2003; Samranbua, 2011).

Additionally, adherence to preventive behaviors for Thais with hypertension is dependent on their construction of meanings of illness. The meaning of hypertension for Thais is explained in terms of the curable and incurable condition. Previous research indicated that when hypertension is perceived as a "curable condition", Thais follow treatment seriously for a short duration whereas if hypertension is perceived as an "incurable condition", a chronic disease, they have to

maintain the prescribed treatment for controlling their disease and ultimately live (Kirdphon, 2003; Leelacharas, 2005; Panpakdee et al., 2003).

Religion

Religion can influence adherence to preventive behaviors in various ways. Involvement of religion is known to influence adherence to preventive behavior as religion seems to help patients enhance their coping skills, well-being, and social support. Religious beliefs also serve as a supportive force for behavior that encourages engagement with healthy behaviors. This might also affect adherence to preventive behavior rates. In contrast, religiosity may also adversely affect adherence to preventive behaviors when adhering to preventive behaviors is considered to be against to religious doctrines. Therefore, religion may be either positively or negatively related to adherence to preventive behaviors, depending on particular beliefs and practices.

In southern Thailand, Buddhism is the dominant religion and the principal philosophy (Mulder 2000). However, five per cent of the population are Muslims and are the majority in the Deep South (Thai National Statistics Office, 2000). The majority of people in the upper southern provinces are Thai Buddhists, while the lower are dominated by Muslims of Thai decent. To understand the adherence to preventive behavior concept for prehypertensive persons who live in southern Thailand, it is important to find out how Buddhism and Islam influence Thai persons adherence to preventive behaviors.

Buddhism

Buddhism has undergirded the understanding of health and approach to healthcare within Thai culture. Health is understood in term of holism. A person's health means the whole person health which includes the physical, mental, social, familial, work relationship, and the environment (Rattanakun, 1999). In addition, health also involves the practice of moral and religious values such as compassion, tolerance, and forgiveness. Therefore, adherence to preventive behaviors is not the mere treatment of these measurable symptoms. Its real aim is to encourage harmony within themselves, in their relationship with others and the natural environment (Rattanakun, 1999).

The main causes of hypertension reported by Thai Buddhist with hypertension are dependent on scientific and religious beliefs. From the scientific perspective hypertension is caused by unhealthy behaviors such as working too hard, being stressed, smoking and drinking, consuming fatty and salty food, and family history (Naewbood, Sorajjakool, & Triamchaisri, 2012; Panpakdee et al., 2003). Besides holding scientific views, most Thai Buddhists believe that the result of past action (karma) either in a past life or in the current life makes them sick (Phutthikhamin, 2008; Thinganjana, 2007). Buddhists do not believe in any power that transcends nature. Everything comes about by intentional actions, not by praying. As a result, this Buddhist teaching is helpful for a committed attitude for Thai people to adopt and maintain the habits of healthy living.

Thai Buddhists always use religious practices such as the Middle Path, prayer, and mindfulness to control their stress level (Naewbood et al., 2012;

Phutthikhamin, 2008). By practicing the Middle Path, most Thai people gradually seek to diminish both extremes of self-denial and self-gratification which are the basic causes of mind diseases. The Middle Path also promotes moderation and temperance in relation to lifestyle modification (Naewbood et al., 2012; Phutthikhamin, 2008). Mindfulness practice is also an important aspect in reducing stress and anxiety by paying attention to the present and not investing all of one's energy worrying about the future. These principles can influence the commitment and persistence in practicing preventive behaviors that will be of benefit in both the effectiveness of treatment and health.

Islam

Muslims view God as the originator of all action. Thai Muslims believe that what happens to them is Allah's will and that the physical body, good health, and well-ness are a gift from God. This belief may have an important influence on Thai Muslim's view of illness and disease. Disease may be seen as the will of God or a punishment of sins committed. In turn, Muslims believe that only God can bring healing and medicine or that seeking a cure is just the tool. (Zahr & Hattar-Pollara 1998, Rassool, 2000). Most Muslims must appreciate Allah's grace through following Islamic doctrines for their whole life. Therefore, maintaining good health and well-ness are part of worship and subservience to Allah since a weak individual may not perform his duties towards Allah.

Health promotion and prevention practices among Thai Muslims are influenced by the Islamic doctrines. Islam regards humans as temporary owners of their bodies and puts a considerable emphasis on health and disease prevention. With

this in mind every Muslim is responsible for maintaining a healthy body according to the numerous examples in Islam doctrine such as eating healthy wholesome food and eating in moderation, provision for adequate exercise, prohibition of intoxicants, as well as maintaining rigorous cleanliness and hygiene (Kahan, 2003). These key Islamic religious practices influence and facilitate adherence regarding prevention behaviors.

Thai cultural values

Since Thai values, beliefs, attitudes, and behaviors do not affect adherence to preventive behaviors in the same way as in the West (Naemiratch & Manderson, 2006; Panpakdee et al., 2003), it is essential to understand how the Thai cultural context connects to the attributes and items/questionnaires which explain Thai peoples' thoughts, expectations, and behaviors. Therefore, a number of Thai cultural values and practices will be reviewed and discussed based on the literature reviews. These cultural values are collectivism, social hierarchies, flexibility and adjustment orientation, and achievement-task orientation.

Collectivism

Thailand is a traditional and family-oriented culture, endorsing family or social opinions as more important than personal freedom. This collectivistic society could be of benefit for a commitment to preventive behavior for Thais when the treatment values are accepted by family or society. According to Lee (2006), Thai smokers are traditional and family oriented and so are likely to have intentions to quit

smoking due to their sensitivity about social norms and familial rejections about smoking.

Although Thailand is generally considered to be a collectivist culture which promotes group cohesion and maintains the importance of group harmony (Hofstede & Bond, 1984 as site in Pimpa, 2012), Thais possess some degree of individualism. This apparent contradiction might be due to the fact that Thais love freedom (to do whatever they please or to follow their will). However, the value placed on individualism, as found among western cultures, is quite different from the concept among Thais. Individualism for Thais refers to the freedom to exhibit a variety of behavior patterns in different social contexts. This interpretation of individuality is consistent with the findings of Embree (1950) who characterized Thais as members of a "loosely structured" culture. Thai social structure is loosely integrated, reflecting a lack of regularity, discipline, and regimentation in Thai life (Embree, 1950). Unfortunately, this individuality has negative effects on not only persistence but also maintenance of preventive behaviors.

Social hierarchies

How social hierarchies in Thai society can lead to adherence to preventive behaviors comes from the nature of Thais which emphasizes hierarchical structure and smooth interpersonal relationships. Several studies found that provider-patient communication and relationships influence the effectiveness of adherence to therapeutic regimens (Naemiratch & Manderson, 2006; Pinprapapan et al., 2013). From this point of view, the hierarchical social structure may lead to a gap in social interaction between patients and providers in addition to contrasting views about

health and illness. Health care providers are trained to believe that prescribed treatment is in the best interests of the patient and that the prescribed treatment will be followed by the patient (Conrad, 1987). Since Thai social interaction is controlled through social status, Thai patients are expected to demonstrate respect for doctors. This system of status and hierarchy, together with values of independence, contributes to conflict between doctors and patients.

In the health care system, Thai patients also emphasize that in their relationship with the doctor they have the feeling of "kreng jai" and harmony. The practice of "kreng jai", which is rooted in Thai hierarchical relationships, is used to keep a relationship pleasant and cooperative, and accounts for a lot of the politeness and compromise found in Thai society (Nimanandh & Andrews, 2009). Trying to be compromising, Thai patients tend to respond to doctors by saying "yes." They are reluctant to impose themselves on the doctor or disturb his or her personal equilibrium and so they avoid conflict and aim to maintain harmony in their relations with their doctors (Naemiratch & Manderson, 2006). Accepting the offered treatment, even though they might not be able to carry out the agreement, is intended to avoid causing the negotiating counterpart to lose face.

Flexibility and Adjustment Orientation

Besides the values of individualism and group cohesion, Thais are flexible and situation-oriented. The idea of flexibility refers to Thais understandings of individual adaptability (Knutson, 1994). The Thai phrase 'mai pen rai', which translates literally as, "never mind, it doesn't matter," reflects an acceptance of things as they are and a willingness to make life as pleasant as possible regardless of life's

circumstances (Knutson, 1994). Thais prefer to explain themselves as being flexible, rather than being truly honest. As a result, it is not surprising that decision-shifting behavior, non-commitment, and irresponsible behavior are quite common for Thais (Komin, 1991). Thais can be found to be unpunctual, procrastinating or not taking responsibility and their assigned tasks cannot lead to the successful implementation of the goals (Cooper & Cooper, 1996). Therefore, the application of persistence behavior as a characteristic of adherence to preventive behaviors may be alien to the Thai. In the same way, the flexibility orientation of Thais can be harmful for an adherence to preventive behaviors program that needs persistence and discipline to be effective. According to the studies of Panpakdee and colleagues (2003), Thai patients who can accept themselves as having chronic illness always used flexible ways to integrate treatment tasks into their daily lives because they believe that health is dependent on a balance of social activities and illness control activities (Panpakdee et al., 2003). They believe that a balance of social activities and illness control activities is significant for maintaining health (Kirdphon, 2003; Naemiratch & Manderson, 2006; Panpakdee et al., 2003). However, Thai patients will follow the prescribed treatment strictly when they believe that disease impacts on their lives or has power over them (Naemiratch & Manderson, 2006; Samranbua, 2011).

Achievement - Task Achievement Orientation

Thais have low motivation to achieve their goals through hard work. The majority of Thais are not ambitious (Komin, 1991). Thais do not like risking anything that does not give immediate results (Apapirom, 1976). This may represent a problem in motivating the person to participate, be responsible and do their part in achieving

the preventive goals. Panpakdee and colleagues (2003) found that adherence to preventive behaviors for Thais with hypertension is based on the understanding of what makes them live more comfortably with hypertension. Although all Thai patients understand that they should follow their doctors' recommendations, several studies of hypertension related to Thai culture found that they perceived the difficulty and inconvenience of making lifestyle changes, especially adjustments related to dietary habits and food preparation (Kirdphon, 2003; Panpakdee et al., 2003; Samranbua, 2011).

These cultural values are important factors that make Thais with prehypertension reflect and interpret adherence to preventive behavior attributes differently from western people. Adherence to preventive behavior attributes are affected by many Thai cultural values. Therefore, it is essential to ensure that the Thai cultural context is reflected in items of each attribute in the APBS. Close-ended items will be constructed and consistent with the Thai cultural context from both the literature review and in-depth interviews. Therefore, the researcher believes that the Thai cultural context deriving from in-depth interviewing of Thais with prehypertension and reviewing literatures will assist in developing items appropriately for the APBS.

In conclusion, several factors affecting the adherence to preventive behavior attributes for Thais with prehypertension include: 1) individual factors, 2) interpersonal factors, 3) environmental factors, and 4) the Thai cultural context.

Adherence to Preventive Behaviors Measurement

A measure of adherence to preventive behaviors for persons with prehypertension setting has yet to be developed. Assessment of adherence to preventive behaviors come out of hypertension treatment and health promotion and prevention areas. In the hypertensive treatment area, adherence to preventive behaviors has been measured using patient ratings of patients' participation, compliance in preventive behavior regimens, or following instructions or advice (Kim et al., 2000; Ma et al., 2012; Pinprapapan et al., 2013). In health promotion and prevention area, adherence has been measured via patient self-report including patients' attendance, the frequency of preventive activities, and preventive behavioral barriers (Freudenheim, 1993; Hardage et al., 2007). These characteristics may not be adequate to measure adherence to preventive behaviors for Thai persons with prehypertension.

At present, available methods for adherence to preventive behavior assessment can be grouped into "indirect methods" and "direct method". Each method has both advantages and limitations and there are no goal standard instruments for assessing adherence to preventive behaviors. Direct method including directly observed behaviors and physiological measures indicating whether the person is under control at the time of the test. The advantages of direct measurement method are accuracy and reliable data. However, the limitations of direct measurement method are high cost and difficult to perform.

Self-report is an indirect measurement method used to assess adherence to preventive behaviors. Although adherence levels reported by patients tend to over-

estimate the level of adherence, an attractive aspect of using self-report measures is that there are a variety of variables that can be measured from the subject that may not be available from other sources. For example, self-report can assess the patterns and timing of an activity as well as the efforts and barriers involved in the activity (Levensky & O'Donohue, 2006). Self-report measures are also having the advantages of being the most economical and simplest way for assessing adherence behavior (Levensky & O'Donohue, 2006; Vitolins et al., 2000). Five adherence scales were developed in the context of different countries. These measures were designed for use in hypertension setting. The following section will explain each of these instruments, their attributes and psychometric properties will be the emphasis.

The hypertensive adherence to therapeutic regimen scale

The Hypertensive Adherence to Therapeutic Regimen Scale (HATRS) was developed by Pinprapapan and colleagues (2013) The purpose of this instrument was to measure the extent of agreement and performance about the recommended behaviors provide by health care providers of patients with hypertension. This HATRS was modified from the Hypertensive Adherence Scale developed by Limcharoen (2006). This questionnaire was grouped into five attributes: antihypertensive medication taking, dietary modifications, weight control, smoking cessation, physical activity, alcohol intake limitation, and stress management. The attributes of adherence to therapeutic regiment concept were alignment of patients' behaviors and recommendations, mastery of new behaviors, ongoing collaboration with health care providers on a treatment plan and patients' perceived ability to meet optimal blood pressure. HATRS consists of the 29 items and an 4-point Likert scale

ranging from 1 (not true) to 4 (strongly true). The researcher reported sound good psychometric evaluation that support total internal consistency reliability and content validity.

The strength of this scale is the use of Thai language as it is suited to the Thai subjects and study's context. While the researcher reported sound good psychometric evaluation that support total internal consistency reliability and content validity, it is arguably difficult to capture human behavior with two items. Since there is no gold-standard measure or agreed upon operational definition of adherence to preventive behaviors, it is also difficult to be sure that the HATRS is really measuring adherence. Furthermore, the instrument's weakness is that this scale did not go through steps in scale development which are essential for the evaluation of the effectiveness of a measure. Subsequent studies may use this measure and results might be biased.

Treatment adherence questionnaire for patients with hypertension (TAQPH)

The TAQPH was developed by Ma and colleagues (2011). The aim of this scale is to measure the willingness and ability of the individual to follow the hypertensive treatment. The researchers used a multi-phase psychometric questionnaire development method to develop the instrument. The item pool was generated using literature reviews and focus groups. The questionnaire's content validity was conducted by a panel of 9 experts. The field testing was conducted by a convenience sampling of 278 hypertensive patients from December 2009 to May 2010 in Guangdong Province of China. Exploratory and confirmatory factor analyses

were used to test construct validity. Finally, internal consistency and test–retest reliability were assessed. A 28 items rating scale was used in this individual treatment adherence questionnaire. It included six dimensions: treatment adherence (28 items), medication (9 items), diet (9 items), stimulation (3 items), exercise (2 items), weight control (2 items) and relieving stress (3 items). Each item of the TAQPH scale was measured on a four-point Likert rating scale response format: (1) never, (2) some of the time, (3) most of the time, and (4) all the time.

The strength of the TAQPH is that it has been developed by comprehensive scale development to measure the treatment adherence for patients with hypertension and has shown acceptable validity and reliability. It can be used for measuring behaviors that are associated with a plan of care for patients with hypertension. In contrast, a major flaw is that the scale measure only the cognitive aspect of the adherence to preventive behaviors concept.

Hill-bone compliance to high blood pressure therapy scale

The HBP created by Kim, Hill, Bone, & Levine (2000) consists of 14 items and 4 point rating (1-4). The purpose of their study was to assess patient behavior for three behavioral domains of hypertension treatment: reducing sodium intake (3 items), appointment keeping (3 items), and medication taking (8 items). The content validity of the scale was assessed by a relevant literature review and an expert panel, which focused on cultural sensitivity and appropriateness of the instrument for low literacy. The authors reported sufficient psychometric properties (internal consistency, constructive and prospective validity).

The strength of this scale is that it was developed by a comprehensive scale development. The scale is short and easy to answer. Furthermore, this scale have been used frequently in hypertensive treatment adherence studies and its psychometric properties have been evaluated in several countries, including the United States, Germany, Korea, Turkey, and Saudi Arabia (Alsolami, Hou, Correa-Velez, & Bahlas, 2013; Koschack, Marx, Schnakenberg, Kochen, & Himmel, 2010; Song et al., 2011). Although Kim and colleagues (2000) and Karademir and colleagues (2009) reported sufficient psychometric properties for the Hill-Bone Scale, some studies that used the scale showed sufficient internal consistency and validity of the factorial construct only for the subscale of medication taking (Lambert et al., 2006; Song et al., 2011). Koschack and colleagues reported that the Hill-Bone Scale lacked adequate reliability and strong evidence of validity (Koschack et al., 2010).

Dietary sodium restriction questionnaire (DSRQ)

The DSRQ was developed by Bentley and colleagues (2009), a doctoral student in the college of nursing, University of Kentucky, USA. The conceptual framework of her study is based on the theory of planned behavior. The DSRQ assesses adherence through the use of 3 subscales. Each subscale represents a construct of the TPB: attitude, subjective norm, and perceived behavioral control. The instrument was developed based on the group's clinical and research experience, and knowledge of relevant literature. Factorial validity was tested using principal attribute analysis. Reliability was tested using Cronbach's alpha to assess the internal consistency of the 3 subscales. Reliability was further evaluated with item-total correlations and inter-item correlations. The strength of this scale is that it is

developed based on the middle-range theory to nursing sciences and its validity and reliability are accepted. It may be used as a predictor of adherence to dietary sodium restriction. However, its weakness is that it measures only the intension of treatment behaviors that do not cover the entire adherence to preventive behavior attribute.

The food frequency questionnaires (FFQ)

The Food Frequency Questionnaire (FFQ) was used to estimate the usual nutrients intake of healthy subjects The biggest limitation of the FFQ is the cultural specificity of the food items included, as the amount and types of items listed reflect foods typically consumed by the population of the United States which reduces its utility among ethnic groups (Burke, Dunbar-Jacob, & Hill, 1997).

In conclusion, most existing scales are developed based on Western countries (three scales from the USA, one from China, and one from Thailand). Since there is lack of consistency in the definition of adherence, several studies have operationalized adherence concept differently. Some of them reported measurements of adherence without providing an explicit definition of adherence. Therefore, the majority problem of these tools had limited internal or external validity. There is a need for clearing definitions of adherence to preventive behaviors to know how we can be sure that adherence to preventive behaviors has improved.

In categorizing all attributes from adherence to preventive behaviors tools, it shows that barrier to practice preventive behaviors as the most important adherence to preventive attribute because it was used the most as an attribute of all the tools. An active participation is the next important attributes. Although ability to follow health regiments is the important attribute of adherence to preventive behavior,

it may be having other characteristics that potential characteristics and plausibility clusters of activity and further empirical work is needed to develop the measures.

Summary

Prehypertension is a significant public health problem worldwide which, if inadequately controlled, can result in devastating hypertension and cardiovascular disease. The JNC VII designation provides the impetus to identify and promote the health of prehypertensive persons that, coupled with a recent interest in health promotion at the national policy level. The Thailand Ministry of Public Health has emphasized surveillance and screening of high risk groups of chronic disease under the draft Thailand Healthy Lifestyle Strategies Plan (2007-2010 and 2011-2020) for greater realization of the nurse's role in health promotion of prehypertensive persons. Strategies to prevent and control prehypertension have aimed to reduce exposure to risk factors and lifestyle modification in the population and high-risk individuals. Adherence to chronic therapeutic regimens is a particular challenge for prehypertensive individuals, their families, and their healthcare providers because successful blood pressure control requires long-term adherence to a regimen that can only promise control rather than cure. Adherence to preventive behaviors studies have been carried out since 1970. Interestingly, most of the studies did not mention any theories but explained their work relying on literature reviews, and a related compliance and concordance concept. Adherence to preventive behavior is a multidimensional concept involving commitment, persistence, and maintenance to health regimens. The existing scales measuring adherence to preventive behaviors

have mostly found scales to measure the cognitive and frequency characteristics in preventive behaviors rather than adherence to preventive behaviors. There was only one adherence to treatment scale for Thais with hypertension. However, this scale did not go through the steps in scale development which are essential for the evaluation of the effectiveness of a measure. Additionally, the attributes of adherence concept are based on literature primarily from western countries which may have some limitations when generalized in a Thai context. Therefore, development adherence regarding preventive behavior scale is appropriated to obtain a cultural based measure for Thai persons with prehypertension.

Table 2

Adherence to Preventive Behavior Tools and Attributes

Adherence to Preventive Behavior Tools and Attributes					
Attributes in group	Tool 1 (HATRS)	Tool 2 (TAQPH)	Tool 3 (HBP)	Tool 4 (DSRQ)	Tool 6 (FFQ)
Commitment to active participation	Alignment of patients' behaviors and recommendations	-The willingness and ability of the individual to follow the clinical prescription	-Low sodium intake participation	Intention	
Persistence in practice	Patients' perceived ability to meet optimal blood pressure	An ability of the individual to follow the clinical prescription	-Barriers to low sodium diet intake		Frequency
Maintenance of preventive behaviors	-Mastery of new behaviors - Ongoing collaboration with health care providers on a treatment plan				

CHAPTER 3

RESEARCH METHODOLOGY

This study aims to develop an adherence to preventive behavior scale (APBS) for Thai persons with prehypertension and evaluate its psychometric properties. Two research questions were proposed in the study (1): what are the attributes of an adherence scale related to the preventive behavior of persons with prehypertension in Thailand? and (2): how valid and reliable is this newly developed adherence scale related to the preventive behavior of persons with prehypertension in Thailand?

To construct the APB scale for Thai persons with prehypertension, this research study incorporated an eight-step scale development and psychometric evaluation method developed by Robert DeVellis (2012). The methodology of this study was conducted in two major phases. The first phase is to develop an adherence to preventive behavior scale. The second phase is to evaluate the psychometric properties of the APBS. The first phase consists of three steps namely; domain specifications, generating an item pool of the instrument, and determining the format of the instrument. The second phase includes five steps which are; establishing the content validity of the instrument, establishing the face validity of the instrument, pre-testing, field testing, and final testing. These phases and steps are explained in detail and are summarized in Figure 2

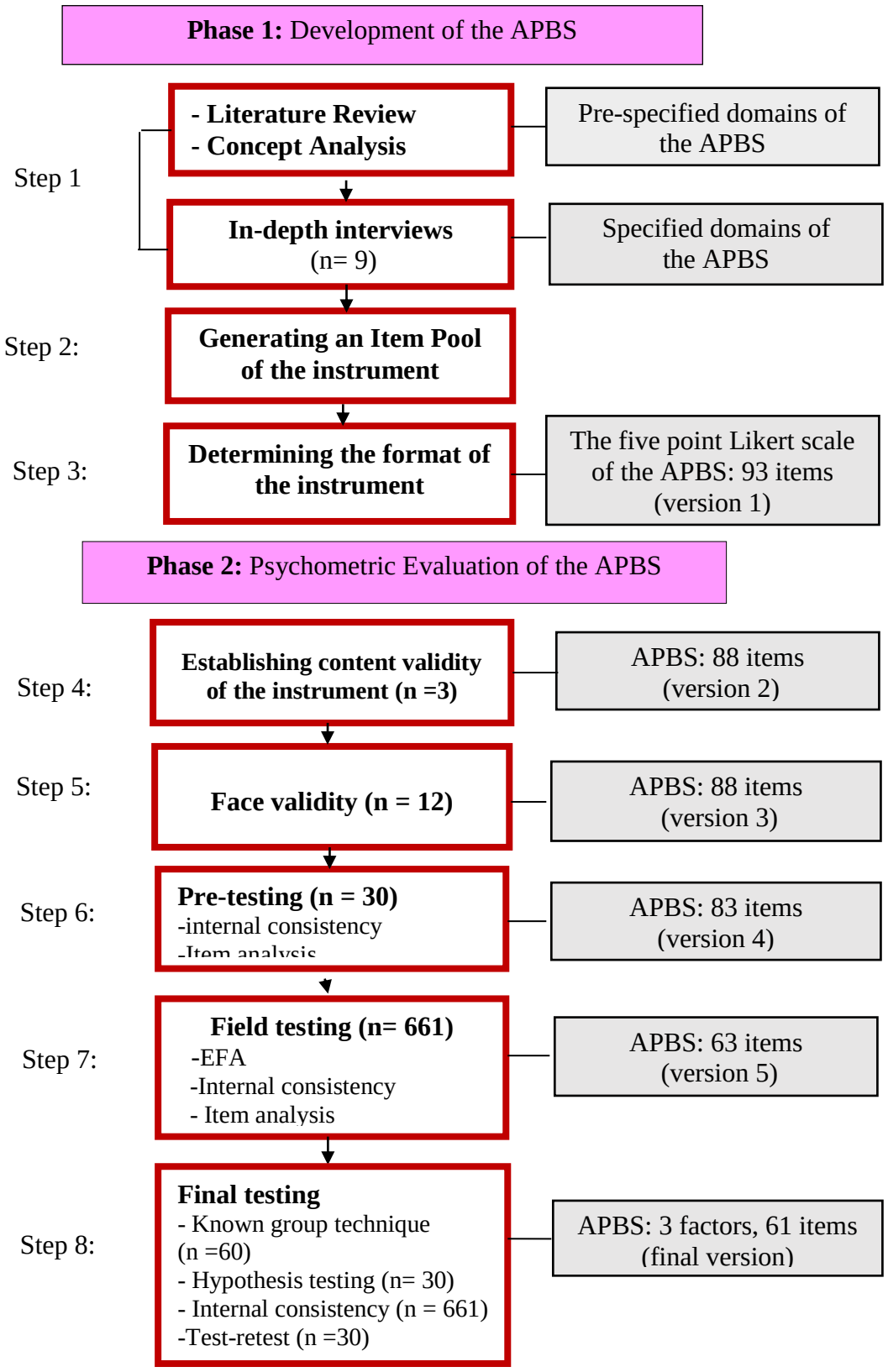

Figure 2. Steps of the Instrument Development

Phase 1: Development of an Adherence to Preventive Behavior Scale

The purposes of this phase are 1) to explore the concept of adherence to preventive behaviors 2) to identify the domain of adherence to preventive behaviors among Thai persons with prehypertension 3) to generate an items pool and 4) to design a format scale. This phase consists of three steps: 1) domain specification 2) generating an item pool 3) determining the format for measurement. The details of each step are described as follows:

Step 1: Domain Specifications

The first step in developing this instrument was to determine clearly what the concept of adherence to preventive behaviors is. Content parameters were established to prevent the inadvertent measurement of unplanned attributes (DeVellis, 2012). The main objective of this step was to explore the concept of adherence to preventive behaviors and specify the culturally-meaningful attributes of adherence to preventive behaviors among Thai persons with prehypertension. To meet these qualifications, this step used an extensive review of the literature and concept analysis to present the theoretical framework designed to clarify the concept of adherence to preventive behaviors and identify the attributes of adherence to preventive behaviors for measuring its' attributes in order to provide a measure of adherence to preventive behaviors.. Moreover, a qualitative study using in-depth interviews that were conducted by the researcher in southern Thailand was done to ensure that the APBS would be relevant to the lived experience of persons with prehypertension. The results

from the in-depth interview study provided practical, valuable information for the development of a culturally sensitive instrument.

Literature review

This involved clarifying the concept of adherence to preventive behaviors which include reviewing the literature from multiple disciplines, to define adherence to preventive behaviors, to identify the attributes of adherence to preventive behaviors, and to review the existing adherence to preventive behavior instruments. Theoretical and empirical literature was reviewed.

Concept analysis

It is apparent within the healthcare literature that adherence to preventive behaviors is used inconsistently and often used interchangeably with the concepts of compliance and concordance. Additionally, the term adherence to preventive behaviors is variously defined and measured in the documentation of these outcomes. Therefore, clarification is necessary in order to further the understanding and use of adherence to preventive behaviors as a concept and as a measure. The aims of this concept analysis were: 1) to clarify the definition and attributes of adherence to preventive behaviors, 2) to differentiate among the meanings and uses of adherence, compliance, and concordance, 3) to integrate the concept analysis of the literature review and the results of the in-depth interviews of persons with prehypertension in order to provide an operational definition of adherence to preventive behaviors for persons with prehypertension, and 4) to begin instrument development and testing.

Design. Walker and Avant‘s (2005) framework for concept analysis was performed to determine the linguistic meaning of adherence to preventive behaviors.

Search method. The literature review used to identify the concept of adherence to preventive behaviors in the concept analysis was undertaken through the available resources including Medline, CINAHL, Ovid, SCOPUS, and Pro Quest databases. The databases were searched between the years 1970 and 2015 using the keywords of “Adherence”, “Compliance”, “Concordance”, and “Non-adherence”. The inclusion criteria of the studies were to be full text and written in English. Walker and Avant (2005) suggest that identifying and defining related concepts or terms that are used interchangeably with the concept of interest will help researchers differentiate the concept in question.

Data analysis. The method used for this concept analysis of adherence to preventive behaviors was guided by Walker and Avant (2005). This guideline suggests that grouping the characteristics that most frequently appear in the literature is an important process of examining and defining the fundamental attributes of a concept. These attributes function as criteria that help the researcher to differentiate the concept of interest from other related concepts.

In-depth interviews

Another way to identify the definition and attributes of the concept of adherence to preventive behaviors was to look at how Thai persons with prehypertension identify and define what adherence to preventive behavior means. This was accomplished through in-depth interviews. This study used in-depth

interviews to clarify adherence to preventive behavior attributes of Thai persons with prehypertension, to confirm whether adherence to preventive behavior attributes from a concept analysis were vastly different from the attributes from the interview, and to assist in creating items.

Participants and setting. Participants were purposively selected from three provinces of Southern Thailand (Songkla, Nakorn Si Thummarat, Suratthani). The data was collected from one primary health care unit in each province. Recruiting criteria for participants for the in-depth interviews were persons: 1) identified by their health care providers as having prehypertension; 2) receiving a preventive behavior intervention routine from a health care provider; 3) participants who have successful adherence behavior, being Thai and aged 35 years or older who have been practicing preventive behaviors regularly and have participated in preventive behaviors for a minimum of 12 months; and 4) able to understand and speak Thai fluently. To gain access to participants the researcher asked health personnel from primary health care units in the selected areas and personnel in any preventive activity groups to advertise this study. Potential participants were initially screened using the above criteria and then were given a brief description of the study by health personnel. They then were contacted and invited to participate in this study by the researcher and health personnel. The sample of potential participants was purposively drawn to select different personal characteristics in terms of age, gender, level of education, and. socio-economic status.

In total, nine people with prehypertension agreed to participate in the study. Four men and five women ranging from 39 to 70 years in age (average 55

years) participated. Five of them were married; five had completed primary school and four were able to read and write. The majority of the women were farmers and housewives, while the majority of the men were retailers or retired. Most of them had succeeded in adhering to exercise and stress management.

Instrument. The interview guide was assembled from the attributes of adherence to preventive behaviors that had been synthesized from literature reviews and the concept analysis. The guide was reviewed by three experts in qualitative research for its appropriateness. It contained open-ended questions asking participants to clarify or elaborate upon specific aspects of their adherence to preventive behaviors. The following are nine examples of the open-ended questions that the subjects were asked: R 1: Tell me what you felt and what you did when you found out that you are at high risk of hypertension? How have you changed your lifestyle since you have known you have a high risk of hypertension? R2: Since you have known of your high risk of hypertension, what important behaviors have you practiced to prevent hypertension disease? R3: What preventive activities do you practice? R4: What are the expected results of these preventive activities? R 5: At present, what preventive behaviors do you think you have done well? What are your reasons for doing them? R6: If you want to continue the preventive behaviors, how should you manage them? R7: Is continuous practice an important factor for preventive behaviors? R8: What are your aims in practicing the preventive behaviors? If you cannot follow them, what are the reasons? R9: How do you integrate the preventive behaviors into your daily life to prevent hypertension?

Data collection. Each individual in-depth interview was conducted by the researcher to obtain valuable information about insights into participants' experiences. During the interview process, field notes were written for every interview to capture nonverbal communication and other relevant contextual information beyond the interview questions. The researcher respected every participant's perspectives without any judgment so that participants were encouraged to speak freely. Participants were interviewed in private areas of their home or the local health centers. The duration of interview varied from 45-60 minutes in length and ended when target data were received. Background information on the participant was gathered at the end of the interviews.

Interviewing continued until data were saturated. Saturation refers to a circumstance when no new themes seems to emerge during coding and when concepts were validated with a variety of participants (Morse, 1994). Despite achieving data saturation after the completion of six interviews, interviews of three participates who already had agreed to participate were continued to support existing themes. This process included looking for three negative cases to confirm saturation had taken place.

Data analysis. The data from the interviews were analyzed by using content analysis. First, all interviews and the content of tape recordings were transcribed verbatim into written text and checked for accuracy. Raw data from participants were read and re-read many times for repeated instances of similar meaning. Codes were categorized and themes and sub-themes were identified (Graneheim & Lundman, 2004). Constant comparison and contrast from one case to

another was performed. Content analysis continued until the researcher found no new information to support existing themes. In order to confirm the validity and reliability of analysis, the themes were discussed in relation to the data with the thesis advisor. Data gathering and analysis continued throughout the study until saturation was reached (Morse, 1994).

Trustworthiness of the data was identified by using the criteria proposed by Lincoln and Guba (Graneheim & Lundman, 2004) Credibility of the present findings was strengthened through member checking the data. Interview participants were asked during and after the interviews to review the information that they shared, to clarify perceptions, and validate their intended meanings. To enhance the credibility of findings, peer checking was conducted by three experts in qualitative research independently and until they reached agreement by consensus. Moreover, a negative case analysis was conducted by examining both adherers and non-adherers to preventive behaviors. In other words, once characteristics were identified in adherers, understanding of the characteristics increased by considering the instances and cases where participants did not adhere to preventive activities. With respect to dependability, three qualitative researchers examined research-related documents and validated the data.

Step 2: Generating an Item Pool of the Instrument

The purpose of this step was to generate a large pool of items for all the attributes of adherence to preventive behaviors from the results of the in-depth interviews, concept analysis, and the literature review. An item pool was developed through a matrix of three attributes with 3 attribute. A recommendation of DeVellis

(2012) is to begin with an item pool that is three or four times as large as the expected final scale. The use of redundancy in an item pool is useful at this step in scale development because it will likely "capture the phenomenon of interest by developing a set of items that reveal the phenomenon in different ways" (DeVellis, 2012, p.78). In addition, item characteristics were considered in the development of the item pool based upon the recommendations described in DeVellis's scale development guidelines. For example, avoidance of lengthy items, use of only positive statements, and selection of wording to avoid multiple negatives and to ensure that items do not contain more than one idea.

Step 3: Determining the Format of the Instrument

After generating the item pool, the researcher considered the format simultaneously with the generation of items for compatibility. Questionnaires for this study were designed in Likert-scale format because its commonly used application in surveys potentially lending familiarity and an improved understanding on the part of the respondents to complete the scale (McLeod, 2008). As stated by DeVellis, a good Likert item should state the opinion, attitude, belief, or other construct under study in clear terms; and the response options should provide the opportunity for gradations. Therefore, all items were written in a structure of five-point scale format. The respondents were given a 5-point Likert Scale, ranging from one to five, where one means "Never," and five means "Always". The items are scored as follows:

5 = Always

4 = Often

3 = Occasionally

2 = Seldom

1 = Never

At this step, the development of an adherence to preventive behavior scale phase was completed. Then, the researcher moved on to the next phase – psychometric evaluation of the APBS.

Phase 2: Psychometric Evaluation of the APBS

The purpose of psychometric evaluation of the APBS phase was to examine the validity and reliability of the new instrument measuring adherence to preventive behaviors in Thai persons with prehypertension. The psychometric evaluation of the APBS phase included five steps: (1) establishing content validity of the instrument, (2) face validity of the instrument, (3) pre-testing, (4) field testing, and (5) final testing. All the steps in this stage involved refining the instrument and testing the psychometric properties of the instrument.

Step 4: Establishing content validity of the instrument

The purpose of this step was to evaluate the relevance of the scale's content to the Thai adherence to preventive behavior concept. As stated by Devellis (2012), a group of people who are knowledgeable in the content area should be asked to review the item pool to help maximize the content validity. In order to maximize content validity, a panel of experts in the content area is asked to evaluate individual items as well as the entire instrument. Two important key issues in the evaluation are whether individual items are relevant and appropriate for the construct, and whether

the items adequately measure all dimensions of the construct (Polit & Beck, 2006) . To evaluate the content validity, the following procedures are planned.

Sample. The initial items pool (APBS version 1) was reviewed by an expert panel, to determine if the questions are totally representative of the interview data. Lynn (1986) recommended that at least five experts are needed in order to minimize erroneous conclusions. Therefore, the panel participants in this study were a group of three Thai experts in the area of hypertension disease, health behavior and scale development. The experts were two nurse educators with expertise in preventive behavioral health and scale development, and one nurse educators with expertise in behavioral health.

Instruments. Two forms of the instrument used in this step were: 1) the first version of the APBS and 2) a content validity evaluation form. In addition, the conceptual framework, operational definitions of adherence to preventive behavior, the blue print of item matrix, and definitions of each subscale were included.

Data collection. Firstly, the experts were approached and asked to evaluate the instrument. Secondly, a letter from the Faculty of Nursing, Prince of Songkla University, was sent to each of the experts who had agreed to participate. The first version of the APBS was sent to the experts who were asked to independently rate their opinions as to whether the first version of the APBS is sufficient to represent the concept of prehypertensive Thai persons adherence to preventive behaviors on a Likert-type, an ordinal scale with 4 responses. The responses include the rating of 1 = not relevant, 2 = somewhat relevant, 3 = quite relevant, and 4 = highly relevant. This 4-point rating scale was used to avoid having a neutral midpoint. They were also

asked to rate their opinion on the degree of relevance to Thai culture. Lastly, the experts were further asked to judge how representative individual items from the total items of the content domain (themes) are. As part of the review process, the experts were asked to suggest improvements in wording and clarity regarding these items.

Data analysis. The content validity index (CVI) was examined to ascertain the appropriateness, clarity, and relevance of the content of the APBS for the purpose of the study. The evaluation of content validity of this new instrument is a vital step and requirement for the standards of the test. In the present study, content validity was examined by three experts using a content validity questionnaire. The inter-rater agreement was computed both at the item level and at the overall scale. To determine which items would be dropped from the instrument, the item-level content validity index (I-CVI) was identified by computing the number of experts giving a rating of either 3 or 4 divided by the total number of experts (Lynn, 1986). That was the proportion of agreement on the relevancy of each item. To determine which items should be retained, the content validity index for scale (S-CVI) was calculated. There are two method to compute the S-CVI. The first method is computed from the proportion of items on an instrument that were favorably rated by all content experts (S-CVI/UA) (Polit, Beck, & Owen, 2007). Another method, the S-CVI/Ave is the average of the I-CVIs for all items on the instrument (Polit & Beck, 2006). For a scale to be judged as having excellent content validity, it would have to be composed of items with I-CVI = 1.00 and an S-CVI/Ave of.90 when there are five or fewer experts (Lynn, 1986; Polit & Beck, 2006; Waltz et al., 2005). For the new instrument

development the I-CVI and S-CVI values greater or equal to .8 are considered as an acceptable level of content validity (Lynn, 1986; Polit & Beck, 2006).

Step 5: Face validity

The APB scale was then tested to assess face validity by the use of a small sample of prehypertensive adults representative of the desired population of interest. The purpose of face validity is to examine the appropriateness of the language used in the items, determine clarity and the adequacy for the research to be conducted, and administer the instrument bias. This method was designed to obtain feedback on question suitability, wording and comprehension, and on overall scale design (Willis, 2005). It helps the investigator understand how participants interpret questionnaire items in order to develop more understandable questions and response choices.

Sample and setting. To evaluate the appropriateness of the language used in the items, to determine clarity and the adequacy for the research to be conducted, and to administer the instruments and bias of the second version of APB scale, twelve persons with prehypertension aged 35 years and older were invited to review the second version of the APB scale. For the setting to carry out the face validity, one primary health care unit (Muang, Songkhla Province) was selected. The researcher visited participants who were identified by their health care providers as having prehypertension. Twelve persons with prehypertension were purposively selected with these inclusion criteria: 1) aged 35 years and older; 2) being willing to participate in this study; and 3) able to read Thai.

Instrument. The instrument used for this step was comprised of two forms: 1) the APB scale version two revised after the step of content validity; 2) closed-ended questions about the appropriateness of content, wording, format instructions, and response scales.

Data collection. A general debriefing pretest and cognitive interviews with probe questions were used with twelve Thai adults with prehypertension in this study. These techniques were designed to understand the participants' comprehension and interpretation of the questions and gain possible suggestions for wording changes. (Willis, Schechter, & Whitaker, 1999). Participants were invited to review the questionnaire and asked to explain problems with particular questions as well as to suggest resolutions to the problems. The general debriefing pretest included 5 open-ended questions about the appropriateness of format instructions, content, wording, and response scales, such as "Can you tell me about what the question is asking you about?" and "Which words were hard to understand?" "Could you tell me in your own words?" Cognitive interviewing included 9 probe questions. For example, participants were asked to explain some phrases like "What does the phrase 'I determine to control my emotions and calm my mind' mean to you?" Likewise, participants were asked to state how they decided on an answer, e.g. what were you thinking about when you answered the question?" Notes were taken by the researcher in order to capture all information.

Data analysis. The notes containing a general debriefing pretest and cognitive interview responses were transcribed verbatim and reviewed. Using data

obtained from the twelve participants, a modification was made to create the third version of the APBS which ensured comprehensibility and practicality.

Step 6: Pre-testing

The purpose of the pre-test was to examine the internal consistency and item analysis of the test. The sample & setting, instrument, and data collection are described after that the data analysis of each approach is to follow:

Sample and setting. The sampled primary health care unit was one of the primary health care units in southern Thailand. Thirty participants were purposively selected for pre-testing. The inclusion criteria for participants in this study were: 1) being persons aged 35 years or older who were identified by their health care providers as prehypertensive and reported no known hypertension or cardiovascular diseases such as coronary heart disease or stroke; 2) being willing to participate in this study; 3) being able to understand and speak Thai; and 4) having no cognitive impairment.

Instrument. The pre-testing instrument is the third version of the APBS. It also includes demographic sheets.

Data collection. Data collection was conducted using three steps. Firstly, a formal letter was sent to the director of the primary health care unit selected asking for permission to collect data. Secondly, the researcher contacted the health personnel who have responsibility for the hypertension clinic and asked for information to determine the prehypertensive participants. Lastly, the selected respondents were

asked to complete the third version of the questionnaire (APBS) after content validity evaluation. After written or oral consent was obtained, each participant completed the questionnaire by self-administration. For those, who were unable to complete the questionnaire due to certain functional limitations, such as illiteracy, the researcher or research assistant read the questionnaire aloud and then the participant selected the rating of choice on their own.

Data analysis. The pre-test of internal consistency and item analysis were evaluated and described as follows:

1. Internal consistency

Cronbach's alpha was used to examine internal consistency reliability of the APBS. There are two basic assumptions related to internal consistency reliability procedures. First, all items within a given subscale should measure the same construct, and second, error in measurement should be unrelated. Cronbach's coefficient alpha was also used to determine the internal consistency reliability of the sub-scale and total scale of the APBS. The Cronbach alpha value should be at least .70, indicating sufficient internal consistency in a new tool (Nunnally & Bernstein, 1994). However, a high alpha coefficient in the test development phase may indicate redundancy of test items and a need for further assessment.

2. Item analysis.

Item analysis, the statistical technique, was further examined to investigate the pattern of responses to each item of the scale and provide the guidance for revision to improve the effectiveness of test items and the validity of test scores (Polit & Beck, 2004). Therefore, item analysis using the alpha correlation of item to

item, item to subscale, item to total scale, subscale to subscale, and subscale to total was performed. A given item with a score which significantly correlated with the relevant scale score (i.e., ≥ .3) was considered as meeting the criterion of internal consistency and was retained in the instrument. An items' score which did not significantly relate to the scale score (i.e., < .3) was rechecked and determined for retainment, elimination or revision.

Step 7: Field testing

The purpose of this step was to evaluate the reliability and validity of the APBS. In this step, the APBS version 4 was sent to a large number of prehypertensive persons who had been randomly selected for data collection in order to re-examine the construct validity of the instrument using factor analysis and the internal consistency reliability of the instrument using Cronbach's alpha.

Sample and setting. The target population of this study were Thai persons with prehypertension aged 35 or older with blood pressure between 120/80 mmHg and/ or 139/89 mmHg and who reported no known hypertension or cardiovascular diseases such as coronary heart disease or stroke. As this study was based on data generated from a sample group of adults from only the southern region of Thailand, the sample was randomly divided into two parts of southern Thailand (the upper southern and the lower southern) by the stratified sampling technique to make it representative of Thai adults with prehypertension from southern region of Thailand.

A four stage random sampling was to select the participants for psychometric testing.

1) Simple random sampling of the provinces of southern Thailand was conducted for data collection. Three provinces from each region of southern Thailand (the upper southern and the lower southern) were randomly selected. These were Songkhla, Nakorn Si Thummarat, and Suratthani in the upper southern and Yala, Pattani and Satun in the lower southern.

2) From the selected provinces, one district was randomly selected using the ballot method without replacement, yielding six districts for the study.

3) From the six selected districts, two sub-districts (Tumbon) of each district were selected by simple random sampling, resulting in a total of 12 sub-districts.

4) From the selected sub-district, two primary healthcare units of each sub-district were selected by simple random sampling. This yielded 24 primary healthcare units.

A total sample size was determined by the minimum number required for the EFA to test the construct validity of the APBS. Nunally and Bernstain (1994) recommended a minimum sample size of 5-10 participants per item for scale validation. Therefore, utilizing this method, a development sample size of 661 was desired, based upon the original 83 items of the APBS. The results of the responses from the development sample then guided this researcher to revise/develop the instrument to a final instrument version.

A sample of Thai persons with prehypertension was recruited from twenty-four primary health care units with the following inclusion criteria: 1) being aged 35 years and older and reporting no known hypertension or cardiovascular diseases such as coronary heart disease or stroke; 2) being willing to participate in this

study; 3) being able to understand and speak Thai, and 4) having no cognitive impairment. The researcher distributed 720 questionnaires equally to 24 sampled primary health care units; and 661 questionnaires were used in this study (table 3).

Table 3

Random Sampling and Number of the Prehypertensive Samples

Province	District	Sub-District	Village/ Community	Number of pre-hypertensive persons	Sample
Province 1	District 1	Sub-District 1	PHC 1	30	
			PHC 2	30	
		Sub-District 2	PHC 3	30	
			PHC 4	30	
Province 2	District 2	Sub-District 3	PHC 5	27	
			PHC 6	27	
		Sub-District 4	PHC 7	28	
			PHC 8	28	
Province 3	District 3	Sub-District 5	PHC 9	27	
			PHC 10	27	
		Sub-District 6	PHC 11	27	
			PHC 12	27	
Province 4	District 4	Sub-District 7	PHC 13	27	
			PHC 14	27	
		Sub-District 8	PHC 15	27	
			PHC 16	27	
Province 5	District 3	Sub-District 9	PHC 17	27	
			PHC 18	27	
		Sub-District 10	PHC 19	27	
			PHC 20	27	
Province 6	District 4	Sub-District 11	PHC 21	27	
			PHC 22	27	
		Sub-District 12	PHC 23	27	
			PHC 24	26	
Total					661

Note. PHC: primary healthcare unit

Instrument. The fourth version of the APBS, which was corrected after pre-testing, including a demographic data form, was used as an instrument in this step.

Data collection. Following the approval of the research proposal by the examination dissertation committee from the Faculty of Nursing, Prince of Songkla University, it was reviewed and approved by the Institutional Review Board (IRB) of the Faculty of Nursing, Prince of Songkhla University. The psychometric testing was conducted by self-administration with 661 participants in eight urban primary care units and eight rural primary care units from the four provinces. The steps in the data collection were initiated as follows:

1. The researcher contacted the Provincial Health Offices and District Health Offices for approval to collect data in the target area. Once permission to collect data had been granted, a formal letter from the Faculty of Nursing, Prince of Songkhla University was mailed to them.

2. The researcher coordinated with the Primary Health Care Center which takes responsibility for the area selected to obtain the list of names and addresses of the persons with prehypertension.

3. Samples were selected using the proportional to size and simple random sampling method.

4. The researcher utilized sixteen research assistants to aid with data collection. The research assistants were registered nurses in primary healthcare units who have had experienced in a hypertension clinic and were willing to participate in the study. The researcher introduced the objective of the study, clarified the contents of the questionnaire, clarified the research assistants' responsibilities including how to

obtain informed consent and collect the data, and checked all questionnaires returned from the participants.

5. The researcher or research assistants met with potential participants, described the consent process, and obtained consent.

6. The researcher or research assistants administered two instruments as follows: First, the participant was asked to complete the fourth version of the APBS followed by the demographic data. The participant had 30-40 minutes to complete the questionnaire. The participants who were educated or well-read were asked to fill out the demographic sheet and respond to the questionnaire by themselves. In the case of those who were illiterate or have any limitations, the researcher or research assistants assisted them by reading the questionnaire and then asking them to rate a score on each item.

Data analysis

1. Descriptive analysis. To evaluate scale score distributions of socio-demographic characteristics, descriptive statistics such as frequency, mean scores, standard deviation and ranges and percentages of participants scoring the minimum (floor) and maximum (ceiling) possible scores were calculated.

2. Internal consistency. The internal consistency estimate using Cronbach's alpha coefficients of the total APBS scale and dimensions was calculated. A high Cronbach's alpha indicates that the instrument has high internal consistency. Nunnally and Bernstein (1994) suggest that, for the newly developed instrument, a Cronbach's alpha of .70 is acceptable.

3. Item analysis. An item analysis was conducted to evaluate the central tendency of each item and how it correlates with the total score. This item analysis is used to decide which items on this instrument will be retained and which should be eliminated (Ferketich, 1991; Nunnally & Bernstein, 1994). First, the item-total correlations were examined. Those items with correlations lower than .30 do not sufficiently contribute to the total score, while those that have correlations higher than .70 are probably redundant (Ferketich, 1991). Therefore, those items that did not meet the criteria were eliminated. Lastly, because item analysis shows the number of items that will be needed to obtain an acceptable level of reliability, the coefficient alpha estimate is of concern in that it should not be decreased if the item is eliminated (Ferketich, 1991). Therefore, the items would still be preserved if their contents were deemed to be strongly consistent with the theoretical definitions of the scale's dimension even if they failed to meet the criteria.

4. Factor analysis. Factor analysis was performed using data from the field test questionnaires to examine the construct validity and to determine empirically how many constructs or factors underlie the set of items within the APBS scale. The number of factors from the analysis explains the number of dimensions that are needed to explain the relationship among the variables. Items set to measure the same dimension should load on the same factor, whereas items set to measure different dimensions should load on different factors. This study used exploratory factor analysis (EFA) with the principle attribute method because the developed APBS has a large number of items and needs to be managed with EFA to condense and group highly correlated items together and create a new composite measure that can represent each group of items.

In order to ensure the factor analysis can be appropriate for analyzing the APBS items, the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy (Kaiser, 1970 as cited in Williams, Onsman, & Brown, 2010) and Bartlett's test of sphericity were used for this study (Bartlett, 1950 as cited in Williams et al., 2010). The KMO can help to determine whether the sample is adequate. If KMO values are nearer to 1.0, it indicates that the variables can be grouped into principle factors or dimensions. Scores below .50 may require more data, which would be possible with a larger sample. Bartlett's test of sphericity is another measure to indicate whether the correlations do not happen by chance. A significant value indicates that the correlation matrix is not an identity matrix and that factor analysis is an appropriate test.

Exploratory factor analysis (EFA) was performed to extract factors from the instrument of adherence to preventive behavior and determine the items to be included in the instrument. It consisted of two stages: (a) the factor extraction method using principle attribute analysis (PCA) and (b) the extracted factor rotating method using the varimax method. The criteria used to select the number of factors were 1) an eigen value equal to or greater than 1, 2) scree plot characteristics, and 3) percentage of total variance explaining at least 60 % or more (Hair, 2006), and 4) interpretability (Nunnally & Bernstein, 1994). An item was retained when: 1) the item-factor loading is greater than or equal to .4; 2) communality is greater than .5; 3) in case of large cross-loading, the factor is chosen that gives conceptually the most sensible interpretation (Nunnally & Bernstein, 1994).

At this point, the instrument of adherence to preventive behavior was established. This final version of the adherence to preventive behavior scale was further evaluated for its reliability and validity in the final testing.

Step 8: Final testing

The aim of the final testing was to examine the validity and reliability of the newly-developed measure of adherence to preventive behavior for pre-hypertensive persons. The sample, instrument, data collection, and data analysis of each approach is explained as follows:

Validity evaluation: Known-group comparison

To test the instrument's validity, the known-group technique has been widely documented as one of the techniques to do this, by identifying at least two groups that are expected (or known) to have contrasting scores on the measuring instrument (Burns & Grove, 2009). This test is utilized when there are two groups of population who are known to be extremely high and extremely low in the characteristic being examined by the instrument. Therefore, the known groups of prehypertensive adults, who are extremely different in adherence to preventive behavior attributes and are expected to have opposing responses to the item in the APBS, were selected. Many studies assert that social support and communication are the important factors that promote adherence to preventive behaviors (Garay-Sevilla et al., 1995; Kahn et al., 2002; Peterson et al., 2002; Trief, Ploutz-Snyder, Britton, & Weinstock, 2004). Two groups of the Thais with prehypertension representing two discrepancies of social support and communication. This study tests the instrument on

the following two groups which representing two discrepancies of social support and communication: prehypertensive persons who have participated in group exercise, and prehypertensive persons who did not participant in an exercise group. It was hypothesized that prehypertensive persons who have participated in an exercise group would score significantly higher on the APBS than prehypertensive persons who did not participate in an exercise group.

*Sample and setting***.** A total of 60 respondents, classified into two groups (30 for each group), was purposively selected for the known-group technique. The first group was prehypertensive persons who have participated in an exercise group while the second group was prehypertensive persons who did not participate in an exercise group. The inclusion criteria are: 1) being a prehypertensive person who is dwelling in the community; 2) being aged 35 years or older; and 3) being able to understand and speak Thai.

*Instrument***.** The final version of the ABPS and a demographic data form were used.

*Data collection***.** The data collection was performed in the same way as the field testing procedure.

*Data analysis***.** A mean score of the APBS in both known groups was compared for their differences using the independent t-test statistic. If the statistically significant difference between the mean score of the two groups is accepted, this indicates that the instrument has construct validity. However, if no difference is found between the mean scores of the two groups, it is possible that: (1) the test is

unreliable; (2) the test is reliable, but not a valid measure of the characteristics; or (3) the conception of the construct of interest is faulty and needs reformulation (Waltz et al., 2005).

Validity evaluation: Hypothesis testing

The purpose of the hypothesis testing approach is to evaluate construct validity. Hypothesis testing is utilized when using the theory or conceptual framework underlying the measure's designed to state the hypotheses about the behavior of people with varying scores on the tool, gathering data to test the hypothesis, and making inferences on the basis of the results concerning whether or not the rationale underlying the measure's construction is adequate to explain the data collected (Waltz et al., 2005). The hypothesis for the study is "Thai persons with prehypertension with a high degree of adherence to preventive behavior were correlated to blood pressure control". It is expected that those with blood pressure controlled at baseline would have the higher total adherence to preventive behavior score than blood pressure uncontrolled at baseline.

*Sample and setting***.** Sixty Thai persons with prehypertension in one targeted sub-district were purposively selected to be the subjects and setting. The inclusion criteria are: 1) being a prehypertensive person who is dwelling in the community; 2) being aged 35 years or older; and 3) being able to understand and speak Thai.

Instrument. The final version of the ABPS and the assessment of blood pressure control status at both baseline were used.

Data collection. The data collection was performed in the same way as the pre-testing procedures. In addition, the assessment of blood pressure control (yes/no) status at both baseline yielded two group: 1) Blood pressure uncontrolled at baseline; 2) Blood pressure controlled at baseline

Data analysis. Pearson's product moment correlation coefficient was used as statistical analysis. The hypothesis can be accepted as evident validity when high correlation between two instruments is found. However, if the hypothesis fails the explanation for the data, it is crucial to: (1) revise the measure, (2) reformulate the rationale, or (3) reject the rationale altogether (Waltz et al., 2005).

Reliability evaluation

1. The final version of the APBS was retested for its internal consistency using Cronbach's alpha. The internal consistency evaluation was conducted on 661 participants in the field study. Internal consistency was calculated on the significant items from each sub-scale of the adherence to preventive behavior questionnaire to determine whether each sub-scale achieves a minimum reliability of .70. Cronbach's coefficient alpha was also used to determine the internal consistency reliability of the total scale of the APBS.

2. The stability of the APBS was examined by test-retest through repeated administration which should yield consistent results. This was used as a method of testing the confirmation of the APBS's reliability on two separate occasions. With a two week interval between the tests, a sample of 30 prehypertensive persons from one district was randomly selected for test-retest reliability. After verbal

consent was obtained, each participant completed the questionnaire by self-administration and returned it to the researcher. Data obtained from the two sets of scores was correlated using the Pearson correlation coefficient (Waltz et al., 2005). The correlation coefficient of the two administrations of an instrument is a numerical index of the magnitude of the test's reliability (Polit & Beck, 2006). A high correlation coefficient indicates high stability or test-retest reliability of the instrument. A reliability coefficient above .70 is considered satisfactory (Burns & Grove, 2009).

Protection of Participants' Human Rights

Prior to the data collection, the research protocol was submitted and approved by the Institutional Review Board (IRB) of the Faculty of Nursing, Prince of Songkhla University, comprised of primary care providers who have worked at primary care units (PCUs), directors of the PCUs and health professional experts, and each participant was contacted for their permission to take part in the study. The protection of their rights was assured by providing (1) the title of the study, (2) outlining the purpose of the study, (3) the methodology of the study, (4) the assurance of the subject's anonymity, (5) the assurance of voluntary participation and possible withdrawal from the study at any time, (6) the benefits of using the results of this study in education, research, and administration in the area of nursing, and (7) the name and address of the researcher. Each subject received a sealed envelope containing a set of questionnaires including a statement regarding their rights. No identification was used except for coding. Code numbers were included on each questionnaire in case follow up was necessary. The data entered into the computer

was anonymous. All documents collected from subjects were reserved and confidential. Since this study is a risk-free study, the return of the questionnaires was treated as consent to participate in this study.

Summary

This study incorporated an eight-step scale development and psychometric evaluation method developed by Robert DeVellis (2012). The initial 95 item pool was developed based upon literature reviews and qualitative study. The APBS was evaluated by an expert panel for clarity, readability, and content appropriateness prior to administering to the prehypertensive sample population. Based upon the inclusion and exclusion criteria referenced above, the sample was identified through simple random sampling of six provinces of southern Thailand. While protecting patient confidentiality, IRB compliance, and patient rights, the researcher recruited potential participants via primary health care units that invited them to complete the APBS through one of two methods: self-administration, or asking them to rate a score. Data analysis will allow for evaluation of the reliability and the validity of the APBS items. Items with low correlation or low variance may be removed to optimize the final version of the APBS.

CHAPTER 4

RESULTS AND DISCUSSION

The results are presented and followed by two phases of the instrument development: 1) phase of scale development and 2) phase of psychometric evaluation. Additionally, each research question is also discussed.

Results

Phase of scale development

The results of this phase consisted of three steps: 1) domain specification, 2) generating an item pool, and 3) determining the format for measurement.

Step 1: Domain specification

As stated by DeVellis (2012), the first step in scale development involves clearly determining what specific phenomenon is sought to be measured. The boundaries of this study were established through a literature review, concept analysis and in-depth interviews of Thai persons with prehypertension. The initial concept structure resulting from the literature review and concept analysis was used to develop an interview guide for in-depth interviews in order to obtain perspectives on adherence to preventive behavior attributes among Thai persons with prehypertension.

Literature review

Adherence to preventive behaviors studies from Western and Eastern countries were reviewed and concept analysis using Walker and Avant's (2005) guidelines was performed. These analyses provided support for the multidimensional concept of adherence to preventive behaviors as having three elements: commitment, persistence, and maintenance. The following definition of adherence to preventive behaviors is offered adherence to preventive behaviors is "a voluntary process of participation, in which patients make efforts to follow preventive behavior recommendations that are mutually agreed upon".

The attribute of commitment in this analysis includes intention to participate in preventive behaviors, an effort to plan or set a goal over time. The attribute of persistence refers to the ability to stick with preventive activities from the start of therapy without a meaningful interruption. Lastly, the attribute of maintenance is one of the most critical attributes of adherence to preventive behaviors. Maintenance of preventive behaviors serves as an ongoing behavior that causes a person to achieve the targeted behavioral change.

Adherence to preventive behaviors is viewed as a multidimensional construct, which encompasses three domains. These domains are: (1) the individual domain including perceived disease severity, perceived self-efficacy, and perceived satisfaction; (2) the interpersonal domain including social support and patient – provider communication; and (3) the environment domain related to policy, economics and culture.

In-depth interviews

After determining the pre-specified attributes of adherence to preventive behaviors, in-depth interviews were conducted. The data, gathered by interviewing 9 prehypertensive adults, 6 Thai Buddhists and 3 Thai Muslims, were analyzed and interpreted to define both the conceptual structure and the attributes of adherence to preventive behaviors among Thais with prehypertension. The analysis of the data resulted in the identification of 3 major themes, each with several related subthemes.

1. "Commitment to active participation"

"Commitment to active participation" was originally a commitment attribute from the literature review and concept analysis. This attribute was viewed as the cognitive and affective aspects that facilitate being adherent to preventive behaviors. For Thai persons with prehypertension, "commitment to active participation" was translated as a sense of psychological bond with preventive activities which involves the participants' willingness, perceived abilities and responsibility to change their behavior and incorporate these preventive activities into their daily life. Three attributes in this domain therefore reflected the importance of autonomy and responsibility.

1.1 Intentional action

This refers to the perception of willingness to follow preventive behaviors without interference from others. The meaning of prehypertension as well as preventive behavior experiences supported participants to incorporate preventive behaviors into their daily life. Intentional action represents a sense of being independent. Since the respondents were Thais, they did not want to feel they were

under control, which they saw as a loss of freedom. The expression of intension and desire to participate in preventive behaviors is shown in the following responses.

"I intend to exercise now I know I am in a high risk group. This is my responsibility. I have had bad behaviors for a long time, eating too much and working hard, and now they have affected my life."

"I felt dizzy when I had hyperlipidemia. I used to have a high fat diet and eat coconut milk every day, but now I have tried to decrease eating these foods. I intend to continue doing this to prevent dizziness even though these were my favorite foods."

"I intend to control my stress because if I have a lot of stress, I'm at risk of hypertension and risk rupturing the blood vessels in my brain."

"When I was diagnosed with prehypertension, I tried to do many things to improve my behavior, for example: eating a low fat and high vitamin diet, eating in moderation, meditation, and exercise. Now, I want to exercise regularly because I have enjoyed it, and when I exercise I feel relaxed."

1.2 Expected success

This refers to the perception of a mastery, confidence, and courage to adjust the preventive regimen to different situations. It can represent the person's readiness to carry out the intentional behaviors. Most respondents claimed that they had fewer difficulties incorporating the regimen into their daily life whereas the others who had considerable experience of non-adherence put immense effort into finding a way to incorporate it into daily life, as reflected in the following statement:

"I decided to exercise regularly. I can do it, and I think that I never have barriers for exercising because I can overcome these obstacles."

"For me, dietary control is very easy and I don't need to push myself hard. I'm determined to eat only fish every day as it is easy to buy from the nearby temple. When I eat outside, I tell the seller not to add monosodium glutamate and pork."

1.3 Self-discipline

This refers to the perception of having enough control over engagement in behavior change. It is viewed as a prerequisite for success in preventive behavior adherence. Although Thais are flexible and situation-oriented, they followed the prescribed treatment strictly when they believed that disease impacted on their lives. Most participants explained that they must have determination and patience every day to control intentional behavior practices without interference from others and to follow their own convictions regarding the treatment. These experiences were declared by:

"We emphasize that we must exercise every day until it becomes our habit. I never forget to exercise; it is my responsibility to do it. In my mind I know when the time comes, I must go and dance."

"I have restricted my diet so as to lose weight. I control my diet and remind myself by writing in my diary every day."

2. "Persistence in practicing preventive behaviors"

"Persistence in practicing preventive behaviors" was originally a persistence domain from the literature review and concept analysis. It refers to the

ability of individuals to continue practicing preventive behaviors despite the difficulties or perceived barriers. For Thais with prehypertension, adherence to preventive behaviors is not only dependent on the decision to perform preventive behaviors but is also dependent on their ability to translate their intentions into actions. As a specified domain, "persistence in practicing preventive behaviors" involved repeated action and establishing a regular pattern.

2.1 Repeated activity

This refers to the ability of individuals to practice preventive behaviors as prescribed. For the participants, this attribute also included the individuals' ability to deal with challenging obstacles. Participants who repeatedly participated in preventive behavior practices tended to succeed in forming preventive behavior habits. Most participants explained how they incorporated the preventive behavior into their daily lives because some of them became non-adherent unintentionally due to an inability to overcome barriers and difficulties. They indicated that situational obstacles, lack of social support, daily pressures and roles, and food culture were the main barriers that they had to overcome. The participants reflected on their repeated activity as follows:

> *"I try to exercise every day even if I have some tasks to do. My family can do these tasks because they encourage me to exercise or I do them after I finish exercising."*

> *"I exercise every day, for example, when I go anywhere for a meeting or just traveling, I never forget to take my exercise shoes even if some people think they are difficult to carry. Or I engage in other forms of exercise if I am unable to do aerobics."*

"I never eat sour, spicy and salty food at any special events such as a funeral or monk ordination. If I have to eat out I make sure that there is no MSG in my food."

"Even though I don't have a lot of time, I often join in community activities for relaxation."

2.2 Regular pattern

This refers to the ability of individuals to establish a regular pattern of preventive behaviors. Generally, establishing a regular pattern is an effective strategy used by patients to facilitate preventive behavior participation. Since the respondents were Thais, they always use religious practices such as the Middle Path to control their stress level. They developed a regular pattern using gradual adjustment to their preventive behaviors for diminishing both extremes of self-denial and self-gratification which are the basic causes of mental distress. The respondents indicated that this pattern, which developed over time, allowed them to easily move through the day while integrating the preventive behaviors around other activities of daily living. The respondents discussed the significance of a regular pattern in the following statements:

"Exercise need not be too hard but be regular and we must perform these activities, not only just have intention, I have done exercise and practiced diet control. We should gradually adjust, for example, we should not eat too much especially at dinner because we need to rest, we do not need the energy. We should do this regularly."

"I felt so stressed in the past, but I feel better because of I follow a moral guide book and the priest's teaching. I do this consistently whenever I feel stressed even though I have poor vision. I'm not going to be stressed."

3. "Maintenance of desired preventive behaviors"

"Maintenance of desired preventive behaviors" was originally a maintenance domain from the literature review and concept analysis. It represents continuing regular practice of desired preventive behaviors over the long term. For prehypertensive persons, this domain translates to the ability of individuals to achieve desired preventive behavior change over the long-term and practices to sustain the change for promoting health and preventing diseases. The specified domain of "maintenance of desired preventive behaviors" consisted of the same two attributes as its interview-based interpretation of long-term behavior changes and sensations of well-being.

3.1 Long-term behavior changes

This refers to the ability of individuals to achieve desired preventive behavior change over the long-term. Most respondents claimed that the duration of preventive behavior experience needs to be long enough to meet a threshold believed to be necessary to prevent an illness and improve personal health or well-being. The following example statements reflected this ability:

"I have eaten fruits and vegetables continually for years which helps me not only control and prevent high blood but also makes me have regular bowl movements."

"I started to decrease salty food intake a long time ago. I have eaten plain tasting food since then and that helps reduce high blood pressure."

"I have exercised since 2002, for over 10 years, which has made me feel very refreshed and energetic."

3.2 Sensations of well-being

This represents a positive effect regarding the behavior and its outcome. Most respondents mentioned experiencing sensations of well-being to identify that the desired preventive behaviors had been retained. Example statements reflecting sensations of well-being are presented as follows.

"I have continued to exercise for a long time. My neighbors followed me and also took up exercise and diet control because I am strong and in good shape. It has made me feel good and I've tried to continue exercising although the past I was not an active guy."

"I maintain a sense of humor to cope with stress and that helps me to feel relaxed."

"I'm still proud to say that my health problems have improved and my weight has decreased and that is why I love to continue exercising."

These findings demonstrated that adherence to preventive behaviors is a series of processes which could be described as having three attributes: commitment to active participation, persistence in practicing preventive behaviors, and maintenance of desired preventive behaviors. The process of adhering to preventive behaviors depended largely on the patients' commitment. Through the utilization of commitment strategies, individuals learned how to translate their intentions into actions. Gradually, they established an automatic or regular behavior to increase their

level of skill and mental capacity as well as reduce their discomfort, and finally find a way to sustain preventive behavior change.

The comparison between evidence from the literature review (pre-specified attributes) and the data from the in-depth interviews (specified attributes) is presented in Table 4

The concepts and attributes identified in this study were based on prehypertensive persons' views toward adherence to preventive behaviors. Adherence to preventive behaviors is defined as a voluntary process of participation, in which patients make efforts to follow preventive behavior recommendations that are mutually agreed upon. Adherence to preventive behaviors includes three critical attributes "commitment to active participation", "persistence in practicing preventive behaviors", and "maintenance of desired preventive behaviors". The three attributes of the APB scale along with their definition are presented in Table 5.

Table 4

Pre-specified (Literature-based), Interview-based, and Proposed Attributes of Adherence to Preventive Behaviors for Thais with Prehypertension

Pre-specified attributes	Interview-based attributes	Proposed attributes
1. Commitment	1. Commitment to active participation	1. Commitment to active participation
	1.1 Intentional action	1.1 Intentional action
	1.2 Expected success	1.2 Expected success
	1.3 Self-discipline	1.3 Self-discipline
2. Persistence	2. Persistence in practicing preventive behaviors	2. Persistence in practicing preventive behaviors
	2.1 Repeated action	2.1 Repeated action
	2.2 Regular pattern	2.2 Regular pattern
3. Maintenance	3. Maintenance of desired preventive behaviors	3. Maintenance of desired preventive behaviors
	3.1 Long-term behavior changes	3.1 Long-term behavior changes
	3.2 Sensations of well-being	3.2 Sensations of well-being

Table 5

Attributes and Definitions of Adherence to Preventive Behaviors

Attributes	Definition
"Commitment to active participation"	The prehypertensive person's willingness to change their behavior and effort to incorporate preventive activities into their daily lives.
"Persistence in practicing preventive behaviors"	The prehypertensive person ability to continue practicing preventive behavior in spite of difficulty or perceived barriers.
"Maintenance of desired preventive behaviors"	The prehypertensive person's achievement of the desired preventive behavior change and is practicing to sustain the change.

The results of this study also supported the idea that adherence to preventive behaviors is a multidimensional behavior involving exercise, healthy eating, and stress management. Although a review of the literature identified the moderation of alcohol and smoking cessation components of adherence that are critical for high blood pressure care, neither of them are included in this study because alcohol consumption is inconsistent with Thai social norms and health policies, and it is difficult to determine an individuals' absolute alcohol intake. Smoking cessation is not included in the prehypertension treatment guidelines of the JNC VII because there is currently no evidence that smoking cessation directly reduces blood pressure in people with hypertension.

Step 2: Generating an item Pool of the instrument.

Based on the findings from the in-depth interviews, the researcher generated items following three attributes and three components of preventive behaviors including exercise, healthy eating and stress management. Three to nine items were generated for each theme. All of them were positive statements and were examined by measurement specialists. The APBS (version 1) was completely developed at the end of this step. The initial form of the APBS contained a total of 95 items for three attributes with 3 components.

Step 3: Determining the format of the instrument

This scale is designed to evaluate prehypertensive persons' views on the adherence to preventive behaviors. Each item measures the adherence to preventive behaviors that by its nature lies on a continuum. Each item is rated on a scale reflecting the prehypertensive person's agreement with the statement. The five-point Likert scale format was selected to measure adherence to preventive behaviors in this study when there is some evidence that the absence of a mid-point on an importance scale produces distortions in the results obtained. Respondents tend to give a more positive reply to questions in order to please the interviewer or to guess what might be the socially acceptable answer. Scale item construction resulted in a summative score that was averaged to obtain an overall score. The higher scores indicate a higher degree of adherence to preventive behaviors.

Phase of psychometric evaluation

The psychometric properties of the APBS contained validity and reliability. The validity included content validity, face validity and construct validity. Reliability was examined by two procedures, i.e., internal consistency evaluation and test-retest method. The results of this phase are presented in the following 5 steps: 4) content validity evaluation, 5) face validity evaluation, 6) pre-testing, 7) field testing, and 8) final testing.

Step 4: Content validity evaluation

To determine the degree to which an instrument has an appropriate sample of items to measure a specific construct, the APBS first version of this instrument was submitted to three healthcare professionals experienced with preventive treatment of hypertension and scale development. The 95 item APBS first version was judged by the experts for relevancy to adherence to preventive behaviors and phrasing of the items. The experts gave comments and recommendations of revisions, possible improvements, and modifications throughout the process of reviewing. Multiple revisions were made at this stage to improve the item's clarity. As a result of the evaluation, the experts indicated the need for minor revisions to eleven items and the suggested elimination of seven items. Finally, three experts approved the item clarity and content validity.

Once the experts had rated the all items, both the item-level content validity index score (I-CVI) and scale-level content validity index score (S-CVI) were computed by a panel of three experts. Polit and Beck (2012) define I-CVI as the

content validity index of each individual item. I-CVI is calculated by the number of experts giving a favorable rating to an item, divided by the total number of experts. Favorable ratings for the APBS were considered as either three or four. The I-CVI value of 1.0 was considered an acceptable level of validity and was the level used for this study (Lynn, 1986; Polit & Hungler, 1999; Waltz et al., 2005). After three experts reviewed the 95 item APBS (version 1), 88 items were rated 3 or 4 by all experts. Five items had an I-CVI of 0.6 (Item # 13, 36, 39, 40, 63), and 2 items had an I-CVI of 0.3 (Item #15, 31). Therefore, all seven items that did not meet this criterion were removed.

The scale-level content validity index S-CVI was selected and calculated. Although both S-CVI calculation methods, S-CVI/Avg and S-CVI/Ave, are utilized in scale development, Polit and Beck (2012) recommend the use of the S-CVI/Ave as they note that requiring universal agreement may be too stringent for new tool development. S-CVI/Ave is defined as the proportion of items on an instrument that are favorably rated by all content experts (Polit & Beck, 2012). The S-CVI/Ave value of .9 was considered an acceptable level of validity and was the level used for this study (Lynn, 1986; Polit & Hungler, 1999; Waltz et al., 2005). A content validity S-CVI/Ave score of .93 was reported. Thus, the 88 item APBS (version 2) was to be further evaluated for its face validity.

Step 5: Face validity

To test the items readability and clarity, the 88 item APBS (version 2) was examined by twelve prehypertensive adults recruited by convenience sampling using a general debriefing pretest and cognitive interviewing with probe questions.

The majority of the scale items were confirmed. No participant commented on the scale layout and response choices. Finally, the third version of the instrument consists of 88 items and is further evaluated for its internal consistency and item analysis in pre-testing step.

Step 6: Pre-testing

Once the third version of the APBS had been developed, a pretest study using participants selected from the target population was accepted to test the psychometric properties of comparability, reliability, and validity. The third version of the 88 item APBS version 3 was pre-tested with a convenience sample of 30 Thai prehypertensive adults who were drawn from Hatyai district, in Songkhla province southern Thailand. Those who were literate completed all the questions by self-administration with the investigator present to answer any questions that might occur, while an interview method was used with those who were illiterate.

Characteristics of the Sample. The mean age of the 30 participants was 52.17 (SD = 13.61) years, ranging from 35 to 84 years. The majority of the study participants were female and Muslim. Most were married with 83.3% married and living together, and the remaining 10% widowed. The sample demonstrated a wide range of educational backgrounds as well as current occupations. Most of them had less than primary school education (40.0%) and half of them were farmers / agriculturalists, as shown in Table 6

Table 6

Number and Percentage of Participants by Characteristics in Pre-test (n = 30)

Characteristic	Frequency	Percentage
Gender		
Women	17	56.7
Men	13	43.3
Age ranged from 35-84 years (Mean = 52.17, SD = 13.61)		
Religion		
Buddhist	13	43.3
Muslim	17	56.7
Marital Status		
Single	2	6.7
Married and living together	25	83.3
Widowed	3	10.0
Education		
None	3	10.0
Less than primary school	12	40.0
Primary school	4	13.3
High school	9	30.0
Graduate school	2	6.7
Occupation		
Unemployed	8	26.7
Agriculturist	15	50.0
Officer	1	3.3
Employee	5	16.7
Retired	1	3.3

Item analysis. Item analysis was completed to determine whether to retain scales and items. The alpha coefficient was used to test correlations between item to item, item to subscale, and item to total, as show in table 7.

Based on the item analysis, there were seven items (item # 30, 31, 52, 54, 59, 60, and 62) which had an item-total correlation coefficient less than .3 (.14-.29), as in appendix F. However, item 52 and 59 were still remained for further

psychometric testing since they represented specific adherence to preventive behaviors. Therefore, the APBS (version 4) consists of 3 attributes and 83 items. Furthermore, Table 8 illustrates the results of the correlation subscale, subscale to subscale and subscale to entire scale.

Table 7

Correlation coefficients of item analysis (item to item, item to subscale, and item to entire scale) of the 88 item APB scale (version 3)(n = 30)

Scale	Item- item	Item-subscale	Item-total
"Commitment to active participation"	.24-.89	.25-.83	.27-.77
"Persistence in practicing preventive behaviors"	.06-.85	.12-.78	.14-.75
"Maintenance of desired preventive behaviors"	.12-.97	.24-.83	.30-.77

Internal consistency assessment. The 88 item APB scale (version 3) was examined on its internal consistency using Cronbach's alpha coefficients. The correlation of the APBS item scores within each subscale and the entire scale was calculated. The pretest results showed that the alpha coefficient of the entire scale of the APBS (version 3) was at .98. The alpha coefficients of the subscales ranged from .93 -.95 (Table 9). ("Commitment to active participation" = .94, "Persistence in practicing preventive behaviors" = .93, and "Maintenance of desired preventive behaviors" = .95)

Table 8

Correlation Coefficients of Subscale Analysis (Subscale to Subscale and Subscale to Entire Scale) of the 88 item APB Scale (version 3) Classified by Three Subscale and Entire Scale

Scale	Entire score	"Commitment to active participation"	"Persistence in practicing preventive behaviors	"Maintenance of desired preventive behaviors"
"Commitment to active participation "	.86	1.00	.79	.87
"Persistence in practicing preventive behaviors"	.85	.79	1.00	.85
"Maintenance of desired preventive behaviors"	.91	.87	.85	1.00
Total	1.0	.86	.85	.91

Table 9

Alpha Coefficients of the Third Version 88 item APB Scale (n = 30)

Scale	Number of items	Mean	SD	Alpha
"Commitment to active participation"	35	101.70	26.09	.94
"Persistence in practicing preventive behaviors"	29	72.33	21.79	.93
"Maintenance of desired preventive behaviors"	24	65.07	21.17	.95
Total	88	79.95	.84	.98

Step 7: Field testing

A cross-sectional study was conducted with 661 participants to test the reliability and the validity of the APBS (version 4). The results of this step consisting of sample demographic data, internal consistency, item analysis, and factor analysis are presented as follows:

Sample demographic data. The subjects were Thai persons with prehypertension who were living in urban and rural areas in the six provinces (Songkhla, Nakorn Si Thummarat, Suratthani, Yala, Pattani and Satun). Among the 661 participants, the mean age was 50.12 (SD = 10.64), ranging from 35-86. About one-third were female (75%, n = 495) and 68% (n = 449) were married. They were fairly well educated; the majority of the participants had graduate school education (28.7%) and the remainder had high school (24.9). Twenty-two percent of the sample were employed, whereas the remaining 26.3% were unemployed, as shown in Table 10

Internal consistency. The 83 item APB scale was estimated on its internal consistency using Cronbach's alpha coefficients. Alphas coefficients were also determined for each subscale as this instrument measures more than one dimension of the attribute. As shown in Table 11, Cronbach's alpha for the 83 item total scale was .98. All subscale coefficients exceeded .70 and were accepted as reliable ("Commitment to active participation" = .97, "Persistence in practicing preventive behaviors" = .97, and "Maintenance of desired preventive behaviors" = .98) (Polit & Hungler, 1999; Streiner & Norman, 2003; Waltz et al., 2005).

Table 10

Number and Percentage of Participants by Characteristics in Psychometric Testing (n = 661)

Characteristic	Frequency	Percentage
Gender		
Women	495	75.0
Men	166	25.0
Age ranged from 35-86 years (Mean = 50.12, SD = 10.64)		
Religion		
Buddhist	384	58.10
Muslim	277	41.90
Marital Status		
Single	70	10.6
Married and living together	449	68.0
Married but living separately	36	5.4
Divorced	24	3.6
Widowed	82	12.4
Education		
None	54	8.1
Less than primary school	98	14.9
Primary school	155	23.4
High school	165	24.9
Graduate school	189	28.7
Occupation		
Unemployed	174	26.3
Agriculturist	97	14.6
Officer	79	12.0
Employee	216	32.7
Retired	95	14.4

Table 11

Alpha Coefficients of the 83 item APB Scale Fourth Version (n = 661)

Scale	Number of items	Mean	SD	Alpha
"Commitment to active participation "	33	94.44	29.89	.97
"Persistence in practicing preventive behaviors"	26	64.96	22.85	.97
"Maintenance of desired preventive behaviors"	24	67.12	23.59	.97
Total	83			.98

Construct Validity. The 83 item APBS was conceptualized as having three attributes associated with preventive activities for prehypertension. Commitment to active participation, persistence in practicing preventive behaviors, and maintenance of desired preventive behaviors represent the three subscales. All 83 items were submitted to an item-item, item-subscale and item-total scale and exploratory factor analysis.

Item analysis. Pearson product moment correlations were used for these analyses. Among these 83 items, item to item correlations ranged from .22 - .90; although most of them were higher than .3. Moreover, the results showed that the item to subscale correlation ranged from .42-.85, and item to total correlation ranged from .42-.82 (appendix F)

A decision to retain or delete an item was mainly based on evaluating the corrected item-total correlation. An item with a high value for this correlation is more desirable than an item with a low value (DeVellis, 2012) while an item with the

lowest corrected item-total correlation is a candidate for deletion because the item measuring content differs from the other items. Among these 83 items, six items had the lowest or the third lowest corrected item-total correlation in their subscale. They were items C30, C31, C27, P59, M77, and M83. However, most of them were not eliminated due to their meaning being congruent with adherence to preventive behavior concepts.

Additionally, the decision to retain or eliminate an item was based on the contribution of the item to the subscale by using item to total correlations. An acceptable item to total correlation should range from .3 to .7 (Nunnally & Bernstein, 1994). Analyses of an item's performance revealed that all the values of the item to total correlations exceeded .3. Therefore, none of the items were eliminated due to this instruction. However, the inter-item correlations that were above .80 were considered for elimination due to the content redundancy. Forty-four items had inter-item correlations of more than .80 (between C1 and C2, C3 and C4, C13 and C14, C20 and C21, C22 and C23, C24 and C25, C30 and C31, C32 and P33, P34 and P35, P37 and P38, P39 and P40, P41 and P42, P54 and M55, M60 and M61, M62 and M63, M64 and M65, M67 and M68, M69 and M70, M71 and M72, M73 and M74, M80 and M81, M82 and M83). Therefore, after reviewing the item content, twenty items (C4, C13, C20, C23, C24, C30, C33, P35, P37, P39, P41, P55, M60, M62, M64, M67, M69, M71, M73, and M75) were eliminated. However, these some items were retained for the next step of the analysis because their meaning was congruent with the concept of adherence to preventive behaviors. Therefore, the 63 item APBS was retained and re-analyzed. The results showed that the item to item correlations

ranged from .21 - .91, the item to subscale correlation ranged from .42-.85, and item to total correlation was from .42-.87, as presented in Table 12

Table 12

Correlation Coefficients of Item Analysis (Item to Item, Item to Subscale, and Item to Entire Scale) of the Third Version 63-item APB Scale (n = 661)

Scale	Item- item	Item-subscale	Item-total
"Commitment to active participation "	.21-.91	.42-.84	.42-.84
"Persistence in practicing preventive behaviors"	.25-.86	.44-.80	.45-.80
"Maintenance of desired preventive behaviors"	.48-.91	.66-.87	.69-.87

Exploratory factor analysis. Exploratory factor analysis were performed in attempt to develop the most parsimonious solution while maintaining the psychometric properties of the scale. This consists of descriptive factor analysis, factor extraction using principal components method, and varimax rotation. The results of this step are presented as follows:

Descriptive factor analysis. The sampling adequacy and multivariate normality for conducting factor analysis was assessed by the Kaiser-Meyer Olkin (KMO) test and Bartlett Test of Sphericity. High values of KMO (between .5 and 1.0) is required to ensure adequate sampling to perform factor analysis. The KMO presented the estimated sampling adequacy at .98 which is considered the excellent indication factorability. Bartlett's test of sphericity also was significant at .000

(approximate chi-square =44728.944; df = 1,953). These findings met Tabachnick and Fidell's (2007) recommendations for good factor analysis, a significance level of $p < .05$, and indicated that the sample of 661 was appropriate for factor analysis to proceed.

The researcher performed several statistical procedures. Descriptive statistics were computed on study variables, and the variables were examined for marked outliers and the presence of systematic missing data. The APBS data consisted of 661 cases. Items were placed in a 5-point Likert scale format. The scale included the following range of responses: 5 = Repeatedly (Always), 4 = Often, 3 = Occasionally, 2 = Seldom, and 1 = Never. There is no report of missing data and outliers.

The factor extraction. The 63 items of the APBS were subjected to Principal Components Analysis (PCA) for factor extraction using an eigenvalue greater than 1. The results were demonstrated in 8 factors with communality ranging .64-.89. The total percent of variance was explained at 74.76. However, an examination of the scree plot (Figure 3) indicates that a number of 3 factors should be examined.

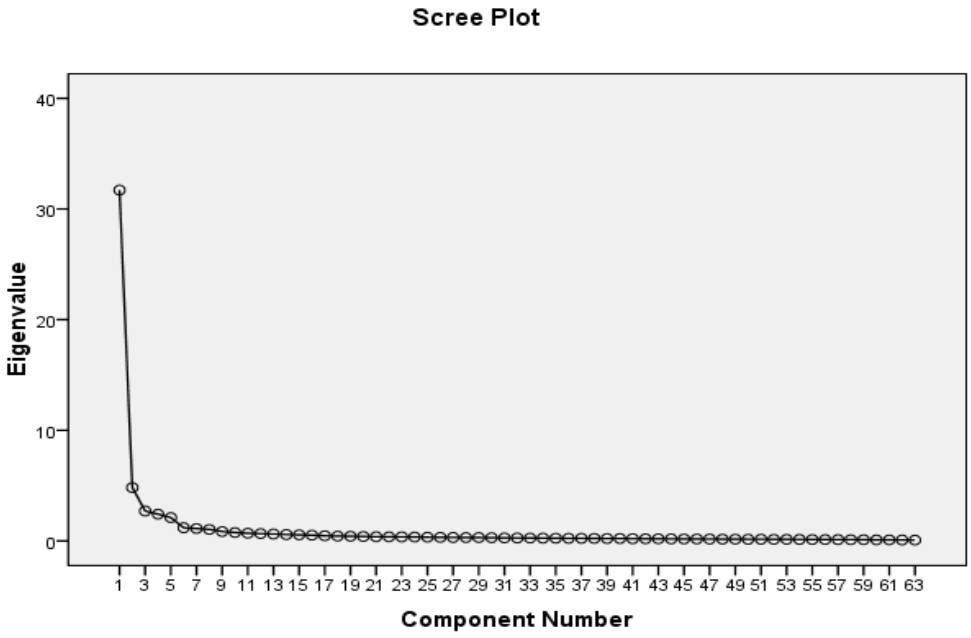

Figure 3. The Cattle's scree plot of the 63 item APBS

Note. Break in size of eigenvalues occurs between the second and the fourth factors

Verimax rotation. The extracted factor rotating method using the varimax method was applied since unrotated factor solutions rarely provide meaningful pairing of variables. Moreover, orthogonal rotation maximizes high correlations and minimizes small ones (Ferketich, 1991). Eigenvalues, variances and factor loadings were calculated. The criteria used to select the number of factors were (a) an eigen value equal to or greater than 1, (b) scree plot characteristics; and (c) interpretability (Nunnally & Bernstein, 1994). An item is retained when: 1) the item-factor loading is greater than or equal to .4; 2) communality is greater than .5; 3) in the case of large cross-loading, the factor is chosen that gives conceptually the most sensible interpretation (Nunnally & Bernstein, 1994).

The percentage of variance explained by the factors was an important criterion used in deciding a satisfactory solution. Although there is no absolute criterion for establishing significant variance for an instrument, Hair (2006) recommendations that in the social sciences, a solution that accounts for 60% of the total variance is considered very good (Hair, 2006). Therefore, the three factors were decided to be the most parsimonious and theoretically interpretable. The three factors composed of 63 items with a total variance explained of 62.27%.

Based on the decision rules described above, three factors were retained. The results of these factors included: (1) “Intention and engagement in practicing preventive behavior”, (2) “Perseverance in practicing preventive behaviors”, and (3) “Maintenance of practicing preventive behaviors” See Table 10 for the rotated factor matrix of the APBS items.

Factor 1, labeled “Intention and engagement in practicing preventive behavior” was composed of 26 items, which had an eigenvalue of 13.78 and accounted for 21.87% of the variance and had factor loadings ranging from .46-.75. An examination of the item content (Table 10) found that this factor had a clean interpretation based on the meaning of “intention and engagement in practicing preventive behavior” which comprised the aspects of: (1) intentional action 14 items, (2) expected success 8 items, and (3) self-discipline 6 items. Two items (# 58 and 59.) had primary loadings on this factor at .49, and .45. However, these were not suitable in the first factor; hence, they were excluded from the scale. Therefore, the first factor consisted of 26 items.

Factor 2, labeled “Perseverance in practicing preventive behaviors”, consisting of 19 items, had an eigenvalue of 13.16 which accounted for 20.89% of the

variance and had factor loadings ranging from .46-.77. An examination of the item content (Table 10) revealed that these items emphasized “perseverance in practicing preventive behaviors” which comprised the aspects of: (1) repeated action 9 items and (2) establishing a regular pattern 10 items. Although one item (#26) had the largest loading on the second factor at .508 and had side loading on the first factor at .46, the meaning of item 26 is conceptually close to the measure of intentional action which is an important aspect of this factor. This item was suitable for the factor “intention and engagement in practicing preventive behavior”. Therefore, the researcher matched item 26 to the first factor as it provides a more sensible interpretation.

Factor 3, labeled “Maintenance of practicing preventive behaviors”, had 16 items, and an eigenvalue of 12.29 which accounted for 19.50 % of variance and had factor loadings ranging from .68-.79. An examination of the item content (Table 13) revealed that these items focused on “maintenance of practicing preventive behaviors” which comprised the aspects of long term behavior change with 16 items. They were comparable to the hypothesized underlying subscale of the 61 item APBS.

Table 13

Items, Factor Loadings, Percent of Variance, Eigenvalue, and Communalities (h^2)

of 61 item APB scale (N = 661)

Item no	Factors and item statements	Eigen value	Variance explained (%)	Factor loading	h^2
Factor 1	"Intention and engagement in practicing preventive behavior"	13.77	21.87		
21	I will definitely cut out of my diet all of the high in fat foods.			.75	.74
14	I will only consume plain tasting food.			.74	.70
19	I intend to consume just fish and lean meat.			.72	.69
22	For every meal, I will consume both fruits and vegetables.			.70	.68
7	I will definitely avoid eating foods preserved with salt such as canned fish, salty preserved eggs and preserved vegetables.			.70	.68
18	I will avoid consuming food that is high in fat such as bacon, chicken skin or pork fat and pork skin			.68	.66
12	I will not add fish sauce or any other kind of sauces into my food before I eat it.			.68	.67
11	I will read the label on a food product to see the amount of sodium before I buy it.			.67	.57
6	I will not add Monosodium glutamate (MSG) to my food to make it taste better.			.65	.63
15	I do not intend to consume any fried foods such as fried chicken, fried banana and fried dough.			.65	.69
9	I will avoid eating foods preserved with salt such as canned fish			.64	.62

Table 13 (Continued)

Item no	Factors and item statements	Eigen value	Variance explained (%)	Factor loading	h2
32	I will definitely balance my time between work and relaxation.			.63	.64
8	I will not consume any salty sauces that are served along with a meal.			.63	.59
10	I will buy only unsalted nuts.			.60	.58
17	I do not intend to consume a main meal and dessert that is made with coconut milk. An example of this would be green curry, massaman curry and banana in coconut milk.			.60	.65
28	I intend to join an activity group			.59	.59
2	I will definitely exercise for 30 minutes each time.			.56	.58
25	I will consume only fruits that are not too sweet after meals.			.56	.61
3	I will exercise 3-5 times a week.			.56	.58
27	I will practice meditation for relaxation to calm my mind.			.55	.40
16	I intend not to eat food that contains shellfish			.54	.60
5	I will exercise because it is a very important duty.			.53	.58
1	I intend to exercise through fast walking, aerobic, cycling, tai chi and yoga which all use a lot of energy.			.53	.53
29	I intend to relax by doing some exercise with my friends as a group.			.51	.56
31	I intend to do chanting before I go to bed every night to calm my mind.			.50	.33

Table 13 (Continued)

Item no	Factors and item statements	Eigen value	Variance explained (%)	Factor loading	h2
26	I intend to consume one pound of both fruits and vegetables each day.			.46	.53
Factor 2	Perseverance in practicing preventive behaviors"	13.16	20.89		
38	I will never stop exercising, even during the rainy season.			.77	.68
40	I have never stop exercising, even during the rainy season			.77	.68
42	I never stop exercising even though I am in pain from working out or feeling exhausted during exercise.			.74	.67
36	I keep trying to exercise even during special days such as weddings and funerals.			.74	.64
49	I never eat greasy or fried food at any special events such as a funeral or a monk ordination.			.73	.64
34	I never miss exercise no matter how busy I get.			.71	.65
50	I never buy seafood that is high in cholesterol such as shellfish despite the fact I like it tremendously.			.70	.59
48	I never buy prepackaged noodles or canned food even they are on sale.			.68	.58
56	I keep trying to eat a pound of fruits and vegetables each day even though it is not easy to go get them.			.68	.60

Table 13 (Continued)

Item no	Factors and item statements	Eigen value	Variance explained (%)	Factor loading	h2
47	I have never eaten nuts with added salt even though I was asked to try some			.66	.55
43	I never add any flavoring to my meal even though it tastes so plain.			.65	.60
45	I keep trying not to consume salty food such as preserved fish and preserved eggs or even canned sardines.			.63	.66
54	I never buy very sweet fruits even though they are on sale.			.62	.59
51	I keep trying to avoid greasy or fatty food such as bacon, pork leg, or chicken skin that is served at parties and by friends and family.			.59	.59
44	If I have to eat out I make sure that there is no MSG in my food.			.58	.57
53	When dinning out I try to order food that includes a side dish of vegetables.			.55	.65
46	I keep trying not to eat really salty food at any special events such as a funeral or monk ordination.			.54	.59
52	I keep trying to prepare my meals by steaming, broiling and oven baking only even though it may not taste good.			.52	.59
57	I keep trying to join a relaxing activity even though I do not have a lot of time.			.47	.58

Table 13 (Continued)

Item no	Factors and item statements	Eigen value	Variance explained (%)	Factor loading	h2
Factor 3	"Maintenance of practicing preventive behaviors"	12.29	19.50		
81	My friend and I found an activity we enjoy and still keep doing it incessantly which makes me feel so relaxed.			.79	.77
76	I am continuing to exercise to keep myself relaxed.			.79	.75
78	I have learned how to manage my time between work and relaxation to be effectively equivalent which is why I continue to do this.			.78	.69
63	Regular exercise can keep high blood pressure under control and that is why I love to continue to exercise.			.78	.74
65	As I have continued to exercise I have become healthier.			.77	.74
79	To be able to relax each day by taking a nap, watching TV or taking a walk has helped me stay fresh which is why I continue to do it now			.76	.71
61	I have continued to exercise and it gives me a chance to meet people.			.76	.68
82	I have continued to practice meditation and it keeps my mind at ease.			.75	.64
83	I like to go to the temple to make merit and that makes me feel so relaxed.			.74	.62
77	I continue to do chanting every night which helps my mind stay calm.			.74	.62

Table 13 (Continued)

Item no	Factors and item statements	Eigen value	Variance explained (%)	Factor loading	h2
74	I eat fruits and vegetable as a main meal and that makes me have regular bowl movements.			.72	.69
66	My friends notices that I look younger than my age and that is why I love to continue to exercise.				.69
80	I sometime share my problems with close friends when I feel down which makes me feel so much better and that is why I continue to do it.			.72	.64
72	I have continued to eat vegetables and lightly sweet fruits for years and that helps me maintain a healthy weight.			.71	.68
68	I have continued to eat plain tasting food and that helps reduce my high blood pressure.			.68	.69
70	I have continued to control my fatty food intake and it helps me to stay in good shape.			.68	.65
Total variance explained (%)		62.27			

Table 14

Differences between the initial attributes and final factors of the APBS

Initial attributes	Final factors
1. “Commitment to active participation” (33 items)	1. “Intention and engagement in practicing preventive behaviors” (26 items)
2. “Persistence in practicing preventive behaviors”(26 items)	2. “Perseverance in practicing preventive behaviors” (19 items)
3. “Maintenance of desired preventive behaviors”(24 items)	3. “Maintenance of practicing preventive behaviors” (16 items)
Total 83 items	Total 61 items

Step 8: Final testing

The final version of the APBS, 61 items, was performed to examine both validities and reliabilities for ensuring the psychometric properties. This psychometric approach included 4 approaches: known group technique, hypothesis testing, stability, and internal consistency.

Known group technique. This involved the comparison of the mean difference between adherence to preventive behaviors scores of the two groups of prehypertensive persons who participated in group exercise and those who did not participate in exercise activities. The findings indicated that the first group showed a high score of adherence to preventive behaviors than the latter. The t-test analysis showed that the mean scores of the APBS of both groups had statistically significant differences at the .005 level. These results indicated that the newly developed ABPS could differentiate between the adherence to preventive behaviors of prehypertensive

persons with success in preventive behavior participation and those who never participated in preventive activities.

Hypothesis testing. The relationship between blood pressure control and adherence to preventive behaviors was hypothesized to be in a negative direction. As shown in Table 16, there is a negative correlation between the total scores of the APBS and the systolic blood pressure level of prehypertensive persons ($r = -.64$, $p < .000$). Additionally, there is also a negative correlation between the total scores of the APBS and diastolic blood pressure level of prehypertensive persons ($r = -.42$, $p < .02$). The results therefore supported the construct validity of the newly developed APBS.

Table 15

Mean, SD, and t-value of the APBS Total Score of Prehypertensive Persons Who Participated in Exercise Groups and Prehypertensive Persons Who Did Not Participant in Other Active Groups (n= 60)

Group of prehypertensive persons	n	Mean	SD	t
Prehypertensive persons who participated in exercise groups.	30	190.73	43.79	3.0*
Prehypertensive persons who did not participant in preventive activities.	30	155.76	45.86	

∗ P< .005

Table 16

Correlation Coefficient of the APBS (Version 5) Score and Blood Pressure Score (n = 30)

Total score	r	p-value
APBS - Systolic blood pressure	-0.64	.000
APBS - Diastolic blood pressure	-0.42	.02

Stability evaluation. Test-retest reliability, using a 2 week interval, was performed in order to assess the stability of the scale. The 61 item APBS was assessed by randomly selecting and asking 30 prehypertensive persons from one district to complete the APBS twice. The total scores of the three factors and the total scores of the APBS of the two-time testing were evaluated for correlation by using the Pearson product-moment correlation coefficient. As shown in Table 17, the result yielded significant correlations at the level of .00 ($p<.00$). The result of the test-retest reliability reflected the stability of this newly developed tool.

Internal consistency assessment. The internal consistency reliability was evaluated by using Cronbach's alpha formula and item analysis. The final 61 item APBS was retested using 661 prehypertensive subjects. As shown in Table 18, the overall internal reliability was still good ($\alpha = .98$) and alpha of each factor and the factors ranged from .96-.97. Thus, the APBS was judged to be reliable for the total scale.

Table 17

Stability Evaluation of the First and Second ABPS Test (n = 30)

	Factor	First test		Second test		r
		M	SD	M	SD	
I	Intention and engagement in practicing preventive behaviors	78.70	18.33	78.06	18.14	.95*
II	Perseverance in practicing preventive behaviors	47.37	15.50	41.23	12.71	.92*
III	Maintenance of practicing preventive behaviors	43.23	14.69	32.77	12.53	.93*
The APBS total score		169.30	46.13	152.07	40.52	.96*

* p<.00

Table 18

Alpha Coefficients of the Entire Scale and Each Factor in 61 item APBS fourth Version (n = 661)

	APBS (version 4)	Items	Inter-item correlation	Corrected Item-total correlation	Alpha
I	Intention and engagement in practicing preventive behaviors	26	.22-.90	.42-.83	.97
II	Perseverance in practicing preventive behaviors	19	.45-.83	.69-.80	.96
III	Maintenance of practicing preventive behaviors	16	.48-.87	.69-.85	.97
	Total	63	.16-.90	.40-.78	.98

Summary of the results

The development and evaluation of an instrument to measure adherence to preventive behaviors for Thai persons with prehypertension was accomplished in this study. The APBS presented acceptable reliabilities of the total scale and most subscales. The principal components analysis supported the construct validity of the APBS total scale and three subscales, which supported the theoretical understanding of adherence to preventive behaviors as a multidimensional concept. In general, the APBS demonstrated satisfactory reliability and validity for a new developed scale.

Discussion

The purpose of this study was to develop and test the psychometric properties of an adherence to preventive behaviors (APB) scale. The subjects were 661 Thai persons with prehypertension aged 35 and older. The sample of nine prehypetensive persons undergoing preventive behaviors treatment from three provinces in southern Thailand were interviewed to specify the APB attributes. The sample of thirty individuals with a diagnosis of prehypertension recruited for pre-testing for the study was adequate in size to evaluate the item statistics and internal consistency. The sample size of 661 individuals with a diagnosis of prehypertension recruited for phase II of the study was adequate in size to evaluate the validity and reliability of the APBS in the field and final testing procedure. The subjects were purposely selected from primary health care units located in six provinces in southern Thailand. The findings of the study are discussed in three sections: 1) what are the attributes of an adherence to preventive behavior scale for persons with

prehypertension in Thailand?, 2) how valid and reliable is this newly developed adherence to preventive behaviors scale for persons with prehypertension in Thailand?, and 3) strength of this study.

Research question 1: what are the attributes of the APBS ?

The phases of the scale's development included domain specifications, generating an item pool of the instrument, and determining the format of the instrument. In domain specifications, the existing studies of adherence to preventive behaviors and related concepts (i.e., compliance and concordance) were extensively reviewed and a concept analysis was performed to determine the pre-specified attributes of adherence to preventive behaviors. The three attributes of adherence to preventive behaviors were identified as: commitment, persistence, and maintenance. These attributes were used to develop the semi-structure interview guidelines for conducting in-depth interviews to clarify the attributes of adherence to preventive behaviors grounded in the Thai cultural context. There were three attributes of the adherence to preventive behaviors which emerged from the in-depth interviews: "Commitment to active participation", "Persistence in practicing preventive behaviors", and "Maintenance of desired preventive behaviors". These three attributes of the 83 item APBS (version 4) were designed for Exploratory Factor Analysis (EFA) using principal component analysis. The principle component analysis using orthogonal rotation with specific varimax rotation and a loading cutoff point of .40, demonstrated the hypothesized 3 factors and 61 items of the APBS for Thai persons with prehypertension with acceptable psychometric evaluation. The resulting three factors were labeled as attributes of adherence to preventive behaviors: 1) "Intention

and engagement in practicing preventive behaviors", 2) "Perseverance in practicing preventive behaviors", and 3) "Maintenance of practicing preventive behaviors. Discussion of the findings was based on logical, conceptual and evidential supports.

The attributes of the APBS

1. "Intention and engagement in practicing preventive behaviors"

The first important factor of adherence to preventive behaviors for Thais with prehypertension is "Intention and engagement in practicing preventive behaviors", the strongest factor that explains the greatest percentage of variance of the APBS. This factor includes 26 items derived from the qualitative study Theme 1, "Commitment to active participation". Fourteen of these were displayed in the category of "intentional action"; eight items were represented in the category of "expected success"; and the other (6 items) were in the category of self-discipline. Item 26 had a cross loading on factor 2 (.50) and factor 1 (.46). The item statement "I intend to consume one pound of both fruit and vegetables each day" could reflect the intention of persons to plan and support dietary modifications. Therefore, item 26 was suitable in factor 1.

All of these items were congruent and supported the qualitative study in phase one and research revealed "an active role" characteristic of adherence to preventive behaviors. Adherence to preventive behaviors including exercise, healthy eating, and stress management need cognitional and emotional adjustments of individuals to be made to not only integrate preventive behaviors into their daily lives but also balance the preventive regimen with social functionality. Adherence to preventive behaviors focuses on people's decisions and/or agreements about their

treatment (Bissonnette, 2008; Cohen, 2009; Horne, 2006; WHO, 2003). For this reason, factor 1 could be labeled as "Intention and engagement in practicing preventive behaviors". Moreover, this factor could be defined as a persons' willingness to change their behavior and effort to incorporate preventive activities into their daily life.

All of the fourteen items which represented intentional action are supported by much research relating to individuals' intention as used in Theory of Planned Behavior and other social-cognitive models of behavior (Ajzen & Fishbein, 1980; Ajzen, 2002; Fishbein, 2000) and the health action process approach (Schwarzer, 2008). These models emphasize that the behavior depends on the intention of the individuals to perform it. Therefore, intention is reflected as the strength of the individuals' desire or willingness to perform the preventive behaviors and the efforts that they plans to invest in order to reach their goal. Examples are APBS 1 "I intend to exercise through fast walking, aerobic, cycling, tai chi and yoga which all use a lot of energy"; APBS 16 "I intend not to eat food that contains shellfish"; APBS 32 "I intend to balance my time between work and relaxation." These three example items assessed intentional action aspects which were similar to the other adherence to preventive behavior tools (Bentley et al., 2009; Ma et al., 2012) where intention and willingness to follow the clinical prescription are identified as important attributes of adherence. Additionally, intentional action seems to correspond with the attributes related to adherence in previous studies, i,e., agreement (Bissonnette, 2008), and willingness (Landier, 2011).

Some items of this factor demonstrated the expected success or goal commitment, as demonstrated in the statement in item APBS 2 "I will definitely

exercise for 30 minutes each time", APBS 21 "I will definitely cut out of my diet all of the high in fat foods.", and APBS 32 "I will definitely balance my time between work and relaxation". These example items supported the results from other studies revealing that the feeling of mastery, confidence, and courage to organize or adjust the preventive treatment to various situations can represent the person's readiness to participate in preventive activities or that they already have acted towards goal attainment, and willingness to carry out the intentional behaviors (McArthur, Dumas, Woodend, Beach, & Stacey, 2014). Additionally, six items of this factor demonstrated self-discipline as an important aspect of adherence to preventive behaviors. Examples are, APBS 3 "I will exercise 3-5 times a week", APBS 8 "I will not consume any salty sauces that are served along with the meal", and APBS 22 "For every meal, I'll consume both fruits and vegetables". These findings supported the concept that individuals with prehypertension must continually follow a prescribed preventive treatment, requiring self-discipline. As a result, adherence to preventive behaviors is difficult, and lapses are common. A lot of literature indicates that adherence to treatment especially preventive behaviors constitutes a prime example of a behavior that requires people to exert self-discipline (Hagger, Wood, Stiff, & Chatzisarantis, 2010). This result was also supported by adults' perspectives that predominantly identified adherence in terms of self-discipline (Ingadottir & Halldorsdottir, 2008) and self-control (Naemiratch & Manderson, 2006).

The merging of intention and engagement in practicing preventive behaviors could be explained by using the Thai cultural context of task achievement. Much previous literature supports the concept that adherence to treatment for Thais is based on the understanding of what treatment makes them live more comfortably with

their disease (Kirdphon, 2003; Panpakdee et al., 2003; Samranbua, 2011). Although they should follow their doctors' recommendations, most of them perceived the difficulty and inconvenience of making lifestyle changes (Kirdphon, 2003; Panpakdee et al., 2003; Samranbua, 2011). Additionally, a study of Thai culture found that Thais have low motivation to achieve their goals through hard work (Komin, 1991) and do not like risking anything that does not give immediate results and/or pleasure (Apapirom, 1976). Thais will follow the prescribed treatment strictly when they believed that disease impacted on their lives or had power over them (Naemiratch & Manderson, 2006). These previous studies supported the idea that "intention and engagement in practicing preventive behaviors" was a very important characteristic of Thais who adhere to preventive behaviors.

2. "Perseverance in practicing preventive behaviors"

"Perseverance in practicing preventive behaviors" was the second strongest contributing attribute explaining the percentage of variance in adherence to preventive behaviors for Thai persons with prehypertension. It incorporated 19 items from the "persistence in practicing preventive behaviors" subscale including repeated action and establishing a regular pattern. A half of this factor (10 items) were drawn from "repeated action" which reflects the ability to overcome barriers. Nearly half (9 items) were drawn from "establishing a regular pattern" which displays the ability of individuals to develop an automatic or regular behavior of preventive activities. These findings support the notion that of the attributes of adherence to preventive behaviors of Thais with prehypertension are not only characterized by "intention and engagement in practicing preventive behaviors" but also perseverance in practicing preventive behaviors. This is in contrast to "intention and engagement in practicing

preventive behaviors". Perseverance in practicing preventive behaviors means the ability to translate their intentions into actions. These results are consistent with previous research that mostly views adherence to preventive behaviors in terms of "implementation" (Ahmed & Aslani, 2014; Vrijens et al., 2012), self-management (Ingadóttir, 2006), and ability to escape from daily pressures and roles through physical activity (Springer, 2004).

A half of this factor revealed the repeated action representing the individuals' ability to overcome barriers as the statement in item APBS 36 demonstrates "I keep trying to exercise even during special days such as weddings and funerals"; APBS46 "I keep trying not to eat really salty food at any special events such as a funeral or a monk ordination"; APBS 52 "I keep trying to prepare my meals by steaming, broiling and oven baking only even though it may not taste good"; and APBS 57 "I keep trying to join a relaxing activity even though I do not have a lot of time". These items highlighted the numerous ways that an individuals' resources and environment may be inadequate for carrying out the preventive activities. Repeated action provides a test of whether an individuals' resources and environment are adequate for carrying out the preventive activities (McArthur, Dumas, Woodend, Beach, & Stacey, 2014). There is much literature which supports the notion that social support, economics and cultural values were important barriers for Thais continuing preventive behaviors (Panpakdee, et al, 2003; Pinprapapan et al., 2013 Samranbua, 2001).

Not only repeated action but establishing a regular pattern has also been considered an important aspect of adherence to preventive behaviors. Examples were APBS item 38 "I will never stop exercising, even during the rainy season"; APBS 43

"I never add any flavoring to my meal even though it tastes so plain"; and APBS 47 "I have never eaten nuts with added salt even though I was asked to try some". These items were supported by studies that stated consistently performed behavior strengthens the establishment of an automatic or regular behavior by increasing the level of skill and mental capacity as well as reducing the discomfort (Brooks, 1986; Johnson, 2002; Sarradon-Eck, 2007; Springer, 2004).

3. "Maintenance of practicing preventive behaviors"

"Maintenance of practicing preventive behaviors" is also identified as an important attribute of adherence to preventive behaviors for Thais with prehypertension. When examining the item content, it was found that most of them (16 items) derived from theme 3 "Maintenance of desired preventive behaviors". Fifteen items represented the aspect of "continued regular practice of desired preventive behaviors". Item 63 is displayed in the aspect of "long-term behavior change". All of the items in this factor confirmed that the intensity and duration of the preventive behavior experience needs to be long enough to meet a threshold believed to be necessary to prevent an illness and improve personal health. Additionally, these items also show that persons choose to maintain a pattern of preventive behavior based on a repeated evaluation of the behavior's value. As most items stated were about continued regular practice of desired preventive behaviors and long-term behavior change, factor 3 was suitable to name as "Maintenance of practicing preventive behaviors".

All of the sixteen items supported the results from in-depth interviews in phase one with the main idea falling in the continuation and duration of practicing preventive behaviors. These loading items were also supported by many researchers

where adopting regular preventive behavior patterns does not automatically lead to sustained preventive behavioral change (Cohen, 2009; Lox, Martin Ginis, & Petruzzello, 2006; Prochaska et al., 2005; Rothman, 2000; Shay, 2008; Vrijens et al., 2012). Adherence regarding preventive behaviors requires continuation and long-term participation before these preventive behaviors are successfully integrated into the routine of everyday life and personal health. However, previous instruments did not included this attribute in their adherence measures (Bentley et al., 2009; Kim et al., 2000; Ma et al., 2011; Pinprapapan et al., 2013).

This factor is similar to one stage of the behavior change process, namely the maintenance stage in the Transtheoretical Model of Change. This model supports the notion that both the cognitive and behavioral processes are used while changing health behaviors (Prochaska et al., 2005). Examples are APBS 63 “Regular exercise can keep high blood pressure under control and that is why I love to continue exercising; APBS 72 “I have continued to eat vegetables and lightly sweet fruits for years and that helps me maintain a healthy weight”; and APBS 78 “I have learned how to manage my time between work and relaxation to be effectively equivalent which is why I continue to do this”.

Moreover, items in this factor also demonstrated that maintenance of practicing preventive behaviors does much more than improve personal health. Examples are APBS 61 “I continued to exercise and it gives me a chance to meet people”, and APBS 81 “My friend and I found an activity we enjoy and still keep doing it incessantly which makes me feel so relaxed”. These items supported the notion that Thais with prehypertension evaluate the behavior’s value not only their personal health but also social and work relationships (Rattanakun, 1999).

Research question 2: How valid and reliable is this newly developed adherence to preventive behaviors scale for persons with prehypertension in Thailand?

The discussion in this section is comprised of three aspects: (1) evidence supporting the content validity of the APBS, (2) evidence supporting the construct validity of this tool, and (3) evidence supporting the reliability of this measure.

Evidence supporting the content validity of the APBS

The APBS has been tested for its content validity by a panel of three experts specialized in the area of tool development, and health promotion studies. Soeken (2005) stated that at least two experts in the area of content are required to investigate the measure. Therefore, three experts for this tool was adequate. A panel of experts was invited to evaluate the relevancy of all generated items based on a provided conceptual definition. All items were rated 3 or 4 by most or all experts and the S-CVI/Ave score was .93, considered an acceptable level of validity which demonstrated that the content validity was well representative of adherence to preventive behaviors for Thai persons with prehypertension. Thus, this evidence supported the content validity of the APBS.

Evidence supporting the construct validity of this tool

Factor analysis, known group technique, and hypothesis testing were used in this study to evidence the construct validity of the APBS. From the exploratory factor analysis, the result indicated a well-constructed instrument to measure

adherence to preventive behaviors of Thais with prehypertension. Each factor was correlated with each item producing moderate to high factor loadings which was acceptable (Waltz et al., 2005). Moreover, each factor had an eigenvalue greater than 1 and most of them had more than 5% of variance which is adequate (Munro, 2005). Furthermore, the APBS accounted for 62.27% of total variance of the variance in adherence to preventive behaviors, which was greater than the 50% of the expected value (Streiner & Norman, 2003). This result indicates that the APBS is adequate for capturing the main attributes of adherence to preventive behaviors for Thai persons with prehypertension.

In addition, known group technique was used to test the construct validity of the scale. The results presented a significant difference between the mean scores of the two groups, Thai prehypertensive participants who participated in group exercise and those who did not participate in exercise activities. This provides support for the construct validity of the APBS. Prehypertensive persons who are successful in preventive behavior participation were expected to demonstrate a higher APBS score than those perhypertensive persons who have never been involved in preventive activities.

Furthermore, this study also used hypothesis testing to support the construct validity of the scale. The relationship between blood pressure control and adherence to preventive behaviors of Thais with prehypertension was hypothesized to be in a negative direction. The results show that there was a moderate negative correlation between the total scores of the APBS and systolic and diastolic blood pressure control, respectively ($r = -.64$, $p<.000$ and $-.42$, $p < .02$). Certainly, the significant difference in the total score supports the validity of the APBS to predict

blood pressure control status. The result was considered supportive of both the hypothesis and the construct validity of the APBS.

Evidence supporting the reliability

The internal consistency and stability of the APBS was used to exam the reliability of the instrument. The internal consistency reliability of the APBS is considered high when the Cronbach's alpha for the overall APBS received from three occasions: pre-test, field test, and post-test showed the alpha of .98. (DeVellis, 2012; Polit & Hungler, 1999). Furthermore, the correlations among items to total scale were moderate to high at .42-.85 and suggested that the items were all measuring the same phenomenon which was Thai prehypertensives' adherence to preventive behavior (Burns & Grove, 2009; Polit & Beck, 2006). As a result, the APBS demonstrated strong evidence supporting the scale's reliability in an internal consistency aspect.

Similarly, understanding the temporal stability of an instrument is important when measuring a phenomenon over time (Nunnally & Bernstein, 1994). The results of the total scores from administering the APBS in two separate occasions of two weeks interval were correlated ($r = .96$, $p < .00$), suggesting the instrument may be highly stable and the cognitive perceptions associated with adherence to preventive behaviors may be a trait attribute. This measure may not be the ideal choice to detect short-term change in an interventional study.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

This chapter presents a summary and conclusions of this study, which entailed the development and psychometric evaluation of a structured instrument to assess the adherence to preventive behaviors of Thai persons with prehypertension. Limitations of the study are also identified. The chapter concludes with recommendations for future research and implications for nursing practice, administration, and research.

Summary

The purpose of this study was to develop a reliable and valid measure of adherence to preventive behaviors for Thai persons with prehypertension. The conceptual framework that guided this study was a blend of concepts derived from a literature review, concept analysis and the results of a qualitative descriptive study of prehypertensive persons regarding their experiences of adherence to preventive behaviors in a Thai cultural context, and a norm-referenced framework.

The researcher conducted this study in two phases. Phase one, development of an adherence to preventive behavior scale, involved domain specification, generating an item pool, and determining the format for measurement. Phase two, evaluation of the psychometric properties of the APBS, involved establishing the content validity of the instrument, establishing the face validity of the instrument, pre-testing, field testing, and final testing.

During phase one, three attributes of adherence to preventive behaviors from extant literatures; commitment, persistence, and maintenance, were used as a guide to conduct the interviews and to explore the initial conceptual structure of adherence to preventive behaviors of Thais with prehypertension. After in-depth interviews with nine prehypertensive participants who represented successful adherence to preventive behaviors were conducted, three pre-specified attributes were revealed: (1) commitment to active participation; (2) persistence in practicing preventive behaviors; and (3) maintenance of desired preventive behaviors. The development and psychometric testing of the APBS was guided by the three attributes and three components that emerged from the qualitative study. The APBS first version is a result of generating the 93 items.

During phase two, the APBS was reviewed by three experts for content validity. After revision, the 88 item APBS version 2 was developed with the item-level content validity index (I-CVI) at 1.0 and the content validity of the overall scale (S-CVI) at .93. The revised scale was also reviewed by twelve prehypertensive participants who were different in gender, age, educational level, and marital status for face validity, item readability and understandability. An 88 item APBS version 3 was derived from face validation and administered to thirty prehypertensive participants for pre-testing. The results revealed Cronbach's alpha coefficient at .98 and acceptable item to item correlation ranged from .30-.97. Therefore, the 83 item APBS version 4 was developed with a satisfactory internal consistency including acceptable item to item correlation.

A cross-sectional study was conducted with prehypertensive participants to test the validity and the reliability of the APBS. The characteristics of the 661

prehypertensive persons from six provinces representing southern Thailand were: female (75.0 %), married and living together (68.0%), university/college education (28.7%), and unemployed (26.3%). The results yielded 661 completed surveys without missing item data for item analysis, internal consistency, and factor analysis.

The APBS for Thai persons with prehypertension is composed of three factors and a total variance explained at 62.27%. Utilizing a component loading cut-off of 0.4, the scale was reduced to 61 items. Each of the three subscales retained from 16-26 items with a range of Cronbach's alpha coefficient from .96 to .97. The total scale Cronbach's alpha coefficient was .98. The results of the three factors included:

1. Factor I: intention and engagement in practicing preventive behaviors (26 items) with factor loadings which ranged from .46-.75 and accounted for 21.87% of variance with an eigenvalue of 13.78.

2. Factor II: perseverance in practicing preventive behaviors (19 items) with factor loadings which ranged from .46-.77 and accounted for 20.89% of variance with an eigenvalue of 13.16

3. Factor III: maintenance of practicing preventive behaviors (16 items) with factor loadings which ranged from .68-.79 and accounted for 19.50% of variance with an eigenvalue of 12.29.

Final testing of known group approach, hypothesis testing, stability, and internal consistency was conducted in this phase. The findings of the known group approach using t-test statistics showed that the mean APBS score of two groups of prehypertensive persons, one participating in group exercise and the other not participating in a healthy activity, was significantly different ($p<.00$), indicating that

the APBS can differentiate between members of one group and the other. Moreover, the results of hypothesis testing indicated that Thais with prehypertension who had higher scores of adherence to preventive behaviors had lower levels of systolic and diastolic blood pressure. A moderate negative correlation between the total scores of the APBS and the systolic and diastolic blood pressure levels, respectively ($r = -.64$, $p<.00$ and $-.42$, $p < .02$), supported the hypothesis that blood pressure level has a negative correlation with adherence to preventive behaviors. Furthermore, the stability examination using test-retest approach indicated a high level correlation between time 1 & time 2 at .96. Additionally, the findings of internal consistency reflected good reliability with a Cronbach's alpha of .98.

Limitations of the Study

As in many studies, there were limitations. The generalizability of the research findings may be limited as the majority of participants were adult females and all were from southern Thailand which may affect the representativeness of the population. Therefore, further research is needed to determine if similar psychometrics emerge with other more diverse participant samples. Similarly, the APBS was somewhat long (61 items) and required approximately 20-30 minutes to complete. Further studies should be conducted to reduce the number of scale items.

Implications and Recommendations

The findings of this study show that the APBS is a valid and reliable measure for evaluating adherence to preventive behaviors of Thai persons with prehypertension. The APBS can identify the factual situations that occur in the lives

of Thai persons with prehypetension as this tool assesses adherence to preventive behaviors of prehypertensive persons through three attributes: (1) intention and engagement in practicing preventive behaviors, (2) perseverance in practicing preventive behaviors, and (3) maintenance of practicing preventive behaviors. Moreover, the findings of this study will certainly benefit the nursing discipline in the areas of theory development, nursing practice and research as discussed in the following.

Implications and recommendations for theory development

The characteristics and components of the adherence to preventive behaviors concept of this study were clarified by using literature reviews and concept analysis using Walker and Avant guidelines (Walker & Avant, 2005). The attributes from the concept were integrated with in-depth interviews of Thais with prehypertension, they became subscales of the APBS. After the EFA, the hypothesized 3 factors were comparable to the hypothesized underlying subscale of the 83 item APBS. Study results support the idea that adherence to preventive behaviors of Thais with prehypertension is a multidimensional concept associated with an active role, behavior pattern, and sustained practice. The attribute of "intention and engagement in practicing preventive behaviors" appears to be related to the cognition and emotional adjustments individuals made to integrate preventive behaviors into their daily lives as well as balance the preventive regimen with social functionality. The "perseverance in practicing preventive behaviors" appears to be related to abilities of individuals to overcome barriers for establishing a regular pattern. Moreover, the "maintenance of practicing preventive behaviors" appears to

reflect the sustained practice which needs intensity and time to train an individual to develop the automatic daily decision making that underlies personal health or well-being. Therefore, it is recommended for researchers to confirm the findings of this study by using another methodology for further investigation such as Confirmatory Factor Analysis (CFA). Subsequent to this, the adherence to preventive behavior theory can be developed.

Implications and recommendations for nursing practice

Accurate and reliable measures of adherence to preventive behaviors are needed because they can help healthcare providers to identify prehypertensive individuals who need assistance with their lifestyle modifications and reduction of risk factors. Since the APBS was developed in a Thai cultural context, the questionnaire can be used to assist healthcare providers in Thailand to better understand the level of adherence to preventive behaviors. Then, an effective intervention can be performed for non-adherents.

Study results support the idea that the domain of “intention and engagement in practicing preventive behaviors” is an active role. Healthcare providers who focus on cognitive and emotional adjustment may affect the active role of individuals to integrate preventive behaviors into their daily lives as well as balance the preventive regimen with social functionality. Compliance to the preventive regimen may threaten the person’s need for autonomy. Respecting the high risk condition without letting it dominate one’s life is a key for successful adherence regarding preventive behaviors. Discussions with prehypertensive persons about regularity and repeated action of preventive behaviors may help in determining how

to counsel prehypertensive persons about behaviors that might promote consistent preventive behavior patterns. Additionally, having the prehypertensive person report the sustained motivations that underlie health and well-being may help in determining how an individual creates automatic daily decision making as well as how an individual prevents relapse of preventive behavior participation.

Implications and recommendations for further research

The development of the APBS may provide measures to begin testing adherence to preventive behaviors. Information is available for this present instrument in terms of the ability of items to discriminate between high and low adherence to preventive behaviors, internal consistency, temporal stability, and construct validity. A researcher can choose this instrument based on its particular strengths and weaknesses in relation to the purpose of the proposed study.

The APBS may be particularly successful in detecting effective interventions as it demonstrated a significant difference between Thai prehypertensive participants of one group from another and the negative correlation between blood pressure level and the total score of adherence to preventive behaviors. The adherence to preventive behaviors questionnaire has higher inter-item correlations and internal consistency estimates, indicating they may be effective in predicting “intention and engagement in practicing preventive behaviors, “perseverance in practicing preventive behaviors”, and “maintenance of practicing preventive behaviors”.

The results of this study support ongoing evaluation of the APBS. Before this instrument can be considered as a standard instrument for measuring adherence to preventive behaviors for Thais with prehypertension, further research is needed to

determine if similar psychometrics emerge from other more diverse participant samples. As The APBS was first tested on Thai persons with prehypertension who live in southern Thailand, the research testing psychometric properties of the four dimensions of the APBS in adults should be conducted on participants recruited from other regions of Thailand so as to provide further consideration of the issues of culture and context.

Another approach is needed in order to accumulate evidence for the validity and reliability of the APBS. The use of confirmatory factor analysis research of the four dimensions of the APBS and item response theory analysis with Thai perhypertensive person is suggested for testing the validity of the APBS.

In addition, while the current study has provided valuable information related to adherence to preventive behaviors of Thai persons with prehypertension, it has highlighted the fact that a further study exploring prehypertensive persons actual adherence to preventive behaviors is necessary. Then, these findings can be compared against the findings of the current study to confirm whether the improvement in all factors will increase adherence to preventive behaviors of Thais.

Summary

The APBS is a new instrument whose purpose is to measure adherence to preventive behaviors for Thai persons with prehypertension. It can be concluded that the APBS has demonstrated satisfactory reliability and validity for a new scale. Therefore, this reliable and valid APBS may be used for further inquiry into assessing adherence to preventive behaviors in various settings and for other studies related to health promotion and prevention. Further studies are recommended using quantitative

programs of research. Recommendations for nursing clinical practice administration, and research have also been addressed in this study.

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APPENDICES

APPENDIX A

Existing Instruments

Existing Instruments

Instrument name	**Adherence to Therapeutic Regimen Scale (HATRS)**	**Treatment Adherence Questionnaire for Patients with Hypertension (TAQPH)**	**Compliance of hypertensive patient scale (CHPS)**	**Dietary Sodium Restriction Questionnaire (DSRQ)**	**Hill-bone Compliance to High Blood Pressure Therapy Scale (HBP)**
Author, year/ Country	Pinprapapan and colleagues (2013) /Thailand	Ma and colleagues (2011) / China	Lahdenperä, Wright & Kyngäs (2003)/ Finland	Brooke B. Bentley (2006)/ USA	Kim, Hill, Bone, & Levine (2000)/USA
Focus	Adherence to Therapeutic Regimen Scale for patients with hypertension	Adherence to medication and lifestyle modification for patients with hypertension	Compliance to healthy behavior for patients with hypertension	Adherence to dietary sodium restriction for patients with heart failure	Compliance to high blood pressure therapy
Adherence definition	The extent of agreement and performance of persons with hypertension about the recommended behaviors provided by health care providers.	Not mention	An active, intentional and responsible process whereby patients work to maintain their health in collaboration with the health care professionals	Not mention	Not mention
Domain/ Construct	Measure the extent of 1. Agreement which consisted of alignment of patients' behaviors and health	Measure the willingness and ability of the individual to follow the clinical prescription (pharmacological or	-Multidimensional aspects of compliance to healthy behavior, including lifestyle, follow-up visits, intention, responsibility,	-Multidimensional aspects of dietary sodium restriction questionnaire based on a mid-range theory of	- Develop a valid, reliable measure of the frequency in the multidimensional aspects of

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	recommendations 2. Mastery of new behaviors and health knowledge 3. Ongoing collaboration with health care providers on treatment plan and 4. Patients' perceived ability to meet optimal blood pressure.	non-pharmacological),	collaboration, attitude towards hypertension, and medication	planned behavior proposed by Ajenz (1991), including attitude, subjective norm, and perceived behavioral control	compliance to high blood pressure therapy, including reducing sodium intake, appointment keeping, and medication taking.
Sample and setting	-20 persons with hypertension	-278 hypertensive patients from December 2009 to May 2010 in Guangdong Province of China.	- 103 patients, in five health care centers in Finland.	174 patients with heart failure from 4 academic medical centers and community hospitals in an urban Midwestern city and 2 rural Southern cities	-480 hypertensive urban African American adults.
Dimensional	The HATRS has four	Factor analysis (PCA)	-From the 21 original items,	-From 16 original items,	- It consists of 14

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ity	attributes : 1) Alignment of patients' behaviors and recommendations , 2) mastery of new behaviors, 3) Ongoing collaboration with health care providers on a treatment plan and 4) Patients' perceived ability to meet optimal blood pressure.	yielded six dimension of treatment adherence: 1) medication, 2) diet, 3) stimulation, 4) exercise, 5) weight control, and 6) relieving stress. -The 4- point rating scale from 1 to 4, where 1 means never, 2 means some of the time, 3 means most of the time and 4 means all of the time. That higher score represented better adherence.	factor analysis (PCA) yielded five domains: 1) intension; 2) lifestyle; 3) attitude; 4) responsibility; and 5) smoking. -From the 21 original items, using criteria of factor loading > 0.3 and at least 10% of respondents did not answer 4 items, the items of CHPS were retained 13 items -Response options ranged from three to five.	factor analysis (PCA) yielded five domains: 1) attitude; 2) subjective norm; 3) perceived behavioral control - A 5-point Likert type scale from 1 to 5.	items divided into three aspects of HBP behaviors: reducing sodium intake, appointment keeping, and medication taking.
Validity and reliability	- The content validity of HARS was performed by five experts and the value of SCVI of this scale was 1.00.	-Construct validity: factor loading of items range from 0.40 to 0.89. -Concurrent criterion related validity: correlation TAQPH with	- Construct validity: Inter-item correlations ranged from 0.24 to 0.61 -Concurrent criterion related validity not acceptable.	-Construct validity: factor loading of items range from 0.45 to 0.87. Correlation TAQPH with MMAS score and GSES score was	The internal consistency reliability for the total scale in two separate studies was determined to

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	-The Cronbach's alpha coefficients of total 29-items was 0.92	MMAS score and GSES score was acceptable. -Item analysis: no items correlation above 0.70 -Internal consistency: reliability of the overall TAQPH was 0.86 and of subscale range from 0.76 to 0.94. -Test-retest reliability : the 10-14 day test-retest ability using pearson's coefficient and total TAQPH was 0.82	-Internal consistency: values of Theta coefficient were 0.74, 0.67 and 0.62, for intension, lifestyle and attitude, respectively. Theta was not calculated for responsibility in the treatment'' or ''smoking'' as these subscales had too few items. The Theta coefficient of the total scale was 0.80	acceptable. -Item analysis: no items correlation above 0.70 -Internal consistency: reliability of subscale range from 0.62to 0.88.	be 0.74 to 0.84, and the average inter item correlations of the 14 items were 0.18 and 0.28, respectively. The subscale of medication adherence had a statistically significant predictive validity (p=.01) when correlated with the level of blood pressure control at baseline and at one year follow up in subjects in one of the two study group
Strength	- The strength of this	-Easy to administer (28	-Domain identification	-This scale is developed	-Easy to

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	scale is the use of Thai language as it is suited to the Thai subjects and study's context. - Easy to administer (29 items) -HATRS showed acceptable validity and reliability.	items) -Domain identification from qualitative study reflected real word construct. -TAQPE showed acceptable validity and reliability. - Scale development step was clear.	from qualitative study reflected real word construct. - Scale development step was clear.	based on the middle-range theory. - DSRQ showed acceptable validity and reliability.	administration (14 items) - HBP showed acceptable validity and reliability.
Weakness	- The number of samples (20) for the internal consistency was very small -The scale brevity (2 items) can lower internal consistency. - This scale was tested for only one type of reliability and validity which are still not adequate for the	- The number of samples (20) for the test–retest reliability was very small - There are two subscales had too few items can lower internal consistency. - Limitation of generalizability to China people because the research settings did not	-The number of the sample (N = 96) for psychometric testing of the scale is quite small and homogenous in high socioeconomic status. This may have biases the sample and limited the generalizability. - There are two subscales had too few items may affect internal consistency. -CHPS meets minimal	- Only diet restriction measure may be not representing adherence to preventive behaviors.	-HBP is not develop grounded from the patient perspective but based on literature review. -Samples are selected only urban African American adults that may be affecting for the bias in instrument

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	standard psychometric properties because reliability and validity often are possible and desirable to use more than one approach	cover different regions.	reliability standard. - Concurrent criterion related validity not clear. - Domain may not fit with Thai context due to adherence to preventive behavior.		development. -Limitation of generalizability to Thais with prehypertension

APPENDIX B

Documents for Requesting Interviews and Interview Data

B.01 Oral Informed Consent

B.02 Interview Questionnaire for Persons with Prehypertension

B. 01

แบบฟอร์มพิทักษ์สิทธิผู้เข้าร่วมวิจัย

เรียน.....

ดิฉัน นางศิริวรรณ ชูกำเนิด นักศึกษาปริญญาเอก สาขาการพยาบาล คณะพยาบาลศาสตร์ มหาวิทยาลัยสงขลานครินทร์ จังหวัด สงขลา สนใจจะศึกษาวิจัยเรื่อง การพัฒนาเครื่องมือประเมินการยึดมั่นในพฤติกรรมการป้องกันโรคสำหรับกลุ่มเสี่ยงต่อการเป็นโรคความดันโลหิตสูง โดยมีวัตถุประ สงค์เพื่อศึกษาประสบการณ์การยึดมั่นในพฤติกรรมการป้องกันโรคและนำผลการศึกษาดังกล่าวไปพัฒนาเป็น เครื่องมือสำหรับประเมินการยึดมั่นในพฤติกรรมการป้องกันโรคสำหรับกลุ่มเสี่ยงต่อการเป็นโรคความดันโลหิตสูงต่อไป

ท่านเป็นผู้หนึ่งที่มีความสำคัญในการศึกษาครั้งนี้ เนื่องจากเป็นผู้ที่มีประสบการณ์การยึดมั่นในพฤติกรรมการป้องกันโรคที่ประสบความสำเร็จ ดังนั้นท่านจึงถูกเชิญเข้าร่วมการวิจัยครั้งนี้ หากท่านตอบรับเข้าร่วมวิจัย ท่านจะได้รับการสัมภาษณ์ประสบการณ์ของท่านในการยึดมั่นพฤติกรรมกาป้องกัน โรคโดยผู้วิจัย ซึ่งใช้เวลาประมาณ 30-45 นาที ขึ้นอยู่กับความสะดวกของท่าน

การเข้าร่วมวิจัยครั้งนี้ จะไม่เกิดผลกระทบใดๆ ต่อร่างกายและการรักษาพยาบาลของท่าน หากขณะสัมภาษณ์ท่านเกิดความรู้สึกไม่สบายใจ ท่านสามารถถอนตัวจากการวิจัยได้ตลอดเวลาโดยไม่ส่งผลกระทบใดๆ ต่อท่านทั้งสิ้น

ข้อมูลที่ได้จากการศึกษาจะถูกเก็บไว้เป็นความลับ จะไม่มีการเปิดเผยชื่อหรือที่อยู่ของท่านและข้อมูลทั้งหมดจะถูกนำเสนอในภาพรวมเท่านั้น หากท่านยินดีเข้าร่วมวิจัยในครั้งนี้ ท่านสามารถแจ้งด้วยทางวาจาหรือลงลายมือชื่อไว้ที่แบบฟอร์มด้านล่าง

.....

(นางศิริวรรณ ชูกำเนิด)

นักศึกษาปริญญาเอก คณะพยาบาลศาสตร์

มหาวิทยาลัยสงขลานครินทร์

สำหรับผู้เข้าร่วมวิจัย

ข้าพเจ้าได้รับทราบข้อมูลการเข้าร่วมวิจัยจากผู้วิจัยและเอกสารฉบับนี้แล้ว ข้าพเจ้าเข้าใจในวัตถุประสงค์ และขั้นตอนการเข้าร่วมวิจัยครั้งนี้เป็นอย่างดี ข้าพเจ้ายินดีเข้าร่วมโครงการวิจัยครั้งนี้ จึงลงลายมือชื่อไว้เป็นหลักฐาน ลายมือชื่อ.....

วันที่.....

B. 02

เลขที่สัมภาษณ์

แบบสัมภาษณ์สำหรับบุคคลที่มีความเสี่ยงสูงต่อโรคความดันโลหิตสูง

ข้อมูลเกี่ยวกับการยึดมั่นในพฤติกรรมป้องกันโรค

1. ตั้งแต่ที่รู้ว่าเสี่ยงต่อการเป็นโรคความดันโลหิตสูงรู้สึกอย่างไรคะ ลองเล่าให้ฟังหน่อยคะ แล้วทำอย่างไรคะ
2. จากก่อนรู้และหลังรู้ว่าเสี่ยงต่อการเป็นโรคความดันโลหิตสูง มีพฤติกรรมอะไรเปลี่ยนไปไหม อะไรบ้างที่เปลี่ยนไป เพราะอะไร
3. ตั้งแต่ในอดีตถึงปัจจุบัน คุณคิดว่าคุณทำอะไรบ้างเพื่อป้องกันโรคความดันโลหิตสูง ที่คุณคิดว่ามันเป็นสิ่งที่จำเป็น ลองเล่าให้ฟังหน่อยซิคะ
4. ทำไมถึงทำ (แต่ละพฤติกรรม สอดคล้องกับของผู้ให้สัมภาษณ์) เช่น ทำไมถึงคิดออกกำลังกาย ฯลฯ และคาดหวังผลของการออกกำลังกาย ฯลฯ อย่างไร
5. แล้วปัจจุบันนี้ ในสิ่งที่คุณทำทั้งหมด คุณทำอะไรที่คิดว่าทำได้ดีที่สุด คิดอย่างไรถึงทำ? ทำไมถึงทำ
6. และถ้าจะทำให้มันต่อเนื่อง คุณคิดว่าต้องทำอย่างไร? คุณมีการจัดการอย่างไรถึงได้ทำได้อย่างต่อเนื่อง ถ้าหยุดได้ไหม สำคัญไหม
7. แล้วที่คุณตั้งใจไว้ (การปฏิบัติ) ตั้งใจไว้อย่างไร (ถ้าทำไม่ได้) เพราะอะไร
8. การที่คุณปฏิบัติการป้องกันโรคความดันโลหิตสูง (สอดคล้องกับผู้ให้สัมภาษณ์ เช่น ออกกำลังกาย) จนทำเป็นประจำ เป็นสิ่งที่คุณติด หรือมันสอดแทรกเข้ามาในชีวิตคุณเกิดได้อย่างไรจนมาถึงทุกวันนี้

APPENDIX C

Content Validity

แบบประเมินความตรงตามเนื้อหา (Content Validity Form) ของเครื่องมือวิจัย

คำชี้แจง เอกสารชุดนี้เป็นแบบประเมินความตรงตามเนื้อหาของเครื่องมือวิจัย ผู้วิจัยขอความอนุเคราะห์จากท่านให้แสดงความคิดเห็นในความสอดคล้องของเนื้อหา (Relevancy) โดย 4 = สอดคล้องดีมาก 3 = สอดคล้องดี 2 = สอดคล้องเล็กน้อย 1 = ไม่สอดคล้อง รวมถึง การกระชับความ(Conciseness) และความชัดเจนของข้อคำถาม (Clarity) โดยการทำเครื่องหมาย √ ลงในช่องตรงกับความคิดเห็นของท่านในแต่ละประเด็น และหากคำถามใดท่านเห็นว่า สอดคล้องเล็กน้อย ไม่สอดคล้อง ไม่ชัดเจน หรือไม่กระชับ สมควรแก่การปรับปรุงหรือมีข้อเสนอแนะอื่นๆ กรุณาเติมข้อความในช่องข้อคิดเห็นในการปรับปรุงข้อคำถาม หรือข้อเสนอแนะอื่นๆ ตามรายละเอียดในเอกสารที่แนบมา ผู้วิจัยขอขอบคุณในความอนุเคราะห์ของท่านในครั้งนี้

ข้อที่	ข้อคำถาม	ความสอดคล้องกับเนื้อหาที่ต้องการวัด				ความสอดคล้องกับวัตถุประสงค์การวิจัย				การกระชับความของข้อคำถาม		ความชัดเจนของข้อคำถาม		ข้อคิดเห็นในการปรับปรุง
		1	2	3	4	1	2	3	4	กระชับ	ไม่กระชับ	ชัดเจน	ไม่ชัดเจน	
1	**ความมุ่งมั่นในการทำพฤติกรรมป้องกันโรค** ฉันตั้งใจจะออกกำลังกายที่ใช้แรงมาก เช่น เดินเร็ว แอโรบิค ถีบจักรยาน ไทเก็ก ฮูลาฮุบ													
2	ฉันจะออกกำลังกายให้ได้ ครั้งละอย่างน้อย 30 นาที													

APPENDIX D

Initial Item Pool

D.01 Initial Item Pool

D.02 Front Cover of the APBS for Persons with Prehypertension

D.03 A General Debriefing and Cognitive Interviewing Guidelines

D. 01

กระบวนการสร้างเครื่องมือ

Attribute/ Components	Exercise	Healthy Eating	Stress Management
Commitment to active participation	1. ฉันตั้งใจจะออกกำลังกายที่ใช้แรงมาก เช่น เดินเร็ว แอโรบิค ถีบจักรยาน ไทเก็ก ฮูลาฮุบ	6.ฉันตั้งใจจะไม่ใช้ผงชูรส/ ผงปรุงรส / ซุปก้อน เพื่อปรุงรสอาหาร	27. ฉันตั้งใจจะนั่งสมาธิ, ละหมาด เพื่อทำจิตใจให้สงบ
	2. ฉันจะออกกำลังกายให้ได้ ครั้งละอย่างน้อย 30 นาที	7.ฉันจะหลีกเลี่ยงไม่รับประทาน ปลาเค็ม เนื้อเค็ม ไข่เค็ม ผลไม้หมักดองให้ได้	28. ฉันตั้งใจจะเข้าร่วมกิจกรรมที่จัดโดยกลุ่มหรือชมรมต่างๆ
	3. ฉันจะออกกำลังกายให้ได้ 3- 5 ครั้ง/สัปดาห์	8. ฉันตั้งใจจะไม่รับประทานเครื่องจิ้ม เช่น น้ำบูดู น้ำพริกชนิดต่างๆ	29. ฉันตั้งใจจะผ่อนคลายอารมณ์ โดยการออกกำลังกายกับกลุ่มเพื่อนๆ
		15. ฉันตั้งใจจะไม่รับประทานอาหารทอด เช่น ไก่ทอด กล้วยทอด ปาท่องโก๋	
		16.ฉันตั้งใจจะไม่ซื้อ กุ้ง หอย ปู ปลาหมึก มาปรุงอาหาร	
		17. ฉันตั้งใจจะไม่รับประทานอาหารหรือขนมหวานที่ปรุงด้วยกะทิ เช่น แกงเขียว หวาน มัสมั่น แกงคั่ว กล้วยบวดชี บัวลอย	

กระบวนการสร้างเครื่องมือ (ต่อ)

Attribute/ Components	Exercise	Healthy Eating	Stress Management
		22.ฉันจะรับประทานผักและผลไม้หลากหลายชนิดสลับกัน	
		23.ฉันตั้งใจจะรับประทานผักสดเป็นเครื่องเคียงกับอาหารทุกมื้อ	
		24.ฉันตั้งใจจะรับประทานผลไม้รสไม่หวานจัดแทนอาหารว่างชนิดอื่น	
Persistence in practicing preventive behaviors	34.ฉันไม่เคยขาดการออกกำลังกาย แม้มีภาระงานมากมายที่ต้องทำ	43.ฉันไม่เคยเติมเครื่องปรุงรส ทั้งๆ ที่รู้สึกว่าอาหารรสชาดไม่อร่อย	57.ฉันพยายามเข้าร่วมกิจกรรมเพื่อผ่อนคลายอารมณ์ ถึงแม้จะไม่ค่อยมีเวลา
	35.ฉันไม่เคยหยุดออกกำลังกาย แม้จะต้องเดินทางไกล	44.ถ้าต้องรับประทานอาหารนอกบ้าน ฉันจะพยายามย้ำไม่ให้ใส่ผงชูรส	58. ฉันพยายามศึกษาธรรมมะ หรือ ฝึกสมาธิเพื่อทำจิตใจให้สงบ ถึงแม้สิ่งแวดล้อมไม่เอื้ออำนวย
	36.ฉันพยายามหาเวลาออกกำลังกายในวันที่ต้องเข้าร่วม งานสังคม เช่น งานบวช งานแต่งงาน งานศพ	45.ฉันพยายามจะไม่รับประทาน ปลาเค็ม ไข่เค็ม อาหารกระป๋อง แม้จะชอบ	59.ฉันไม่เคยลืมสวดมนต์ไหว้พระหรือละหมาดทุกคืน แม้จะรู้สึกง่วงและต้องการพักผ่อน
		49.ฉันไม่เคยรับประทานอาหารมันๆ ของทอด แกงกะทิ ที่จัดเลี้ยงในงานบุญ เช่น งานบวช หรืองานศพ	

กระบวนการสร้างเครื่องมือ (ต่อ)

Attribute/ Components	Exercise	Healthy Eating	Stress Management
		50.ฉันไม่เคยซื้ออาหารทะเลที่มีไขมันสูง เช่น ปลาหมึก หอย ปู กุ้ง มารับประทาน แม้จะชอบรับประทานก็ตาม	
		51.ฉันพยายามจะหลีกเลี่ยงอาหารมันๆ เช่น ขาหมูติดมัน หนังไก่ คอหมูย่าง ที่จัดเลี้ยงในงานสังสรรค์กับเพื่อนฝูงหรือญาติพี่น้อง	
		53.ฉันพยายามจะสั่งอาหารที่มีผักเป็นส่วนประกอบมารับประทาน เมื่อต้องรับประทานอาหารนอกบ้าน	
		54.ฉันไม่เคยซื้อผลไม้รสหวานจัดมารับประทานถึงแม้จะจำหน่ายในราคาถูก	
		55.ฉันไม่เคยรับประทานผลไม้รสหวานจัดเมื่อเพื่อนสนิทชวนรับประทาน	

กระบวนการสร้างเครื่องมือ (ต่อ)

Attribute/ Components	Exercise	Healthy Eating	Stress Management
Maintenance of desired preventive behaviors	60.ฉันรู้สึกสนุกเมื่อได้ออกกำลังกาย เลยออกกำลังกายต่อเนื่องจนถึงปัจจุบัน	67.ฉันรับประทานอาหารรสจืดต่อเนื่องจนถึงปัจจุบัน ทำให้รู้สึกปวดมึนศีรษะลดลง	75.ฉันยังคงพูดจาเพื่อสร้างอารมณ์ขัน โดยตลอด เลยทำให้รู้สึกคลายเครียด
	61.ฉันยังคงออกกำลังกายติดต่อกันมาตลอด ทำให้ได้พบปะกับเพื่อนๆอยู่เสมอ	68.ฉันยังคงรับประทานอาหารรสจืดโดยตลอด ทำให้ ความดันเลือดไม่สูงขึ้น	76.ฉันยังคงออกกำลังกายอย่างต่อเนื่อง ทำให้รู้สึกผ่อนคลายความเครียด
	62. การออกกำลังกายช่วยทำให้ฉันนอนหลับสบาย ฉันจึงยังคงออกกำลังกายอย่างต่อเนื่อง	69. ฉันยังคงควบคุมอาหารไขมันสูงอย่างต่อเนื่อง ทำให้ฉันมีระดับไขมันในเลือดลดลง	77. ฉันยังคงสวดมนต์ไหว้พระหรือละหมาดทุกคืนอย่างต่อเนื่อง ทำให้ฉันมีจิตใจที่สงบขึ้น
		72. ฉันยังคงรับประทานผักและผลไม้รสไม่หวานจัดอย่างต่อเนื่อง ทำให้การควบคุมน้ำหนักได้ผลดี	
		73. ฉันรับประทานผักและผลไม้ต่อเนื่องมาเป็นปีแล้ว ทำให้ควบคุมความดันเลือดได้ดี	
		74. ฉันยังคงรับประทานผักและผลไม้โดยตลอด ทำให้มีระบบขับถ่ายดีขึ้น	

D.02

เรียน ผู้ร่วมตอบแบบสอบถามทุกท่าน

เรื่อง ขอความร่วมมือในการทดสอบแบบสอบถามเพื่อการทำวิจัยประกอบวิทยานิพนธ์

แบบสอบถามฉบับนี้เป็นข้อคำถามเกี่ยวกับการยึดมั่นในพฤติกรรมป้องกันโรคของบุคคลที่มีความเสี่ยงสูงต่อความดันโลหิตสูง ซึ่งเป็นส่วนหนึ่งของการทำวิทยานิพนธ์ สาขาพยาบาลศาสตร์ มหาวิทยาลัยสงขลานครินทร์ และเพื่อให้เกิดประโยชน์สูงสุดกับการทำวิจัยนี้ จึงใคร่ขอความร่วมมือจากท่าน ในการตอบแบบสอบถามนี้ให้ตรงกับความเป็นจริงที่เกิดขึ้นกับท่านมากที่สุด ทั้งนี้ข้อมูลที่ท่านกรุณาตอบ จะเก็บเป็นความลับและจะไม่มีผลกระทบต่อท่านในการรักษาพยาบาลแต่อย่างใดและผลที่ได้จะใช้เพื่อการวิจัยเท่านั้น

จึงเรียนมาเพื่อขอความร่วมมือจากท่านและขอขอบพระคุณที่ท่านได้สละเวลาตอบแบบสอบถามมา ณ โอกาสนี้

ขอแสดงความนับถือ

(ศิริวรรณ ชูกำเนิด)

D. 03

ข้อคิดเห็นและข้อเสนอแนะ

โปรดแสดงความคิดเห็น หลังจากที่ท่านได้ตอบแบบสอบถาม

1. มี **คำ** ใดในแบบสอบถามที่ท่านไม่เข้าใจหรือเข้าใจยาก (โปรดระบุ.....) ท่านคิดว่าควรใช้คำอะไรแทน

2. ท่านคิดว่า **คำถาม** ข้อใดเข้าใจยากหรือสับสน

3. ท่านคิดว่าข้อใด **ตอบยากหรือไม่รู้ว่าจะตอบอะไร**

4. ท่านคิดว่าคำถามข้อใด**ยาวเกินไป**

5. มีคำถามข้อใดอ่านแล้วรู้สึก **ไม่อยากตอบ**

6. ท่านใช้**เวลาทั้งหมด** เท่าไร ในการตอบแบบสอบถามนี้

APPENDIX E

Field Test

E.01 Subject's Right and Instruction for the Questionnaire

E.02 Demographic Data Form

E.03 The APBS Version 3

E. 01

แบบฟอร์มพิทักษ์สิทธิผู้เข้าร่วมวิจัย

เรียน.....

ดิฉัน นางศิริวรรณ ชูกำเนิด นักศึกษาปริญญาเอก สาขาการพยาบาล คณะพยาบาลศาสตร์ มหาวิทยาลัยสงขลานครินทร์ จ. สงขลา สนใจจะศึกษาวิจัยเรื่อง การพัฒนาเครื่องมือประเมินการยึดมั่นในพฤติกรรมการป้องกันโรคสำหรับกลุ่มเสี่ยงต่อการเป็นความดันโลหิตสูโดยมีวัตถุ ประ สงค์ เพื่อศึกษาประสบการณ์การยึดมั่นในพฤติกรรมการป้องกันโรคและนำผลการศึกษาดังกล่าวไปพัฒนาเป็น เครื่องมือสำหรับประเมินการยึดมั่นในพฤติกรรมการป้องกันโรคสำหรับกลุ่มเสี่ยงต่อการเป็นความดันโลหิตสูงต่อไป ซึ่งงานวิจัยนี้ได้ผ่านการพิจารณาด้านจริยธรรมจากคณะกรรมการประเมินงานด้านจริยธรรม คณะพยาบาลศาสตร์ มหาวิทยาลัยสงขลานครินทร์มาเรียบร้อยแล้ว และในการเก็บข้อมูลครั้งนี้ ท่านจะเป็นหนึ่งในตัวแทนของผู้ที่มีภาวะเสี่ยงต่อการเป็นโรคความดันโลหิตสูงในภูมิภาคภาคใต้ของประเทศไทยในการตอบแบบสอบถามเหล่านี้ซึ่งใช้เวลาประมาณ 30-40 นาที ท่านจึงมีส่วนสำคัญอย่างยิ่งที่จะทำให้การพัฒนาและการประเมินแบบสอบถามนี้สำเร็จลุล่วงได้ ซึ่งจะมีประโยชน์แก่การศึกษา การบริการ และการวิจัยของพยาบาลวิชาชีพในเรื่องที่เกี่ยวข้องในอนาคตอย่างมาก

ในการที่ท่านเข้ามามีส่วนร่วมในการตอบแบบสอบถามนี้ เป็นการสุ่มตัวอย่าง ขอให้ท่านตอบแบบสอบถามที่ตรงกับความเป็นจริงที่เกิดขึ้นกับท่านมากที่สุด การเข้าร่วมตอบแบบสอบถามนั้นเป็นไปโดยความสมัครใจและเมื่อท่านเข้าร่วมวิจัยแล้ว ท่านสามารถถอนตัวจากการให้ข้อมูลได้ตลอดเวลาที่ท่านต้องการ โดยไม่ส่งผลกระทบใดๆที่เป็นอันตรายต่อตัวท่านและการรับบริการทางสุขภาพจะไม่มีการเปิดเผยชื่อของท่าน ทั้งนี้ผู้วิจัยได้ใช้ตัวเลขแทนชื่อท่านและเมื่อได้รับแบบสอบถามคืน ตัวเลขจะถูกลบออกก่อนการป้อนข้อมูลทางคอมพิวเตอร์ ดังนั้นเมื่อท่านได้รับแบบสอบถามแล้วกรุณาทำโดยไม่ต้องเขียนชื่อใดๆ ลงบนแบบสอบถาม และเมื่อทำเสร็จ ให้ท่านกรุณาส่งคืนแก่ผู้ประสานงานการวิจัย เพื่อส่งคืนแก่ผู้วิจัย ข้อมูลที่ได้รับจากท่านจะถูกนำเสนอในภาพรวมของผู้ที่มีภาวะเสี่ยงต่อโรคความดันโลหิตสูงเท่านั้น หากท่านประสงค์จะสอบถามข้อสงสัยใดๆที่เกี่ยวกับการศึกษาครั้งนี้ กรุณาติดต่อดิฉันได้โดยตรงและดิฉันใคร่ขอขอบพระคุณเป็นอย่างสูง สำหรับความร่วมมือของท่านเป็นอย่างดีในครั้งนี้

ขอแสดงความนับถือ

.....

(นางศิริวรรณ ชูกำเนิด)

ผู้ทำการวิจัย นางศิริวรรณ ชูกำเนิด
ที่อยู่ 40 ซอย 2 ถ. ศุภสารรังสรรค์ ต. หาดใหญ่ อ. หาดใหญ่ จ. สงขลา
เบอร์โทรศัพท์ (081) 6086407

E. 02

ข้อมูลส่วนบุคคลทั่วไป

<u>คำชี้แจง</u> กรุณาตอบแบบสอบถามนี้โดยทำเครื่องหมาย √ ลงใน ☐ หน้าข้อความหรือเติมข้อความ ลงในช่องว่างให้สมบูรณ์และตรงตามความเป็นจริงเกี่ยวกับตัวท่าน

1. อายุ _____ ปี

2. เพศ
   - ☐ ชาย
   - ☐ หญิง

3. ศาสนา
   - ☐ พุทธ
   - ☐ คริสต์
   - ☐ อิสลาม

4. สถานภาพทางการสมรส
   - ☐ โสด
   - ☐ หย่าร้าง
   - ☐ สมรสและอยู่ร่วมกัน
   - ☐ หม้าย
   - ☐ สมรสแต่แยกกันอยู่
   - ☐ อื่นๆ .....

5. ระดับการศึกษาสูงสุด
   - ☐ ไม่ได้เรียน
   - ☐ ปวส. / ปวช.
   - ☐ น้อยกว่าประถม 4
   - ☐ ปริญญาตรี
   - ☐ ประถม 5-6
   - ☐ สูงกว่าปริญญาตรี
   - ☐ มัธยมศึกษา

6. อาชีพ
   - ☐ ว่างงาน
   - ☐ รับจ้าง

☐ รับราชการ /รัฐวิสาหกิจ ☐ อื่ น ๆ

☐ เกษตรกร .....

7. รายได้

☐ เพียงพอใช้แต่ไม่เหลือเก็บ ☐ ไม่มีรายได้

☐ เพียงพอใช้และเหลือเก็บ ☐ มีหนี้สิน

☐ ไม่เพียงพอใช้ แต่ไม่มีหนี้ ☐ เงินสะสม

☐ ไม่มีหนี้สิน ☐ อื่นๆระบุ.....

8. แหล่งที่มาของรายได้

☐ คู่สมรส บุตรหลาน ญาติพี่น้อง ☐ การประกอบอาชีพ

☐ เงินช่วยเหลือจาก รัฐบาล

9. ภาวะสุขภาพร่างกายในปัจจุบัน

☐ แข็งแรงดี ☐ ไม่แข็งแรง ระบุ .....

☐ ปานกลาง

10. ภาวะสุขภาพจิตใจในปัจจุบัน

☐ ดี ☐ แย่ ระบุ .....

☐ ปานกลาง

11. ท่านทราบว่าเป็นกลุ่มเลี่ยงต่อโรคความดันโลหิตสูงเป็นระยะเวลานานเท่าไร……

12. ขณะนี้คุณวางแผนปรับเปลี่ยนพฤติกรรมอะไรบ้าง**.....**

E.03

แบบประเมินการยึดมั่นในพฤติกรรมการป้องกันโรคในบุคคลที่มีภาวะเสี่ยงสูงต่อการเป็นความดันโลหิตสูง

คำชี้แจง แบบสอบถามชุดนี้ มีวัตถุประสงค์เพื่อประเมินพฤติกรรมการยึดมั่นในการป้องกันความดันโลหิตสูงของท่านเมื่อท่านมีภาวะเสี่ยงสูงต่อการเป็นความดันโลหิตสูง ซึ่งประกอบด้วยข้อคำถาม 83 ข้อ แบ่งเป็น 3 ด้าน ได้แก่ 1) การมุ่งมั่นที่จะปฏิบัติพฤติกรรมป้องกันโรค 2) การปฏิบัติพฤติกรรมป้องกันโรคอย่างสม่ำเสมอ และ 3) การคงไว้ซึ่งพฤติกรรมการป้องกันโรค ขอให้ท่านอ่านและพิจารณาแต่ละข้อคำถามอย่างละเอียดว่าตรงกับตัวท่านมากน้อยเพียงใด แล้วทำเครื่องหมาย √ ลงในช่องว่างที่ตรงกับตัวท่านมากที่สุดเพียงคำตอบเดียว โดยใช้เกณฑ์ในการพิจารณาต่อไปนี้

ตรงมากที่สุด	หมายถึง	ข้อความนั้นตรงกับตัวท่านมากที่สุด
ตรงมาก	หมายถึง	ข้อความนั้นตรงกับตัวท่านมาก
ค่อนข้างตรง	หมายถึง	ข้อความนั้นค่อนข้างตรงกับตัวท่าน
ตรงเล็กน้อย	หมายถึง	ข้อความนั้นตรงกับตัวท่านเล็กน้อย
ไม่ตรงเลย	หมายถึง	ข้อความนั้นไม่ตรงกับท่านเลย

ข้อที่	คำถาม	ไม่ตรงเลย	ตรงเล็กน้อย	ค่อนข้างตรง	ตรงมาก	ตรงมากที่สุด
1	ฉันตั้งใจจะออกกำลังกายที่ใช้แรงมาก เช่น เดินเร็ว แอโรบิค ถีบจักรยาน ไทเก็ก ฮูลาฮุบ					
2	ฉันจะออกกำลังกายให้ได้ ครั้งละอย่างน้อย 30 นาที					
3	ฉันจะออกกำลังกายให้ได้ 3- 5 ครั้ง/สัปดาห์					
4	ฉันจะออกกำลังกายจนกว่าจะมีเหงื่อออก					
5	ฉันมุ่งมั่นที่จะออกกำลังกายเพราะเป็นหน้าที่สำคัญที่ต้องทำ					
6.	ฉันตั้งใจจะไม่ใช้ผงชูรส/ ผงปรุงรส / ซุปก้อน เพื่อปรุงรสอาหาร					
7.	ฉันจะหลีกเลี่ยงไม่รับประทาน ปลาเค็ม เนื้อเค็ม ไข่เค็ม ผลไม้หมักดองให้ได้					
8.	ฉันตั้งใจจะไม่รับประทานเครื่องจิ้ม เช่น น้ำบูดู น้ำพริกชนิดต่างๆ					
9.	ฉันตั้งใจจะไม่ซื้ออาหารสำเร็จรูปมารับประทาน เช่น ปลากระป๋อง บะหมี่กึ่งสำเร็จรูป					
10.	ฉันจะไม่ซื้อ ถั่วอบเกลือเช่น ถั่วลิสงคั่ว เม็ดมะม่วงหิมพานทอด ถั่วปากอ้า มารับประทาน					
11.	ฉันจะอ่านฉลากระบุปริมาณเกลือที่ข้างซองอาหารหรือข้างขวดก่อนซื้อ					

ข้อที่	คำถาม	ไม่ตรงเลย	ตรงเล็กน้อย	ค่อนข้างตรง	ตรงมาก	ตรงมากที่สุด
12.	ฉันจะไม่เติมน้ำปลา หรือซอสปรุงรสเพิ่มในอาหาร ก่อนรับประทาน					
13.	ฉันตั้งใจจะรับประทานอาหารรสจืดโดยค่อยๆ ลดปริมาณเกลือในอาหาร					
14	ฉันต้องรับประทานอาหารรสจืดให้ได้					
15.	ฉันตั้งใจจะไม่รับประทานอาหารทอด เช่น ไก่ทอด กล้วยทอด ปาท่องโก๋					
16	ฉันตั้งใจจะไม่ซื้อ กุ้ง หอย ปู ปลาหมึก มาปรุงอาหาร					
17	ฉันตั้งใจจะไม่รับประทานอาหารหรือขนมหวานที่ปรุงด้วยกะทิ เช่น แกงเขียวหวาน มัสมั่น แกงคั่ว กล้วยบวดชี บัวลอย ลอดช่อง					
18	ฉันจะหลีกเลี่ยงการรับประทานอาหารที่มีไขมันสูงให้ได้ เช่น ขาหมูติดมัน หมูสามชั้น หนังไก่ คอหมูย่าง					
19	ฉันตั้งใจจะรับประทานปลา และเนื้อสัตว์ไม่ติดมัน					
20	ฉันตั้งใจเปลี่ยนวิธีปรุงอาหารเป็นประเภท ต้ม นึ่ง ลวก และอบ แทนการทอด					
21	ฉันจะงดรับประทานอาหารไขมันสูงให้ได้					
22.	ฉันจะรับประทานผักและผลไม้หลากหลายชนิดสลับกัน					

ข้อที่	คำถาม	ไม่ตรงเลย	ตรงเล็กน้อย	ค่อนข้างตรง	ตรงมาก	ตรงมากที่สุด
23	ฉันตั้งใจจะรับประทานผักสดเป็นเครื่องเคียงกับอาหารทุกมื้อ					
24	ฉันตั้งใจจะรับประทานผลไม้รสไม่หวานจัดแทนอาหารว่างชนิดอื่น					
25	ฉันจะรับประทานผลไม้รสไม่หวานจัดก่อนหรือหลังอาหารทุกมื้อ					
26	ฉันตั้งใจจะรับประทานผักและผลไม้สดรวมกันประมาณครึ่งกิโลต่อวันให้ได้					
27	ฉันตั้งใจจะนั่งสมาธิ ละหมาด เพื่อทำจิตใจให้สงบ					
28	ฉันตั้งใจจะเข้าร่วมกิจกรรมที่จัดโดยกลุ่มหรือชมรมต่างๆ					
29	ฉันตั้งใจจะผ่อนคลายอารมณ์ โดยการออกกำลังกายกับกลุ่มเพื่อนๆ					
30	ฉันตั้งใจคลายเครียดโดยการปฏิบัติศาสนกิจ เช่น เข้าวัด และทำบุญ					
31	ฉันตั้งใจสวดมนต์ไหว้พระหรือละหมาดทุกคืน เพื่อทำจิตใจให้สงบ					
32	ฉันตั้งใจจะบริหารเวลาให้สมดุลระหว่างการทำงานกับการพักผ่อนให้ได้					
33	ฉันมุ่งมั่นจะควบคุมอารมณ์และสงบจิตใจให้ได้					
34	ฉันไม่เคยขาดการออกกำลังกาย แม้มีภาระงานมากมายที่ต้องทำ					

ข้อที่	คำถาม	ไม่ตรงเลย	ตรงเล็กน้อย	ค่อนข้างตรง	ตรงมาก	ตรงมากที่สุด
35	ฉันไม่เคยหยุดออกกำลังกาย แม้จะต้องเดินทางไกล					
36	ฉันพยายามหาเวลาออกกำลังกาย ในวันที่ต้องเข้าร่วม งานสังคม เช่น งานบวช งานแต่งงาน งานศพ					
37	ฉันพยายามปล่อยวางงานทั้งหมด เมื่อถึงเวลาออกกำลังกาย					
38	ฉันไม่เคยหยุดการออกกำลังกาย ในช่วงหน้าฝน					
39	ฉันไม่เคยหยุดออกกำลังกาย ในวันที่รู้สึกเหนื่อยล้าจากการทำงาน					
40	ฉันไม่เคยหยุดออกกำลังกาย แม้มีอาการปวดเมื่อยกล้ามเนื้อ หรือเหนื่อยล้าขณะออกกำลังกาย					
41	ฉันไม่เคยหยุดออกกำลังกาย แม้จะต้องทำคนเดียว					
42	ฉันไม่เคยหยุดออกกำลังกาย ในวันที่รู้สึกเครียด หรือมีเรื่องวิตกกังวล/ไม่สบายใจ					
43	ฉันไม่เคยเติมเครื่องปรุงรส ทั้งๆ ที่รู้สึกว่าอาหารรสชาดไม่อร่อย					
44	ถ้าต้องรับประทานอาหารนอกบ้าน ฉันจะพยายามย้ำไม่ให้ใส่ผงชูรส					
45	ฉันพยายามจะไม่รับประทาน ปลาเค็ม ไข่เค็ม อาหารกระป๋อง แม้จะชอบ					

ข้อที่	คำถาม	ไม่ตรงเลย	ตรงเล็กน้อย	ค่อนข้างตรง	ตรงมาก	ตรงมากที่สุด
46	ฉันพยายามจะไม่รับประทานอาหารรสเค็มจัด เช่นแกงไตปลา ผัดผักกาดดองที่จัดเลี้ยงในงานบวช หรือ งานศพ					
47	ฉันไม่เคยรับประทานถั่วอบเกลือเช่น ถั่วลิสงคั่ว เม็ดมะม่วงหิมพานทอด ถั่วปากอ้า แม้จะมีคนชวนรับประทาน					
48	ฉันไม่เคยซื้อบะหมี่กึ่งสำเร็จรูป หรืออาหารกระป๋องมารับประทาน แม้จะลดราคาหรือมีของแถม					
49	ฉันไม่เคยรับประทานอาหารมันๆ ของทอด แกงกะทิ ที่จัดเลี้ยงในงานบุญ เช่น งานบวช หรืองานศพ					
50	ฉันไม่เคยซื้ออาหารทะเลที่มีไขมันสูง เช่น ปลาหมึก หอย ปู กุ้ง มารับประทาน แม้จะชอบรับประทานก็ตาม					
51	ฉันพยายามจะหลีกเลี่ยงอาหารมันๆ เช่น ขาหมูติดมัน หนังไก่ คอหมูย่าง ที่จัดเลี้ยงในงานสังสรรค์กับเพื่อนฝูงหรือญาติพี่น้อง					
52	ฉันพยายามปรุงอาหารด้วยวิธี ต้ม นึ่ง ลวก และอบ แม้ว่าจะไม่อร่อย					
53	ฉันพยายามจะสั่งอาหารที่มีผักเป็นส่วนประกอบมารับประทาน เมื่อต้องรับประทานอาหารนอกบ้าน					
54	ฉันไม่เคยซื้อผลไม้รสหวานจัดมารับประทานถึงแม้จะจำหน่ายในราคาถูก					

ข้อที่	คำถาม	ไม่ตรงเลย	ตรงเล็กน้อย	ค่อนข้างตรง	ตรงมาก	ตรงมากที่สุด
55	ฉันไม่เคยรับประทานผลไม้รสหวานจัด เมื่อเพื่อนสนิทชวนรับประทาน					
56	ฉันพยายามรับประทานผักและผลไม้ให้ได้วันละครึ่งกิโลกรัม ถึงแม้หาซื้อลำบาก					
57	ฉันพยายามเข้าร่วมกิจกรรมเพื่อผ่อนคลายอารมณ์ ถึงแม้จะไม่ค่อยมีเวลา					
58	ฉันพยายามศึกษาธรรมมะ หรือ ทำสมาธิเพื่อทำจิตใจให้สงบ ถึงแม้สิ่งแวดล้อมไม่เอื้ออำนวย					
59	ฉันไม่เคยลืมสวดมนต์ไหว้พระหรือละหมาดทุกคืน แม้จะรู้สึกง่วงและต้องการพักผ่อน					
60	ฉันรู้สึกสนุกเมื่อได้ออกกำลังกาย เลยออกกำลังกายต่อเนื่องจนถึงปัจจุบัน					
61	ฉันยังคงออกกำลังกายติดต่อกันมาตลอด ทำให้ได้พบปะกับเพื่อนๆอยู่เสมอ					
62	การออกกำลังกายช่วยทำให้ฉันนอนหลับสบาย ฉันจึงยังคงออกกำลังกายอย่างต่อเนื่อง					
63	การออกกำลังกายทำให้ควบคุมความดันเลือดได้ดี ฉันจึงออกกำลังกายต่อเนื่องมานานเป็นปีแล้ว					
64	ฉันออกกำลังกายติดต่อกันมาตลอด ทำให้ฉันรู้สึกกระฉับกระแฉงและคล่องแคล่วขึ้น					

ข้อที่	คำถาม	ไม่ตรงเลย	ตรงเล็กน้อย	ค่อนข้างตรง	ตรงมาก	ตรงมากที่สุด
65	ฉันออกกำลังกายติดต่อกันมาตลอด ทำให้เจ็บป่วยลดลง					
66	เพื่อนๆทักว่าฉันดูหน้าตาอ่อนกว่าวัย ฉันจึงยังคงออกกำลังกายอย่างต่อเนื่อง					
67	ฉันรับประทานอาหารรสจืดต่อเนื่องจนถึงปัจจุบัน ทำให้รู้สึกปวดมึนศีรษะลดลง					
68	ฉันยังคงรับประทานอาหารรสจืดโดยตลอด ทำให้ความดันเลือดไม่สูงขึ้น					
69	ฉันยังคงควบคุมอาหารไขมันสูงอย่างต่อเนื่อง ทำให้ฉันมีระดับไขมันในเลือดลดลง					
70	ฉันควบคุมอาหารไขมันสูงอย่างต่อเนื่องจนถึงปัจจุบัน ทำให้ฉันมีรูปร่างดีขึ้น					
71	ฉันควบคุมอาหารไขมันสูงต่อเนื่องมานานเป็นปีแล้ว ทำให้ความดันเลือดไม่สูงขึ้น					
72	ฉันยังคงรับประทานผักและผลไม้รสไม่หวานจัดอย่างต่อเนื่อง ทำให้การควบคุมน้ำหนักได้ผลดี					
73	ฉันรับประทานผักและผลไม้ต่อเนื่องมาเป็นปีแล้ว ทำให้ควบคุมความดันเลือดได้ดีขึ้น					
74	ฉันยังคงรับประทานผักและผลไม้โดยตลอด ทำให้มีระบบขับถ่ายดีขึ้น					

ข้อที่	คำถาม	ไม่ตรงเลย	ตรงเล็กน้อย	ค่อนข้างตรง	ตรงมาก	ตรงมากที่สุด
75	ฉันยังคงพูดจาเพื่อสร้างอารมณ์ขันโดยตลอด เลยทำให้รู้สึกคลายเครียด					
76	ฉันยังคงออกกำลังกายอย่างต่อเนื่อง ทำให้รู้สึกผ่อนคลายความเครียด					
77	ฉันยังคงสวดมนต์ไหว้พระหรือละหมาดทุกคืนอย่างต่อเนื่อง ทำให้ฉันมีจิตใจที่สงบขึ้น					
78	การบริหารเวลาให้สมดุลระหว่างการทำงานกับการพักผ่อนช่วยทำให้ฉันไม่เครียด ฉันจึงยังคงทำต่อเนื่อง					
79	การหาเวลาพักผ่อนในแต่ละวันเช่น นอนเล่น นั่งดูทีวี หรืองีบหลับ ช่วยทำให้ฉันคลายเครียด ฉันจึงทำอย่างต่อเนื่องจนถึงปัจจุบัน					
80	การปรับทุกข์กับคนสนิทเมื่อมีปัญหาไม่สบายใจ เป็นวิธีที่ยังคงได้ผลดี ฉันจึงทำโดยตลอด					
81	ฉันยังคงทำกิจกรรมกับเพื่อนๆ โดยตลอด ทำให้รู้สึกสบายใจไม่เครียด					
82	ฉันยังคงนั่งสมาธิ ศึกษาธรรมะอย่างต่อเนื่อง ทำให้ฉันรู้สึกจิตใจสงบ					
83	ฉันเข้าวัด ทำบุญมาโดยตลอด ทำให้รู้สึกผ่อนคลายความเครียด					

APPENDIX F

Item Correlations of 88 Item APBS
In Pre-testing

Table 1

Item and Subscale Correlations of the 88 item-APBS in Pre-testing (n=30)

Item no.	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
1	235.9333	4110.616	.618	.976
2	236.1000	4110.852	.678	.975
3	236.0333	4104.516	.664	.975
4	236.1000	4094.645	.765	.975
5	236.5333	4110.464	.674	.975
6	236.6000	4151.766	.331	.976
7	236.5333	4121.775	.588	.976
8	237.1333	4139.223	.557	.976
9	236.4000	4154.869	.375	.976
10	236.0000	4171.586	.305	.976
11	237.0000	4098.069	.580	.976
12	236.1000	4113.059	.492	.976
13	236.6333	4093.275	.759	.975
14	236.7333	4091.857	.734	.975
15	237.0333	4134.861	.647	.976
16	237.0333	4159.275	.426	.976
17	236.6000	4143.903	.480	.976
18	236.4667	4108.878	.588	.976
19	236.2333	4125.289	.596	.976

*** Item total correlations less than 0.3**

Table 1 (continued)

Item no.	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
20	236.6000	4123.007	.564	.976
21	236.3333	4130.575	.570	.976
22	235.4667	4169.982	.434	.976
23	235.8333	4143.661	.537	.976
24	236.3333	4118.575	.605	.976
25	236.7667	4127.633	.545	.976
26	236.6333	4130.033	.531	.976
27	236.6333	4131.413	.501	.976
28	236.4333	4110.737	.561	.976
29	236.3667	4090.999	.664	.975
30	235.6000	4172.317	.294*	.976
31	236.0333	4171.826	.265*	.976
32	236.0333	4147.895	.406	.976
33	235.3333	4120.368	.582	.976
34	235.8000	4156.234	.387	.976
35	235.9333	4132.478	.672	.976
36	236.7000	4080.217	.689	.975
37	237.4667	4097.430	.748	.975
38	237.2333	4095.495	.659	.975
39	236.9000	4083.886	.664	.975

*** Item total correlations less than 0.3**

Table 1 (continued)

Item no.	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
40	237.3333	4131.195	.495	.976
41	237.3667	4098.309	.710	.975
42	237.3000	4102.286	.645	.975
43	236.5667	4092.737	.585	.976
44	236.8667	4087.223	.698	.975
45	236.6667	4093.471	.641	.975
46	236.9667	4089.482	.630	.976
47	236.6667	4152.161	.506	.976
48	236.5333	4119.292	.604	.976
49	236.6000	4144.800	.407	.976
50	236.8000	4154.993	.354	.976
51	237.3667	4164.516	.442	.976
52	236.9667	4192.516	.169*	.976
53	236.5333	4112.464	.537	.976
54	235.7667	4163.909	.281*	.976
55	236.7667	4139.702	.564	.976
56	236.3667	4113.206	.596	.976
57	237.0667	4144.685	.493	.976

*** Item total correlations less than 0.3**

Table 1 (continued)

Item no.	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
58	237.1000	4142.852	.472	.976
59	236.8333	4180.213	.290*	.976
60	236.5000	4182.534	.218*	.976
61	236.4000	4115.834	.556	.976

*** Item total correlations less than 0.3**

Table 1 (continued)

Item no.	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
62	235.7000	4199.252	.142*	.976
63	236.3667	4153.689	.424	.976
64	235.7333	4147.926	.403	.976
65	236.5000	4068.328	.771	.975
66	236.7333	4069.099	.769	.975
67	236.3000	4083.390	.702	.975
68	236.7667	4069.909	.753	.975
69	236.2667	4080.064	.750	.975
70	236.4000	4079.628	.733	.975
71	236.9333	4096.961	.649	.975
72	237.4333	4137.840	.624	.976
73	237.5000	4117.638	.769	.975
74	237.3667	4101.344	.707	.975
75	237.2667	4103.030	.771	.975
76	237.3667	4107.551	.735	.975
77	236.8000	4093.683	.755	.975
78	236.9333	4105.995	.633	.976
79	235.7667	4092.047	.706	.975
80	236.1333	4137.154	.490	.976
81	236.5667	4092.806	.658	.975

*** Item total correlations less than 0.3**

Table 1 (continued)

Item no.	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
82	235.4667	4150.740	.470	.976
83	236.2333	4137.151	.578	.976
84	235.8667	4180.395	.301	.976
85	236.2000	4156.097	.390	.976
86	236.0667	4130.823	.533	.976

*** Item total correlations less than 0.3**

Table 2

Item Correlation of "Commitment to active participation" Subscale in Pre-testing (n=30)

Item no	Corrected Item-total Correlations	Alphas if item deleted
1	.547	.941
2	.569	.941
3	.565	.941
4	.713	.940
5	.661	.940
6	.333	.944
7	.649	.940
8	.576	.941
9	.373	.943
10	.251*	.944
11	.590	.941
12	.394	.943
13	.834	.939
14	.722	.940
15	.644	.941
16	.425	.942
17	.450	.942
18	.678	.940
19	.685	.940
20	.608	.941

*** Item total correlations less than 0.3**

Table 2 (continued)

Item no	Corrected Item-total Correlations	Alphas if item deleted
21	.495	.942
22	.433	.942
23	.611	.941
24	.668	.940
25	.622	.941
26	.559	.941
27	.640	.941
28	.633	.941
29	.606	.941
30	.324	.943
31	.347	.943
32	.452	.942
33	.538	.941
34	.500	.942
35	.747	.940
	Total alpha 0.943	

*** Item total correlations less than 0.3**

Table 3

Item Correlation of "Persistence in practicing preventive behaviors" Subscale in Pre-testing (n=30)

Item no	Corrected Item-total Correlations	Alphas if item deleted
36	.703	.919
37	.756	.919
38	.777	.918
39	.653	.920
40	.522	.922
41	.776	.919
42	.687	.920
43	.652	.920
44	.722	.919
45	.706	.919
46	.565	.922
47	.480	.923
48	.576	.922
49	.450	.923
50	.404	.924
51	.595	.922
52	.317	.925
53	.652	.920
54	.301	.926
55	.528	.922
56	.587	.921

*** Item total correlations less than 0.3**

Table 3 (continued)

Item no	Corrected Item-total Correlations	Alphas if item deleted
57	.603	.921
58	.582	.921
59	.267*	.925
60	.166*	.927
62	.375	.924
63	.120*	.927
64	.131*	.927
	Total alpha 0.925	

*** Item total correlations less than 0.3**

Table 4

Item Correlation of "Maintenance of desired preventive behaviors" Subscale in Pre-testing (n=30)

Item no	Corrected Item-total Correlations	Alphas if item deleted
65	.821	.944
66	.810	.944
67	.788	.945
68	.798	.945
69	.819	.944
70	.833	.944
71	.713	.946
72	.621	.947
73	.704	.946
74	.646	.947
75	.783	.945
76	.758	.946
77	.727	.946
78	.633	.947
79	.729	.946
80	.549	.948
81	.730	.946
82	.375	.950
83	.564	.948
84	.236	.951
85	.339	.950

*** Item total correlations less than 0.3**

Table 4 (continued)

Item no	Corrected Item-total Correlations	Alphas if item deleted
86	.576	.948
87	.360	.950
88	.410	.949
	Total alpha 0.949	

*** Item total correlations less than 0.3**

APPENDIX G

Items Correlations of 83 Item APBS in Filed Testing

Table 5

Item and Subscale Correlations of the 83 item APBS in Field Testing (n = 661)

Item No.	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
1	223.7943	4661.549	.705	.988
2	223.6838	4655.571	.738	.988
3	223.7156	4655.204	.746	.988
4	223.6551	4655.181	.742	.988
5	223.7247	4656.839	.747	.988
6	223.7095	4659.819	.727	.988
7	223.6747	4662.565	.739	.988
8	223.8517	4671.384	.697	.988
9	223.7474	4665.901	.727	.988
10	223.9077	4674.993	.679	.988
11	223.8926	4669.529	.665	.988
12	223.7791	4662.239	.727	.988
13	223.6853	4659.352	.748	.988
14	223.7292	4660.874	.737	.988
15	223.7685	4664.381	.740	.988
16	223.9576	4670.501	.715	.988
17	223.8154	4665.169	.722	.988
18	223.4932	4653.375	.737	.988
19	223.3737	4652.153	.747	.988
20	223.5416	4656.570	.753	.988
21	223.4221	4651.662	.777	.988

Table 5 (continued)

Item No.	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
22	223.3903	4653.608	.757	.988
23	223.4584	4657.440	.749	.988
24	223.6823	4655.690	.777	.988
25	223.8729	4657.999	.760	.988
26	223.9244	4672.309	.695	.988
27	223.5129	4693.720	.509	.988
28	223.7005	4658.453	.724	.988
29	223.7141	4647.314	.736	.988
30	223.3979	4719.179	.398	.988
31	223.2980	4713.564	.415	.988
32	223.5129	4662.508	.760	.988
33	223.3933	4662.209	.738	.988
34	224.1437	4665.393	.722	.988
35	224.2829	4674.276	.679	.988
36	224.2602	4672.375	.685	.988
37	224.1225	4666.877	.706	.988
38	224.2965	4672.857	.677	.988
39	224.2224	4674.122	.666	.988
40	224.2300	4673.592	.669	.988
41	224.0439	4662.948	.705	.988
42	224.0681	4665.461	.687	.988
43	224.0408	4670.618	.698	.988
44	224.0076	4658.204	.709	.988

Table 5 (continued)

Item No.	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
45	223.8502	4663.843	.746	.988
46	223.7670	4667.267	.709	.988
47	224.1679	4688.673	.625	.988
48	224.1195	4686.760	.614	.988
49	224.1513	4683.165	.649	.988
50	224.1346	4686.599	.635	.988
51	223.7504	4662.875	.709	.988
52	223.7655	4664.071	.741	.988
53	223.7035	4658.248	.774	.988
54	223.9970	4672.242	.705	.988
55	224.1029	4680.411	.682	.988
56	224.0166	4673.629	.697	.988
57	223.8366	4658.919	.751	.988
58	223.9017	4669.868	.659	.988
59	223.6309	4696.164	.506	.988
60	223.7852	4658.484	.703	.988
61	223.9032	4662.372	.687	.988
62	223.6868	4652.861	.711	.988
63	223.7458	4654.044	.724	.988
64	223.7368	4653.203	.718	.988
65	223.7398	4651.950	.737	.988
66	223.9395	4659.263	.720	.988
67	223.8835	4660.412	.752	.988

Table 5 (continued)

Item No.	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
68	223.8094	4659.603	.757	.988
69	223.7277	4667.544	.726	.988
70	223.8366	4666.173	.722	.988
71	223.8623	4666.713	.719	.988
72	223.8124	4666.250	.731	.988
73	223.7912	4664.308	.742	.988
74	223.5809	4661.350	.738	.988
75	223.6142	4665.780	.742	.988
76	223.7776	4659.107	.724	.988
77	223.5461	4693.803	.539	.988
78	223.5356	4686.661	.658	.988
79	223.5477	4666.397	.705	.988
80	223.6324	4675.736	.666	.988
81	223.6339	4661.723	.727	.988
82	223.6445	4685.860	.616	.988
83	223.6309	4687.797	.594	.988

APPENDIX H

Factor Loading of Each Item and Attributes of the 61-Item APBS

Table 6

Factor Loading of Each Item and Attributes of the 61-Item APBS

Items no	Factors			Communality
	1	2	3	
21	.753			.745
14	.743			.706
19	.723			.691
22	.700			.677
7	.700			.683
18	.685			.661
12	.679	.419		.665
11	.672			.751
6	.654			.632
15	.652	.490		.689
9	.638			.623
32	.634			.640
8	.634			.596
10	.604	.434		.577
17	.604	.512		.651
28	.590		.426	.588
2	.565			.577
25	.559	.437		.610
3	.550	.423		.581
27	.548			.404
16	.547	.523		.607
5	.531	.450		.584

Table 6 (continued)

Items no	Factors			Communality
	1	2	3	
1	.527	.416		.531
29	.513		.416	.556
31	.503			.332
58	.498			.473
59	.450			.338
38		.772		.679
40		.771		.683
42		.744		.658
36		.736		.644
49		.725		.635
34		.712		.650
50		.708		.599
48		.681		.577
56		.667		.604
47		.664		.546
43		.648		.604
45	.450	.632		.657
54		.621		.585
51	.426	.599		.592
44	.407	.577		.572
53	.502	.553		.651
46	.513	.540		.595

Table 6 (continued)

Items no	Factors			Communality
	1	2	3	
81			.797	.774
76			.796	.752
78			.782	.693
63			.777	.742
65			.767	.740
79			.762	.710
61			.756	.682
82			.750	.639
83			.742	.620
77			.740	.617
74			.723	.689
66			.723	.690
80			.718	.643
72			.711	.675
68			.689	.693
70			.686	.645

APPENDIX I

List of Experts

List of Content Validity Experts

Associate Professor Dr. Patcharaporn Aree**,** RN.

Faculty of Nursing, Chiang Mai University, Chiang Mai, Thailand

Assistant Professor Dr. Sunida Prechawong, RN.

Faculty of Nursing, Chulalongkorn University, Bangkok, Thailand

Associate Professor Dr. Pajongsil Perngmark, RN.

Faculty of nursing, Prince of Songkla University, Songkhla, Thailand

VITAE

Name Mrs. Siriwan Chukumnird

Student ID 5310430009

Educational Attainment

Degree	Name of Institution	Year of Graduation
Master of Science (Physiology)	Prince of Songkla University (Thailand)	1999
Diploma in Nursing and Midwifery (Equivalent to Bachelor of Science in Nursing).	Boromarajonni Colleage of Nursing, Songkhla (Thailand)	1993

Scholarship Awards during Enrolment

1. Scholarship provided by Praboromarajchanok Institute for Health Workforce Development.

2. The dissertation grant, Faculty of Graduate School, Prince of Songkla University

Work – Position and Address

Register Nurse (Teaching), Boromarajonani College of Nursing, Songkhla, Thailand

List of Publication and Proceeding (If Possible)

Hiranyachattada, S., Saetew-Chukumnird, S., & Harris, P.J. (2005). Effects of candesartan on rat renal haemodynamics and proximal tubular reabsorption. *Clinical and Experimental Pharmacology and Physiology*, *32*(9), 714-720.

Chukumnird, S., Boonyasopun, U., & Jittanoon, P. (2016). Perspective regarding adherence to preventive behaviors: A qualitative study of Thais with prehypertension. *Pacific Rim International Journal of Nursing Research*, *20*(2), 106-118.