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THESIS

PREDICTORS OF PHYSICAL ACTIVITY AMONG OLDER PEOPLE  
WITH HYPERTENSION IN BANTUL, INDONESIA



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Physical activity can bring significant health benefits to people of all age, extend years of active independent living, reduce disability, and control blood pressure for older people. Hypertension that considered one of early signs of risk factor leading to chronic diseases can be controlled with adequate physical activity. Identifying the predictors of physical activity within a theoretical framework is a prerequisite to increase physical activity. This study aimed to identify predictors of physical activity among older people with hypertension in Bantul, Indonesia. A cross-sectional design was used to achieve the aim. Participants were selected from four primary health centers in Bantul, Indonesia using multi stage sampling method. A total of 174 older people with hypertension were recruited and were asked to complete five questionnaires by a face-to-face interview. Multiple linear regression with backward method was employed for analyzing data.

The results showed that age, perceived barrier, perceived self efficacy, and social support were predicting physical activity in older people ( $p < .01$ ). It can explain 17.4% of variance in physical activity (Adjusted  $R^2 = .174$ ). While, gender, income, education level, BMI, occupation, living arrangement, and perceived health status were not predicting physical activity ( $p > .05$ ). In conclusion, adequacy of physical activity can be reached by decreased of perceived barrier, increased of perceived self efficacy, and social support. Intervention program to overcome the barrier, improve self efficacy, and social support for physical activity should be focused for older people.

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Student's signature

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Thesis Advisor's signature

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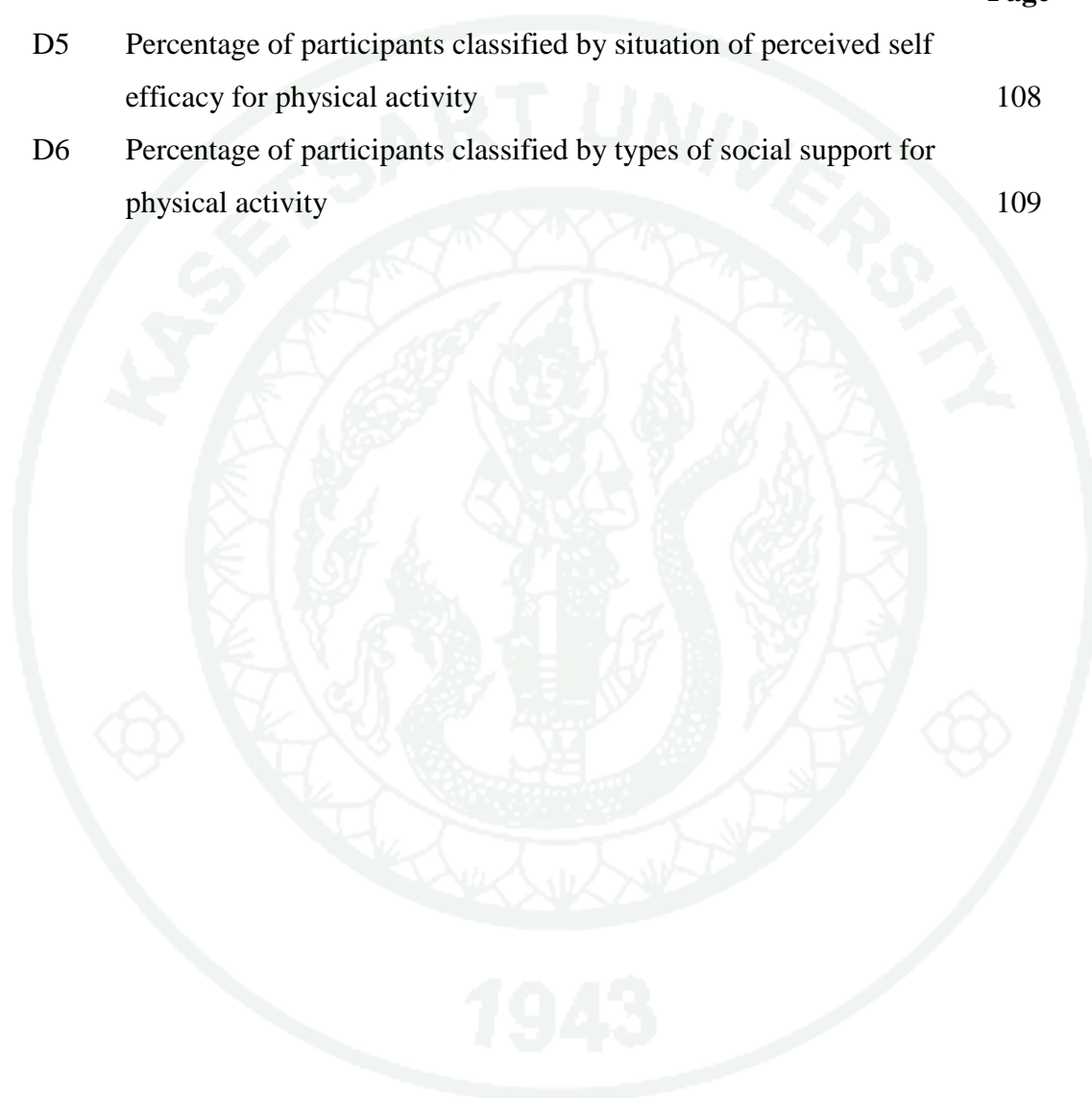
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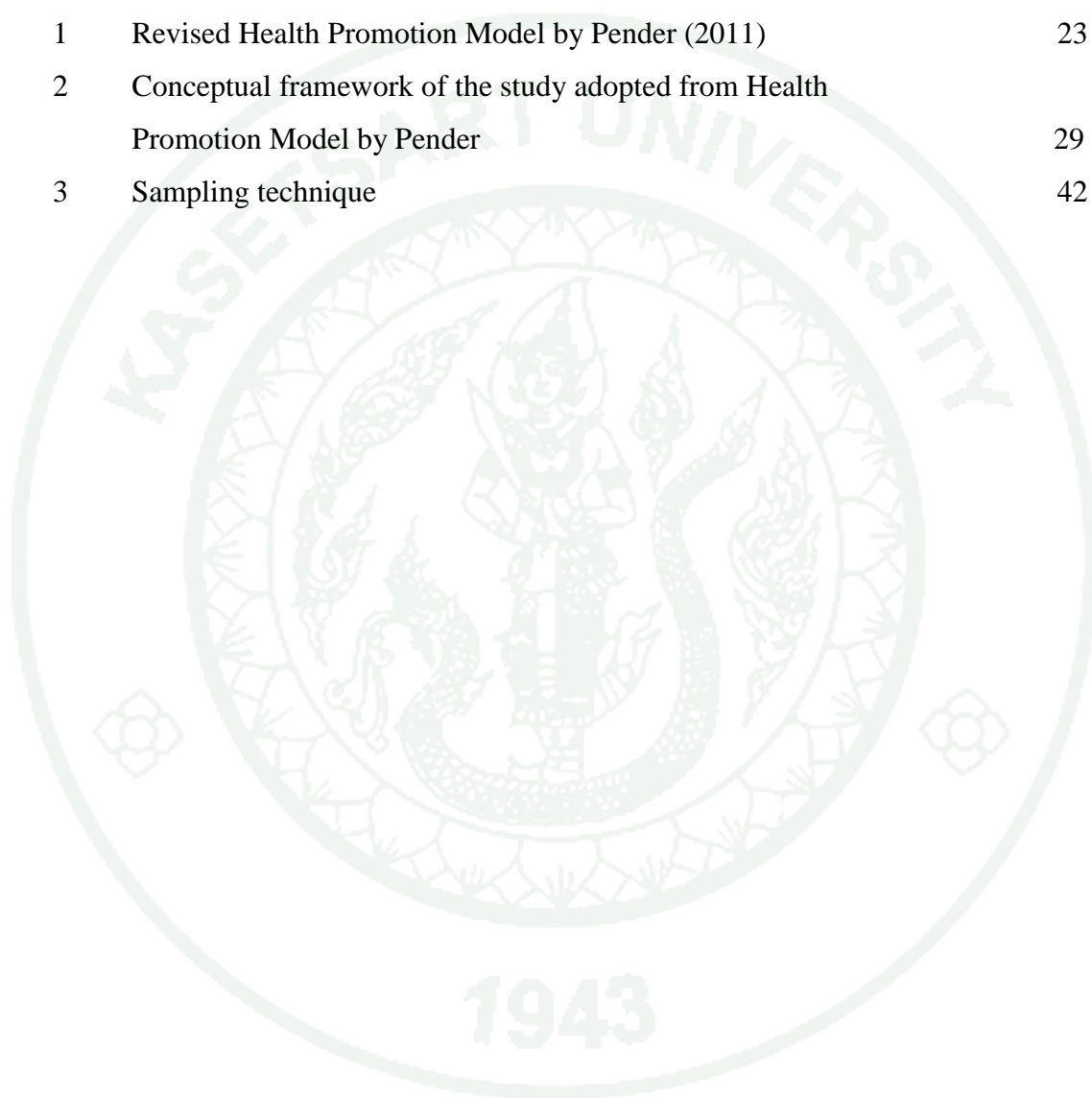
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## LIST OF ABBREVIATIONS

$\alpha$	=	Alpha
$\beta$	=	Beta
AHA	=	American Heart Association
BCNNV	=	Boromarajonani College of Nursing Nopparat Vajira
BES	=	Barriers to Exercise Scale
BMI	=	Body Mass Index
BAPPEDA	=	Badan Perencanaan dan Pembangunan Daerah
ERB	=	Ethical Review Board
HPM	=	Health Promotion Model
HT	=	Hypertension
Max	=	Maximum
Min	=	Minimum
MoH	=	Ministry of Health
PHC	=	Primary Health Center
PA	=	Physical Activity
PSEEQ	=	Perceived Self-Efficacy for Exercise Questionnaire
SD	=	Standard Deviation
SPAQ	=	Self-reporting for Physical Activity Questionnaire
SSEQ	=	Social Support for Exercise Questionnaire
VIF	=	Variance Inflation Factor
WHO	=	World Health Organization

# **PREDICTORS OF PHYSICAL ACTIVITY AMONG OLDER PEOPLE WITH HYPERTENSION IN BANTUL, INDONESIA**

## **INTRODUCTION**

Statistically the rates have continued to increase unchecked for various chronic diseases which are the major cause of mortality and disability worldwide. World Health Organization (WHO, 2008a) claimed that without action to address these causes, the complications from chronic diseases will likely to increase by 17% annually. Chronic diseases have caused financial burden to many countries. The economic impacts of chronic diseases include higher health care costs, lost productivity due to illness, and the need to replace these lost workers. WHO had three keys in management chronic disease including limited tobacco use, healthy diet, and engaging physical activity

Hypertension is considered one of early signs of risk factor leading to chronic disease such as chronic renal disease, heart disease, and diabetes mellitus. Study by Chang et al. (2008) found that people with hypertension carried risk factor of 2.25 times higher of developing chronic renal disease than normal people who did not have hypertension. Hypertension is also the leading factor of heart disease. Another study found that 20.3% of cases of heart disease were caused by hypertension (Ramakrishnan et al., 2003). Moreover, the incidence of diabetes mellitus is also affected by hypertension. People with hypertension would be 2 to 3 times more likely of becoming patients of Diabetes than people who had normal blood pressure (Grossman and Messerli, 2008).

WHO (2008b) reported the prevalence of hypertension was 40% amongst global population of 25-year old and over, whereas the prevalence was 38% amongst population in South-East Asia who developed hypertension. Moreover, prevalence of hypertension is expected to increase every year. Based on report by the Ministry of Health (MoH, 2012) of Indonesia the prevalence of hypertension in 2008 in Indonesia was 37.4% of the total population aged 18 years and over and by 2012, this has increased to 41%. The findings suggested that current intervention to reduce the number of hypertension cases might not have been carried out effectively.

The high number of hypertension cases is related to several factors. The influencing factors leading to hypertension include eating habit (Rahajeng and Tuminah, 2009; Suzana et al., 2011), smoking habit (Viridis et al., 2010; Liu et al., 2013), and drinking alcohol habit (Rahajeng and Tuminah, 2009; Puavilai et al., 2011). Moreover, high Body Mass Index (BMI) also another influencing factor causing hypertension (Puavilai et al., 2011). Furthermore, the factor related to hypertension is physical activity (Rahajeng and Tuminah, 2009). According to Huai et al. (2013), people engaging in high level of physical activity had risk factor of hypertension of 0.89 times, which is lower risk than people engaging in low level of physical activity. Research by Sihombing (2010) showed people in Indonesia who engaged in inadequate physical activity were 1.5 times higher at risk of hypertension than those who had adequate physical activity. Previous case study in Indonesia by Rahajeng and Tuminah (2009) found 42.9% of the people who had hypertension were amongst people with low physical activity.

Physical activity (PA) is defined as any bodily movement produced by skeletal muscles that result in energy expenditure (WHO, 2008c). Physical activity can bring significant health benefits to people of all age, even in older people. Physical activity can extend years of active independent living, reduce disability and improve quality of life for older people (Division of Ageing and Senior in Canada, 2011 as cited in Sun et al., 2013). In a large scale, longitudinal 8-year-study it was found that every additional 15 minutes of daily physical activity up to 100 minutes per day resulted in 4% decrease in mortality from any cause (Wei et al., 2011). Furthermore, physical activity aimed at effectively managing hypertension is expected to have an impact on population health. Physical activity has significant influence to control blood pressure (Fagard, 2007). Previous study has established that if hypertension control was optimized, cardiac mortality would decline by 49% and cerebral vascular mortality by 62% (Whitworth as cited in Lewanczuk, 2008). It is recommended that adults aged 65 years and over should undertake a minimum of 30 minutes of physical activity of moderate intensity at least 5 days a week, just like younger adults but with consideration for age-appropriate intensity and type of activity (WHO, 2008c).

In spite of physical activity having shown many benefits to individual health, many people are not concerned of its benefits. Based on WHO (2008c), it was estimated that

31% of adults and older people were insufficiently engaged in physical activity (28% in men and 34% in women), while in the South East Asia, statistic has shown 15% of men and 19% of women were insufficiently engaged in physical activity, and in Indonesia, the statistical records of physical activity that did not meet WHO's guideline was 31.9 % of male population and 27.9% of female population (Rahajeng and Tuminah, 2009). In addition, WHO (2008c) stated that physical inactivity was identified as the fourth leading risk factor of global mortality causing an estimated 6% of mortality globally.

Several studies have been conducted by focusing their study on factors predicting physical activity in older people. Researchers reported factors predicting physical activity in older people were personal factors (Lin, 2010; Jaiyungyuen et al., 2012), perceived barriers of physical activity (Alias 2006; Phantapak et al., 2009; Patel et al., 2013), perceived self-efficacy (Lee, 2006; Jaiyungyuen et al., 2012), and social support (Lee, 2006; Phantapak et al., 2009; Chamroonsawasdi et al., 2010; Jaiyungyuen et al., 2012). Several of personal factors influencing physical activity include gender, Body Mass Index (BMI), perceived health status, living status, income, occupation, and educational level. By comparison between different genders, previous studies found the level of physical activity in older male people was found to be higher than older female people (Willey et al., 2010), whereas other study contradicted that older female people had higher level of physical activity than older male people (Kanyoni et al., 2009). BMI is an indicator commonly used to classify underweight, overweight and obesity and can be a factor related to physical activity (Giuli et al., 2012; Hamer et al., 2014). Moreover, several studies examined physical activity in light of any correlation with perceived health status (Poolsawat, 2006; Goldsholl, 2008; Giuli et al., 2012) and living arrangement (Lin et al., 2010; Nosorn and Saengngern, 2013), whereas income and occupation correlating to the social and financial status were found to be also associated with physical activity (Lee, 2006; Chamroonsawasdi et al., 2010; Jaiyungyuen et al., 2012). As for level of education, individuals with low-education were associated with reduced physical activity (Shaw et al., 2008). In contrast, study by He et al., (2005), has found individuals with high education level engaged in less physical activity than those with low education level.

Another factor that predicts physical activity is perceived barrier of physical activity. Older people might perceived more barriers to physical activity than younger

people. Perceived barrier has showed the strong predictor of physical activity in older people (Patel et al., 2013). Study by Moschny et al. (2011) found that age, poor health, and lack of interest were barriers amongst older people to engage themselves in physical activity. Study by Schwarzer (2008) concluded that perceived barriers were relevant elements in explaining health behavior, but in contrary, some previous studies revealed that perceived barriers could not predict physical activity (Alias 2006; Phantapak et al., 2009).

Self-efficacy is yet one of the great factor of predicting physical activity in older people. According to aging process theory, older people can feel lost their power and their confidence to perform activity. Self-efficacy is a primary determinant of behavior (Bandura & King, as cited in Alias, 2006). Previous studies noted that self-efficacy was one predictor of physical activity in older people (Smith et al., 2007; Jaiyungyuen et al., 2012), while other studies found that self-efficacy was not considered a predictor of physical activity without social support (Alias, 2006; Lee, 2006). In addition, self-efficacy was a significant predictor of physical activity amongst young adults, but was not a significant predictor of physical activity amongst older people (Lee, 2006).

Moreover, study of social support factor also looked into the role of others in facilitating physical activity and found that social support could also predict physical activity amongst older people (Lee, 2006; Phantapak et al., 2009; Chamroonsawasdi et al., 2010; Jaiyungyuen et al., 2012), but in contrary to that, study by Kraithaworn (2011) found social support did not significantly predict physical activity without a good spirit of community. Other people are important for older people to facilitate and help older people to perform activities.

Physical activity is one of health behavior which could be explained by theory or a model, and one model was Health Promotion Model (HPM) by Pender (2011) which stated that any health behavior was influenced by personal factors, perceived benefits, perceived barriers, perceived self-efficacy, and interpersonal influence. Various studies of health behavior in different age groups have adopted Pender's HPM as the guideline, these were oral health behavior in children (Vakili et al., 2013), accident prevention in adult (Conway et al., 2007), and physical activity amongst older people (Nosorm et al., 2013;

Patel et al., 2013). In conclusion, factors influencing physical activity are important in order to determine appropriate strategies of raising the level of engaging in physical activity.

Bantul is one of district in Yogyakarta. Yogyakarta, Indonesia is one particular province with the highest population of older people and concerns are about the health-related problems among these older people. One problem in particular is increased number of hypertension cases. In 2008, there was reported 29.8% of hypertension cases were among older people aged 60 years and above (Rahajeng and Tuminah, 2009), and this has increased to 33% in 2011 (Indonesia MoH, 2012). Based on the previous studies, factors of hypertension in Yogyakarta were genetic, obesity, and inadequate physical activity (Yenni et al., 2009; Pranama, 2012). In spite of the Indonesian Ministry of Health having conducted health educational program in every public health center (PHC) to promote healthy behavior among older people and highlighted benefits of physical activity (Indonesia MoH, 2013) as well as providing services for older people in each PHC covering 100% of PHC in Yogyakarta, but still, previous study found that older people had inadequate physical activity (Pranama, 2012).

This study was focused on physical activity because being physically active can reduce and control blood pressure in older people with hypertension (Rossi et al., 2012). Moreover, previous study stated that older people would be easier to manage their physical activity behavior than eating behavior (Suzana et al., 2011). Several studies have identified factors predicting physical activity, but research reflecting aspects of physical activity in a theoretical framework is still limited as for Bantul, Yogyakarta. Overall increased attention to physical activity among young people is evident but there are relatively few studies of physical activity focusing on older people with hypertension (Lee, 2006). Therefore, research focusing on physical activity among older people with hypertension is needed for a variety of benefits. The results of this study that identifying the predictors of physical activity within a theoretical framework is a prerequisite to devise guideline leading towards developing interventions to increase physical activity and meeting WHO's criteria of physical activity. Moreover the result of the study could be used as a baseline data for Indonesian government and health center to promote healthy behavior especially among older people.

## OBJECTIVES

The following objectives of the study divided into overall objective and specific objectives:

### 1. General objective

The aim of the study is to identify the predictors of physical activity among older people with hypertension who lived in Bantul, Yogyakarta, Indonesia

### 2. Specific objectives

2.1 To describe the level of physical activity, personal factors (age, gender, BMI, perceived health status, education level, income, living arrangement, and occupation), perceived barrier, perceived self efficacy, and social support for physical activity among older people with hypertension who lived in Bantul, Yogyakarta, Indonesia

2.2 To examine the effect of personal factors (age, gender, BMI, perceived health status, education level, income, living arrangement, and occupation) on physical activity among older people with hypertension who lived in Bantul, Yogyakarta, Indonesia

2.3 To examine the effect of perceived barrier on physical activity among older people with hypertension who lived in Bantul, Yogyakarta, Indonesia

2.4 To examine the effect of perceived self efficacy on physical activity among older people with hypertension who lived in Bantul, Yogyakarta, Indonesia

2.5 To examine the effect of social support for physical activity among older people with hypertension who lived in Bantul, Yogyakarta, Indonesia

## LITERATURE REVIEW

Literature review presents summary of definition older people, aging process related to physical activity, description of hypertension in older people, hypertension in older people related to physical activity, and synthesis of the research on the predictors and effects of physical activity among older people with hypertension. Research addressing physical activity, older people, hypertension, personal characteristic, perceived benefits, perceived self-efficacy, and social support is included.

### 1. Older people

Currently, the life expectancy of older adults has increased and has extended the amount of time spent in older age. As a result, this has brought a huge increase in the older people population.

#### 1.1 Definition of older people

Definition of older people varies across country. Africa defined older people is age of the people either 50 or 55 years of age. The older population is the people who reach age 60 and over (Law of the Republic of Indonesia, 1998). Similarly with Persson (2011), WHO (2012) explained that the older people is all those whose age 60 and over. The United States' older people population is defined people who reach age 65 and over (Werner, 2011). Therefore, this study adopted the definition of older people are the people who aged 60 years old and over.

#### 1.2 Aging theories

There are numbers of different theories of aging, which are generally specific to each discipline. Theories of aging are biological, psychological and sociological focus (Tabloski, 2006; Eliopoulos, 2010).

Biological theories attempt to explain the individual difference in aging. Biological aging theories include genetic theories and non genetic theories. The genetic

theories assume that aging is predetermined, such as glycation theory that suggests glucose acts as a mediator of aging and the somatic DNA damage theory states mutations are those inheritable changes that occur in the cellular DNA (Eliopoulos, 2010). Whereas the non genetic theories presume that aging events occur randomly and accumulate with time, such as the wear and tear theory attributes aging to the wear and tear of the body as it performs its functions overtime and nutrient deprivation theory purposes that oxygen deprivation leads to senescence of deprived cells. These theories explain the aging process and characteristics as various factors that may affect aging such as genetics, random events, environment, lifestyle, and habits.

Psychological aging theories focus on mechanisms for maintaining emotional regulation at older ages (Bengston et al., 2009). These theories include Jung's Theory of Individualism and Erickson's Developmental Theory. Jung assumed that successful aging means older people as individual aged accept the past and have ability to cope with functional decline an loss significant others. Erickson concluded that the primary psychosocial task of this stage is to maintain ego integrity include holding on to one's sense of wholeness, while avoiding despair or fearing. Psychological aging theories agreed that development is a process of lifelong adaptation for emotional regulation (Eliopoulos, 2010). In addition to older age, increased vulnerability is more likely under conditions of resource limitations and cognitive decline.

Sociological aging theories discuss changes that relate to the environmental influences that contribute to and affect aging people. It includes the disengagement theory, the activity theory, and the continuity theory (Tabloski, 2006). The disengagement theory views aging as a process of mutual withdrawal in which older adults willingly slow down by retiring, as expected by society and hold that mutual social withdrawal benefits both individuals and society. On the other hand, the activity theory present that the changing of activities was the result of changed meaning in the activities as seen through the life span. Activity theory emphasizes the importance of ongoing social activity. The continuity theory includes basic personality, attitudes, and behaviors remain constant throughout the life span. Continuity theory states that older people try to preserve and maintain by using strategies that maintain continuity. Hence, these theories focus on the developmental

stages of aging and perceptions regarding the value of interactions and the ways that these perceptions affect older people relationships.

In summary, aging theories provide guideline for understanding about older people and investigate the nature of aging itself. Aging theories present a foundation for the older people's attitude. These theories can be used as the basis for determine the changes in older people related to their physical activity.

### 1.3 Aging process

Changes that occur with aging include three categories: physical, psychological, and social. As a change begins to happen in one area of a person's life, the other two aspects will be affected. Normally, older people experience common changes to some degree. However, the aging process can affect individual differently both in the same of age and environment (Saxon et al., 2010).

#### 1.3.1 Physical changes

Older people tend to decrease in physical strength, endurance, and flexibility. Muscle strength and flexibility decrease with age. A major reason muscles tend to become weaker is that there is the muscle mass shrink because of limited of muscle activity. The capacity also gradually declines (Saxon et al., 2010). Increase in age, the efficiency of body organs decline in older people. For example the heart becomes less efficient in pumping and controlling blood circulation. Lungs become less elastic and poor expansion, also blood pressure tend to rise. Older people are also more likely to get loss of bone mass and slower reflex. Thinning and shrinkage occurs in the bone, most noticeably in the vertebrae and the long bones of the arms and legs. The movements become slower, reaction time also become slower because of changes in the central nervous system. Moreover, decline in the senses happen in older people. The most impactful changes are changing in hearing and vision (Saxon et al., 2010).

The physical change can influence the older people to perform activity daily living. Study by Milanović et al. (2013) found that reduction in physical activity

level in older people was similar for both men and women due to aging process, and differences between young and old people were due to the reduction of muscle strength in both upper and lower limbs and changes in body-fat percentage, flexibility, agility, and endurance. Physical activity was found have a greater proportion in young adults than older adults because of decreased flexibility (Belanger et al., 2011; Stathokostas et al., 2013). This study described reduction was due to the aging process. Hence, WHO (2008c) had guideline for physical activity especially in older people.

### 1.3.2 Psychological changes

Older people seem to be vulnerable to psychological dysfunction when they experience change. Psychological changes include affective and cognitive function. Affective function refers to mood and emotion such as happiness, fear, and anger. Affective function is influenced by the way an individual views the world and self. Stanley and Isaacowitz (2011) found the older age (58-89 years old) exhibited slower processing speed, more state anxiety and neuroticism, and looked less at happy faces than the younger groups (18-30 years old). Previous studies demonstrated that the prevalence of depressive symptoms increases with age (Cairney et al., 2009; Singh and Misra, 2009; Aylaz et al., 2012). While, cognitive function refers to memory, learning and intelligence (Glisky, 2007). Cognitive function has changed with age (Salthouse, 2012). Intelligence of older people gained throughout the years remains intact such as vocabulary, general knowledge, and understanding. At this time, the older people easier to remember what happened a year ago than remember what happened last night. As increased of age, the older people lose the capacity to process information from many sources at one time. Having conversations one-on-one makes communication more positive by allowing the brain to respond to one stimulus at a time (Eliopoulos, 2010).

### 1.3.3 Social changes

In later life, the older people begin to experience many different types of losses, such as health, job, money, home, and death of friends and family. Changes of social status influence older people to feel lose their social power, roles, and feel being abandoned. The important emotional needs of older adults include having a sense of

control and being involved in decisions. Older people who perceive less sense of control in their lives tend to be more discouraged, less satisfied and do not confidence (Eliopoulos, 2010). Feelings of confidence that called self-efficacy can affect the behavior of older people include physical activity (Morris, 2008; Priscilla, 2011; Jaiyungyuen et al., 2012).

In conclusion, the changes have impact to older people in health, psychological and social. Physical changes cause health problem because of deterioration of body system in older people. Psychological changes influence mental health such as afraid of inability and communication with other. While, social changes decline the confidence to perform behavior.

## **2. Hypertension**

Hypertension as a condition that can lead chronic disease is elevated pressure of the blood in the arteries. Number of hypertension is expected to increase every year and it needs more understanding about hypertension.

### **2.1 Definition of hypertension**

Hypertension, also known as high or raised blood pressure, is a condition in which the blood vessels have persistently raised pressure (WHO, 2013). Hypertension in older people is defined as a condition with systolic blood pressure of at least 140 mm Hg and/or a diastolic blood pressure of at least 90 mm Hg (American Heart Association, 2011). Similarly with La Ode (2012), hypertension is an increase in blood pressure where systolic blood pressure greater than 140 mmHg and diastolic blood pressure over 90 mmHg. The blood pressure was classified by the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. There are four classifications include normal blood pressure, pre hypertension, stage 1 hypertension and stage 2 hypertension.

**Table 1** Classification of blood pressure based on The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7)

Category	Systolic	Diastolic
Normal	<120	and <90
Pre hypertension	130-139	or 80-89
Stage 1 hypertension	140-159	or 90-99
Stage 2 hypertension	≥160	or ≥100

**Source:** Rafey (2013)

## 2.2 Causes of hypertension

Causes of hypertension divide into two types. First, primary hypertension means the high blood pressure with no obvious underlying medical cause. Second, secondary hypertension is caused by other conditions that affect the kidneys, arteries, heart or endocrine system. Hypertension is related to many factors include genetic factors, age, gender, and life style such as eating habit (Rahajeng and Tuminah, 2009; Suzana, et al., 2011), BMI (Puavilai et al., 2011), and physical activity (Huai et al., 2013).

## 2.3 Pathophysiology of hypertension

Blood pressure is the product of cardiac output and systemic vascular resistance. It follows that patients with arterial hypertension may have an increase in cardiac output, an increase in systemic vascular resistance, or both. In the younger age group, the cardiac output is often elevated, while in older patients increased systemic vascular resistance and increased stiffness of the vasculature play a dominant role. Vascular tone may be elevated because of increased  $\alpha$ -adrenoceptor stimulation or increased release of peptides such as angiotensin or endothelins. The final pathway is an increase in cytosolic calcium in vascular smooth muscle causing vasoconstriction. Several growth factors, including angiotensin and endothelins, cause an increase in vascular smooth muscle mass termed vascular remodelling. Both an increase in systemic vascular

resistance and an increase in vascular stiffness expand the load imposed on the left ventricle; this induces left ventricular hypertrophy and left ventricular diastolic dysfunction (Foex and Sear, 2004)

In hypertensive patients, both increased release of, and enhanced peripheral sensitivity to, norepinephrine can be found. In addition, there is increased responsiveness to stressful stimuli. Another feature of arterial hypertension is a resetting of the baroreflexes and decreased baroreceptor sensitivity. The renin–angiotensin system is involved at least in some forms of hypertension (e.g. renovascular hypertension) and is suppressed in the presence of primary hyperaldosteronism. Older people with higher melanin tend to have low-renin hypertension. Others have high-renin hypertension and these are more likely to develop myocardial infarction and other cardiovascular complications (Nadar and Lip, 2009).

#### 2.4 Hypertension in Older People

Hypertension in older people is a significant problem that deserves more attention because it is one risk factor that can lead chronic disease. Systolic hypertension is the most common type of hypertension in the elderly and a major modifiable cardiovascular risk factor. Systolic hypertension is associated with a wide pulse pressure resulting largely from excessive large artery stiffness. Arterial stiffness increases with age independently of mean blood pressure or the presence of other risk factors (Laurent et al., 2002). Systolic hypertension may occur even though diastolic blood pressure is in the normal range (Prisant, 2005).

Precipitating factors of hypertension in older people include uncontrolled factors and controlled factors. Uncontrolled factors comprise family history of hypertension and age (Chacón et al., 2008). While, controlled factors cover Body Mass Index (BMI) at obesity categorize, smoking habits, excessive salt intake, and low physical activity (Chacón et al., 2008).

### 3. Physical Activity

Physical activity is the important leading health indicator in the elderly, along with independent living. Physical activities can impact body endurance, strength, balance, and flexibility of older people. These are important for staying healthy and independent.

#### 3.1 Definition of physical activity

WHO (2008c) defined physical activity is defined as bodily movement produced by skeletal muscles that result in energy expenditure. Physical activity is the most important leading health indicator in the older people, along with independent living. Physical activities directly impact body endurance, strength, balance, and flexibility, and each of these is important for staying healthy and independent. In addition, National Heart, Lung, and Blood Institute (2008) explained physical activity is any body movement that works of muscles and requires more energy than resting.

#### 3.2 Classification of physical activity

Physical activity can be classified according to various versions. Classification is based on activities, time, and intensity.

US National Institute of Aging (2011) defined physical activity into endurance activities, strength activities, stretching and flexibility activities. Endurance activities increase heart rate and breathing for extended periods of time. They improve the health of the heart, lungs, and circulatory system, and have been shown to help prevent or delay some diseases associated with aging, such as diabetes, arthritis, heart disease, and others. Endurance activities include walking, climbing stairs, and grocery shopping. Strength activities increase cardiac and musculoskeletal function, and consequently, older adults remain strong enough to do the things they need and like to do. Balance activities help prevent falls, which are a major cause of disability in older adults. Stretching and flexibility activities help keep the body in line and maintain flexible range of motion (ROM).

Based on time, physical activity divided into 3 categories. There are activity daily living, leisure time activity, and exercise (Moh of Singapore, 2010). Activity daily living includes occupation, self-care ability, home management, and any active movement that has benefits. Then, leisure time activity focuses on recreational activity such as gardening, traveling playing music and religion activity. While, exercise refers to bodily movement done to improve or maintain one or more of physical fitness such as, jogging, riding bicycle, and sport.

WHO classify activity into light intensity, moderate intensity, vigorous intensity, and aerobic activity. Light intensity refers to activity that is performed less than 3 times intensity to rest. Moderate intensity refers to activity that is performed at 3.0-5.9 times the intensity to rest. Vigorous intensity refers to activity that is performed at 6.0 or more times the intensity of rest, while aerobic activity refers to endurance activity that improves physical fitness. WHO categorizes physical activity based on energy expenditure per week into adequate (MET <100 per week) and inadequate physical activity (MET  $\geq$ 100 per week). MET per week are calculated by MET value in each activity times to the duration of activity in a week (Visuthipanich, 2009).

### 3.3 Physical activity in Older People

In older people, physical activity includes leisure time physical activity (for example: walking, dancing, gardening, hiking, swimming), transportation (e.g. walking or cycling), occupational (if the individual is still engaged in work), household chores, play, games, sports or planned exercise, in the context of daily, family, and community activities (WHO, 2008c).

WHO (2008c) recommended older adults aged 65 years and over should do at least 150 minutes of moderate-intensity, aerobic physical activity throughout the week or do at least 75 minutes of vigorous-intensity, aerobic physical activity throughout the week or an equivalent combination of moderate- and vigorous-intensity activity. These activities are equivalent with 100 MET values per week. In addition, previous study suggested that adults aged 65 years and over should undertake a minimum of 30 minutes of moderate intensive physical activity at least 5 days a week, like younger adults but with

consideration for age-appropriate intensity and type of activity (Persson and While, 2011). Previous study found that only 20.2% of older people were met goal of WHO's guideline of physical activity for older people (Kraithaworn et al., 2011). Other study in 647 midlife women found that 47 % of midlife women were reached the WHO's goal of physical activity (Laosupap et al., 2008).

**Table 2** Classification of physical activity based on MET

Classification	Types of activity	MET
Light intensity (MET <3)	Household activity	
	Taking care other people	2.50
	Preparing food	2.50
	Cleaning dishes or other equipments	2.50
	Ironing	2.50
	Feeding pet	2.50
	Repairing electrical or part of house	2.50
	Light gardening	2.25
	Occupation activity	
	Light occupation	2.00
	Leisure time and exercise	
	Religious activity	1.50
	Wood working, needlework, or other arts	1.50
	Reading or using computer	1.50
	Watching television	1.50
	Playing light activity games	2.00
Playing traditional music	2.00	
Walking leisurely	2.50	
Transportation activity		
Riding motorcycle or car	2.00	

**Table 2** (Continued)

Classification	Types of activity	MET
Moderate intensity (MET 3-5.9)	Household activity	
	Sweeping, mopping, and cleaning bathroom	3.00
	Washing clothes by machine	3.00
	Washing clothes manually	3.00
	Cleaning windows, gutters, refrigerator, bicycle or car	3.00
	Cleaning a pet or pet's cage	3.00
	Moderate gardening or farming	4.00
	Occupation activity	
	Moderate occupation	3.00
	Working with heavy stuff	5.50
	Leisure time and exercise	
	Active in elderly club	3.25
	Walking fast or briskly	3.50
	Riding a bicycle	4.00
	Aerobic for older people	3.50
	Light strength training	3.00
	Moderate strength training	4.50
	Playing badminton for pleasure	3.50
	Transportation activity	
	Walking with heavy items	3.00
Vigorous intensity (MET ≥6)	Household activity	
	Digging	6.00
	Leisure time and exercise	
	Jogging or run	6.00
	Rapidly bicycling	6.00

**Source:** Ainsworth et al. (2000)

### 3.4 Effect of physical activity in older people with hypertension

Physical activities have many benefits for health. It can extend years of active independent living, reduce disability and improve the quality of life for older people (Division of Ageing and Senior of Canada, 2011 as cited in Sun et al., 2013). The experimental study by Kusumaratna (2008) found that physical activity increased quality of life in older people. Physical activity also has benefit to control blood pressure in Hypertension people (Fagard, 2007). In addition, 15 minutes of daily PA up to 100 minutes per day resulted in 4% decrease in mortality from any cause (Wei et al., 2011).

Based on WHO, physical activity include exercise has many health benefits and protects people against high blood pressure and cardiovascular diseases. Study by Rossi et al. (2012) showed that by reducing systolic blood pressure by 5 mmHg, deaths from strokes can be reduced by 14% and deaths from coronary heart disease can be decreased by 16%. In addition, Huai (2013) found people who perform more than four hours per week in their leisure time physical activity had 19 % lower risk of high blood pressure than those who perform less than one hour per week and people who had one to three hours per week of leisure physical activity had an 11 percent lower risk than those with under an hour of activity. Hence, older people with hypertension need to perform physical activity more than an hour per week to reduce the risk of chronic disease.

Being physically active is one of the most important steps to prevent or control high blood pressure by keeping heart and blood vessels in good condition. By physical activity, systemic vascular resistance decreased by 7.1%, plasma norepinephrine by 29%, and percentage body fat by 1.4% which resulting blood pressure reduction (Fagard and Cornelissen, 2007). Movement of body can improve circulation of blood and help the body use oxygen better (AHA, 2011). AHA (2011) suggested physical activity for older people with blood pressure no more than 179/99.

### 3.5 Factors related with physical activity

In older people, physical activity can maintain their health, decrease the illness, and improve health. According to Pender et al. (2011), health promoting behavior is action

of each individual or group to improve health. There are many factors that affect health promotion behavior. Pender et al. (2011) described personal factors (gender, BMI, perceived health status, education level, income, living arrangement, and occupation), perceived barriers, perceived self-efficacy, and social support are factors that influence health promotion behavior. Health promotion behavior in this study is physical activity.

Gender has an effect to physical activity, beside anatomical different, gender indicate personality and role in family. Currently, female have mean life expectancy more than male. It might be represent better health and better life style than male. It supported by previous study that found older female people had higher level of physical activity than older male people (Kanyoni et al., 2009), whereas other studies found that male tend to have more physical activity than female (Musselman and Brouwer, 2005; Azevedo et al., 2007; Willey et al., 2010). Many previous studies found gender related to physical activity behavior among the older people (Lim and Taylor, 2005; Lee, 2006; Shaw 2008; Chamroonsawasdi et al., 2010; Lin, 2010; Jaiyungyuen et al., 2012). However, other studies did not show significant differences in physical activity behavior between men and women (Bogard et al., 2007; Rachman, 2011; Gobbi et al., 2012; Tsunoda et al., 2013).

Body Mass Index (BMI) is defined as the weight in kilograms divided by the square of the height in meters ( $\text{kg}/\text{m}^2$ ). It is simple index of weight-for-height that is commonly used to classify underweight, overweight and obesity (WHO, 2006). WHO classified BMI into 4 categorized: underweight ( $<18.5$ ), normal weight (18.50-24.99), overweight (25.00-29.99), and obese (30.00 and over). Several studies mentioned that BMI has significant influence to blood pressure (Tesfaye, 2007; Tuan et al., 2009). BMI can affect physical activity that is related to weight of older people with hypertension. Previous study described that people who in obesity categorized tend to physically inactive (Giuli et al., 2012; Hamer et al., 2013) and could be barriers to perform physical activity (Maibach et al., 2009)

Perceived health status refers to overall health at present time based on older people evaluation of her or himself. Perceived health status can influence the perception of older people about health promotion behavior. Several studies examined that better perceived health status were influence to higher physical activity (Poolsawat, 2006;

Goldsholl, 2008; Giuli et al., 2012) while, other studies found that perceived health status did not influence physical activity (Kaleta et al., 2006; Kull, 2010).

Education is important to improve knowledge, skill, and good attitude for physical activity. People who have high education can be easier to search the information related to health behavior to increase their knowledge. Educational level can influence physical activity in older people (Shaw et al., 2008; Lin, 2010; Jaiyungyuen et al., 2012 and Lee, 2006). Research documented that older people with higher levels of education were more likely to participate in leisure time physical activity (Azevedo et al., 2007; Lin, 2010). In addition, previous studies showed low-education individuals were associated with reduced physical activity (Shaw et al., 2008; Jaiyungyuen et al., 2012; Lee., 2006). On the other hand, He et al. (2005) found individuals with high education level had low physical activity than those who low education level.

Income and occupation is one of indicator for social and financial status. High income can reach better health service. It is supported by previous studies found family income has association with health promoting behavior in older people (Lee, 2006; Jaiyungyuen et al., 2012). Occupation also can influence physical activity in older people (Chamroonsawasdi et al., 2010). In addition, previous study by Shaw et al. (2008) identified that older people who did not have occupation had lower physical activity than those who still have occupation.

Living arrangement has effect to physical activity, older people who living with spouse or family will have more support than those who living alone. Spouse or other family member can advise to perform physical activity. Studies recorded that living arrangement is the significant factor that influences physical activity. People who living alone more likely perform low duration of physical activity. (Poolsawat, 2006; Lin et al., 2010; Giuli et al., 2012; Nosorn and Saengngern, 2013). In contrast, Lim and Taylor (2005) reported living arrangement did not associate with physical activity.

Research shows that perceived barriers to physical activity are important predictors to physical activity initiation and maintenance in older people, as well as in young and middle-aged adults. In older people, barriers to physical activity commonly

include emotional and physical aspects such as an unpleasant sensation, feel too old, fear of injury, and lack of energy (Moschny et al., 2011; Gobbi et al., 2012; Patel et al., 2013). Researcher reported perceived barrier is factor that associate with physical activity and considered that barriers were a relevant element in explaining health behavior (Lee, 2006; Schwarzer 2008; Moschny et al., 2011; Patel et al., 2013). Contrarily, previous studies revealed perceived barriers could not predict physical activity in older people (Alias, 2006; Phantapak et al., 2009; Idowu et al., 2012).

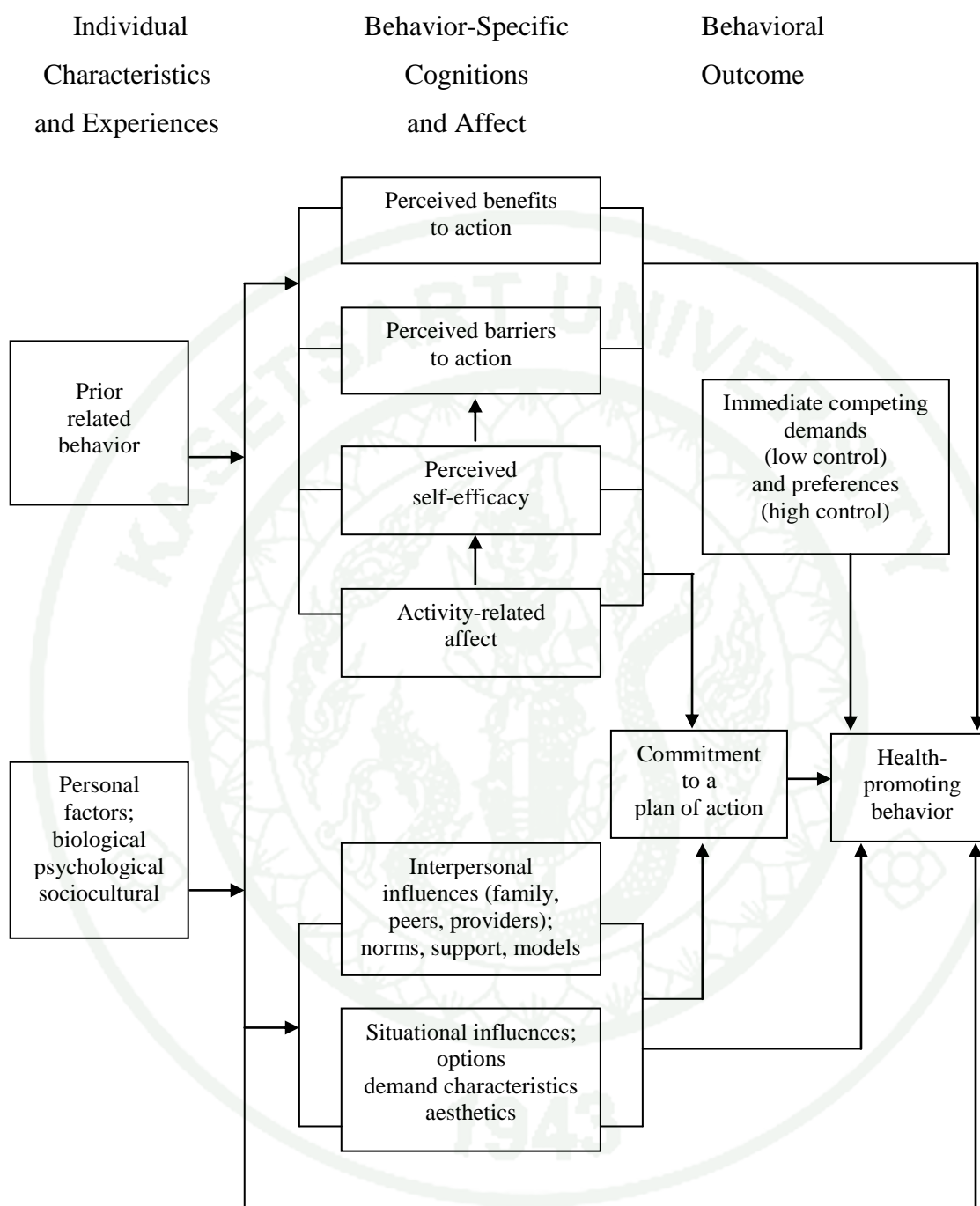
Perceived self-efficacy, people's belief about their ability to carry out specific behavior in a particular situation, has been well known to predict specific behaviors, such as physical activity (Lee, 2006; Morris et al., 2008). Research regarding older adults has also shown that self-efficacy is a predictor of physical activity among that population (Smith et al., 2007; Morris et al., 2008; Phantapak et al., 2009; Idowu, et al., 2012; Jaiyungyuen et al., 2012). While, other studies found that self-efficacy was not directly predict physical activity (Alias, 2006; Lee, 2006). In addition, self-efficacy was significant predictor of physical activity in young adult, but was not significant predictor of physical activity in older people (Lee, 2006).

Social support factor looks into the role of other persons in facilitating physical activity performance. Several studies identified support from family and friends as a positive stimulus to physical activity (Phantapak et al., 2009; Chamroonsawasdi et al., 2010; Idowu, et al., 2012; Jaiyungyuen et al., 2012; Noosorn and Saengngern, 2013; Tamers et al., 2013). Conversely, other studies found social support did not significantly predict physical activity (Lim and Taylor, 2005; Lee, 2006; Kraithaworn et al., 2011).

As Pender's HPM explained, age, gender, education level, income, occupation, living arrangement, perceived health status, perceived barrier, perceived self-efficacy, and social support have effect to physical activity in older people. However, there were some previous studies still found these factors have no effect on physical activity.

#### **4. The Health Promotion Model (HPM) by Pender (2011)**

The health promotion model was established by Ottawa charter for health promotion to increase control over and improve the people health (WHO, 1986 as cited in Pender, et al., 2011). Pender et al. (2011) defined the different of health promotion and disease prevention. Health promotion is behavior motivated by the desire to improve well-being and health of the people, while the disease prevention is behavior motivated by the desire to actively avoid the illness, early detection the illness, or maintain functioning within the constrain of illness (Pender et al., 2011). Pender used multidimensional nature approach for the health promotion. Health promotion includes the individual, family, community, socioeconomic, cultural, and environmental dimensions (Pender et al., 2011).



**Figure 1** Revised Health Promotion Model by Pender (2011)

**Source:** Pender et al. (2011)

There are three new variables were added in the revised model including activity-related affect, commitment to a plan of action, and immediate competing demands and preferences (Pender et al., 2011). The HPM has three parts which include: individual characteristics and experiences, behavior-specific cognitions and effects, and behavioral outcome. Within these three parts, there are number variables which influence an individual's commitment to plan of action and health promoting behavior.

#### 4.1 Individual Characteristic and Experiences

The unique individual characteristic and experiences is owned each individual that affect the action of behavior (Pender et al., 2011). Individual characteristic and experiences consist of two variables. There are prior related behavior and personal factors. Prior related behavior defines as the similar behavior in the past that have direct and indirect effect to the health promoting behavior, while the personal factors include biological, psychological, and sociocultural factors (Pender et al., 2011).

#### 4.2 Behavior-Specific Cognitions and Affect

The behavior-specific cognitions and affect describes as critical variables that have major significance for health intervention. The variables are able to be modified (Pender et al, 2011). These parts include: perceived benefits to action, perceived barriers to action, perceived self-efficacy, activity-related affect, interpersonal influences, and situational influences. Perceived benefits to action, perceived barriers to action, perceived self-efficacy, and activity-related affect are link together (see figure 1).

##### 4.2.1 Perceived benefits of action

The variable perceived benefits describes as the perceptions of the positive consequences of behavior. Intrinsic and extrinsic benefits influence the individual expectation directly or indirectly. Intrinsic benefits and extrinsic benefits are greater to motivate the sustainability of the behavior (Pender et al, 2011). Previous studies reported that perceived benefits have positive correlation with health behavior (Phantapak, 2009; Chamroonsawasdi et al., 2010; Jaiyungyuen et al., 2012).

#### 4.2.2 Perceived barriers of action

Perceived barriers of HPM define the individual perception about the unavailability, difficulty or time consuming to perform the behavior (Pender et al., 2011). Perceived barriers can affect the intention and commitment to perform health promoting behavior (Pender et al., 2011). If the barriers are higher than readiness to act, positive action is unlikely to occur. Previous studies reported that perceived barriers have negative correlation with health behavior (Lim et al., 2005; Moschny, 2011; Osorio et al., 2013; Patel et al., 2013).

#### 4.2.3 Perceived self-efficacy

HPM includes the concept of self-efficacy as one of number of social cognitive factors that influence health promoting behavior. Self-efficacy is the judgment of personal capability to organize and carry out the action (Pender et al., 2011). Pender (2011) described self-efficacy is the judgment, does not engage the skill which are distinguished from outcome expectation. The HPM proposes that perceived self-efficacy is influenced by activity-related affect showed by more positive the affect, greater the perception of self-efficacy. Previous studies reported that perceived self-efficacy have correlation with health behavior (Pathumarak, 2005; Morris, 2008; Priscilla, 2011; Jaiyungyuen et al., 2012)

#### 4.2.4 Activity-related affect

Activity-related affect consists of subjective positive or negative feelings associated with a particular behavior, three components are: emotional arousal to the act itself, the self acting, and the environment in which the action takes place (Pender et al., 2011). Activity-related affect is proposed to directly influence the performance of behavior and indirectly influenced by the behavior through enhancing self-efficacy and commitment to perform the behavior.

#### 4.2.5 Interpersonal influences

Interpersonal influences are cognitions concerning the behavior, beliefs and attitudes of others (Pender et al., 2011). The primary sources of these cognitions are family, peers, and health care providers. Families, peers, and health care providers are important sources of interpersonal influence that can increase or decrease commitment to and engagement in health-promoting behavior. Based on Pender (2011) interpersonal include norms, social support and modeling that is observing others engaged in the behavior.

Social support for a behavior reaches the sustaining resources offered by others. Cohen (1992, as cited in Peterson et al., 2009) described the social support consist of three components include social networks, perceived support, and supportive behaviors. Albercht and Adelman (1987 as cited in MacGeorge, 2011) defined social support as a verbal and nonverbal communication between recipients and providers that reduces uncertainty situation and help individual to control over the situation. In addition, House (1981 as cited in Peterson et al., 2009) defined attributes of social support consists of emotional support, informational support, instrumental support, and appraisal support.

The attributes of House social support include possible actions of support. Emotional support is associated with sharing life experiences. It involves the provision of empathy, love, trust and caring. Instrumental support involves the provision of physical help and services that directly assist a person in need. It is provided by close friends, colleagues and neighbors. Informational support involves the provision of advice, suggestions, and information that a person can use to address problems. Appraisal support involves the provision of information that is useful for self-evaluation purposes: constructive feedback, affirmation and social comparison (House, 1981 as cited in Glanz et al., 2002). The previous study found that social support influence health promoting behavior (Smith et al., 2007; Murrock, 2008; Willey et al., 2010).

#### 4.2.6 Situational influences

Pender (2011) explained that situational influences on health-promoting behavior include perceptions of options available, demand characteristics, and aesthetic features of the environment in which a given behavior is proposed to take place. Individuals are performing more competently in situations or environmental context in which they feel compatible, related, safe, and reassured. Personal perceptions and cognitions of any given situation or context can facilitate or impede behavior. Situational influences may have direct or indirect influences on health behavior (Lee, 2006).

#### 4.2.7 Commitment to a Plan of Action

The greater the commitments to a specific plan of action, the more likely health-promoting behaviors are to be maintained over time. Commitment to a plan of action is less likely to result in the desired behavior when competing demands over which persons have little control require immediate attention. In the revised HPM, commitment to a plan of action implies the following underlying cognitive processes: commitment to carry out a specific action at a given time and place and with specified persons or alone, irrespective of competing preferences, and identification of definitive strategies for eliciting, carrying out, and reinforcing the behavior. Commitment alone without associated strategies often results in good attention but failure to perform the health behavior (Pender et al., 2011).

#### 4.2.8 Immediate Competing Demands and Preferences

Immediate competing demands and preferences refer to alternative behaviors that encroach into consciousness as possible courses of action immediately prior to the intended occurrence of a planned health-promoting behavior. Competing demands are alternative behaviors over which individuals have a relatively low level of control because of environmental contingencies such as work or family care responsibilities (Pender et al., 2011).

### 4.3 Behavioral Outcome

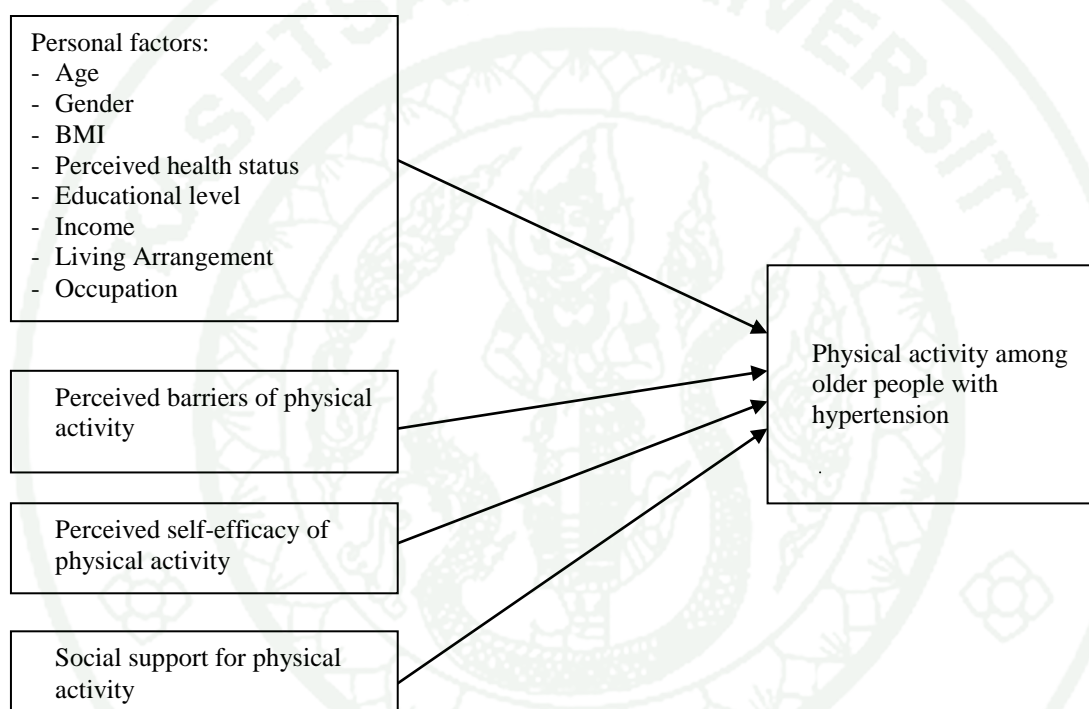
The end point of outcome of the HPM is Behavioral outcome. People are more likely to have those behaviors when they have a good experiences and motivation inside themselves. Health-promoting behaviors, especially when integrated into a healthy lifestyle, improved health outcomes, improved functional capacity, and quality of life better in all stages of development (Pender et al., 2011). HPM is used as model in nursing to predict health promoting activity. Pender (2011) explained that the HPM is used for many studies that focused on testing the predictability of the health promotion behavior.

## 5. Conceptual Framework of this study

The framework of this study was based on Pender's HPM as given in figure 2. Pender's HPM has been chosen for several of reasons. First, Pender's HPM has provided the theoretical basis for previous studies on health promotion behavior especially in physical activity (Phantapak, 2009; Chamroonsawasdi et al., 2010; Priscilla, 2011; Noosorn et al., 2013; Osorio, 2013; Patel et al., 2013). Second, Pender's HPM integrates nursing and behavioral science theory that applicable in all of age, such as behavior in children (Yoo et al., 2010), behavior in adult (Conway et al., 2007; Priscilla, 2011), and behavior in older people (Jaiyungyuen et al., 2012; Nosorm et al., 2013; Patel et al., 2013). Last, Pender's HPM has been tested widely and was found suitable for Western (Willey et al., 2010; Patel et al., 2013) and Asian populations (Alias, 2006; Chamroonsawasdi et al., 2010)

This study determined the predictors related to physical activity in older people with hypertension following Pender's HPM. The predictors based on Pender's HPM include perceived benefits, barriers, perceived self-efficacy, activity-related affect, interpersonal and situational influences to physical activity. The benefits of physical activity have been well documented in previous studies in Indonesia (Ismayanti, 2011; Rachman, 2011; Agoes et al., 2013). In addition, Indonesia Ministry of Health had health education program in every public health center to promote the healthy behavior in older people include benefits of physical activity (Indonesia MoH, 2004). Other factor such as situational influences include the availability of facilitation and environment wherein

provides safe, comfort and compatible situation were provided by Indonesia government. Based on Indonesia MoH (2013), government provided services for older people in each public health center. However, it has been found that most of older people do not meet the required level of physical activities (Indonesia MoH, 2013). Hence, this study was focused on other factors of physical activity include personal factors, perceived barriers, perceived self-efficacy, and social support as interpersonal factor .



**Figure 2** Conceptual framework of the study adopted from Health Promotion Model by Pender (Pender et al., 2011).

These variables measured by some questionnaire related to perceived barriers, perceived self-efficacy, social support and physical activity. Based on previous study, several questionnaires were provided by the expert. Measurements used in previous studies include:

### 5.1 Perceived barriers

Perceived barriers variable has several questionnaires include Barrier to Physical Activity Scale (BES) by Melillo et al. (1997) and Exercise Barriers and Benefits

Scale by Walker et al. (1987). The BES by Melillo et al. (1997) consists of 13 items with a 4-point rating scale from 1 (strongly disagree) to 4 (strongly agree) among older adults. The BES score is the sum of the 13 items and ranged from 13 to 52. Cronbach's alpha coefficient is 0.73 for reliability and a test-retest correlation coefficient of 0.75. In addition, the standardized alpha coefficient was 0.82 with 24 older adults in the pilot study. (Lee, 2006). While, Exercise Barriers and Benefits Scale by Sechrist et al. (1987) consist of two part include barriers and benefits. Based on Sechrist et al. (1987), barriers scale can use separately. Barriers scale consists of 14 items with a 4 scale from strongly agree to strongly disagree. The Cronbach's alpha coefficient for barrier scale is 0.88. Test and re test for reliability is 0.77.

Many previous studies used these questionnaires to measure the barrier of physical activity (Lee, 2006; Phantapak, 2009; Osorio et al., 2012). This study used Barrier to Physical Activity Scale (BES) by Melillo et al. (1997). This study used this questionnaire because the questionnaire consists of category of barriers for physical activity. The categories are access or environmental, health or medical, knowledge, motivational, psychological category (Melillo et al., 1997) and have been used in older people population (Lee, 2006; Moschny et al., 2011)

## 5.2 Perceived self-efficacy

Perceived self-efficacy has variance of measures. The measures are the Self-Confidence for Exercise Scale (SES) by Marcus et al. (1992), Task Self-Efficacy Scale (TSE) by Roberts et al. (1999), self-efficacy scale for exercise (SEE) by Resnick (2000), and the Peceived Self-efficacy Questionnaire (PSEEQ) by Chinuntuya (2001). The Self-Confidence for Exercise Scale (SES) by Marcus et al. (1992) scale consists of 5 items that assess a person's confidence for exercise in specific physical, emotional, time, leisure, and environmental situations. The test-retest reliability was .90 (n = 20) after 2 weeks, and the Cronbach's alpha coefficient was .76 (n = 388) for the sample from the medical center (Marcus et al., 1992). In addition, the reliability was 0.76 in physical activity study for older people with hypertension (Lee, 2006).

TSE by Roberts et al. (1999) consists of 18 items with scale from 0 (no confidence) and 10 (completely confidence). The validity and reliability were assessed in 278 older adults with Cronbach's alpha coefficient was 0.96. Items were generated based on IADL, basic ADL, and common physical tasks required for daily activities (Robert et al., 2010). SEE by Resnick (2000) consists of 9 items. This questionnaire assesses the confident of people in range 0 (not confident) to 10 (very confident). The validity and reliability used face-to face interview based on the questionnaire was alpha coefficients ranging from .89 to .94 (Resnick, 2004).

PSEEQ was developed by Chinuntuya (2001) was used in this study because the questionnaire is based on Southeast Asia culture of physical activity. This questionnaire used to examine older peoples' confidence regarding whether they would, under various situations engage physical activity. PSEEQ consist of 12 items on scale 0=cannot do at all and 10=certain can do. Cronbach's Alpha was 0.89 for older people samples (Kraithaworn et al., 2011). Therefore, PSEEQ is more appropriate for this study related to the similarity of culture.

### 5.3 Social Support

The social support has general questionnaire and specific questionnaire for physical activity. There are social support for exercise by Sallis (1987) and Social Support for Exercise Questionnaire (SSEQ) by Chinuntuya (2011). Social support for exercise by Sallis (1987) is one example of social support to assess the perceived influence of family and friends. This questionnaire consists of 13-item scale. The Cronbach's  $\alpha$  coefficients for the family and friend support in older people were .89 and .86 (Lee, 2006). In addition, reproducibility showed an intra class correlation coefficient between 0.63 and 0.80 and alpha internal consistency between 0.87 and 0.91 (Reis et al., 2011).

Chinuntuya (2011) develop the Social Support for Exercise Questionnaire (SSEQ) to measure family and friends' support of older people when they performing physical activity. This questionnaire consists of 11 items which measure emotional support, tangible support, and emotional support. Cronbach's Alpha of SSEQ was 0.84 in older people sample (Kraithaworn et al., 2011). This study used SSEQ because this

questionnaire focuses social support for physical activity that appropriate for Asian culture.

#### 5.4 Physical activity

Previous study has shown many questionnaires for physical activity. Several questionnaires have developed for older people. First, the Habitual Physical Activity Questionnaire (HPAQ) developed by Baecke et al. (1982) and modified for older adults by Voorrips et al. (1991). The questionnaire consists of 22 question include household activities score, sports scores, and leisure time activity scores. Voorrips et al. (1991) reported a test retest reliability coefficient of 0.89 at a 20-day interval for 30 adults aged 63 to 80 years. Then, the Physical Activity Scale for the Elderly (PASE) by Washburn (1993) consist 21 items includes household activities, leisure time activities, and work. This questionnaire asks about physical activity in past 7 days. The correlation coefficient was 0.79 (Schuit et al., 1997)

The International Physical Activity Questionnaire (IPAQ) include job-related physical activity, transportation physical activity, house work, house maintenance, caring for family, recreation, sport, leisure time physical activity and time spent sitting. This questionnaire produced repeatable data (Spearman's clustered around 0.8). But, the studies in Japan showed the reliability for this questionnaire was not sufficient in older people (Tomioka et al., 2011).

The Self-report Physical Activity Questionnaire (SPAQ) was developed by Visuthipanich (2009) to measure the physical activity in Thai older people. This questionnaire include for domains of physical activity consist of household, leisure time and transportation of existing physical activity in older people. SPAQ has 55 items with content 7-day test-retest reliability was 0.90 with older people as samples (Visuthipanich, 2009). SPAQ was modified by Kraithaworn et al. (2011) to be 42 items with cronbach's alpha 0.98. SPAQ was used in this study because this questionnaire was developed for older people that appropriate for activity in Asian people. SPAQ also described each activity clearly and can measure the intensity, duration, and energy expenditure of physical activity.

## 6. Definition of term

6.1 Older people with hypertension are the people aged 60 years old and older who has been diagnosed hypertension by physician and recorded in Public Health Center documentation, both male and female living in Bantul, Indonesia.

6.2 Physical activity is any body movement of older people with hypertension that makes the muscle works and requires more energy than resting include household activity, leisure time activity, occupation activity, and transportation activity. Physical activity was measured by the Self-report Physical Activity questionnaire developed by Visuthipanich (2011) in terms of duration and energy expenditure.

6.3 Personal factors are individual characteristic of older people with hypertension comprise biological (gender and BMI), psychological (perceived health status), and socio-cultural (educational level, income, living arrangement, and occupation). Personal factor was measured by demographic data developed by researcher.

6.4 Perceived health status is subjective evaluation of older people regarding their condition. Subjective evaluation including excellent, good, fair, and poor health.

6.5 Perceived barriers are subjective evaluation about obstacle of older people with hypertension to execute the physical activity. Perceived barriers was measured by Barriers to Physical Activity Scale developed by Mellilo et al. (1997) in terms of unavailability, inconvenience, difficulty, and time-consuming.

6.6 Perceived self-efficacy is older peoples' feeling confidence regarding to physical activity whether they would perform under various situations. Perceived self-efficacy was measured by the Peceived Self-efficacy Questionnaire (PSEEQ) that developed by Chinuntuya (2001) in terms of whether older people would confidence to perform physical activity, under various situations and daily life activities related to one's occupational, household, transportation and leisure time (exercise and recreation) activity.

6.7 Social support is subjective evaluation of older people about receiving emotional, tangible, and informational assistance from family and friends' when they performing physical activity. Social support was measured by the Social Support for Exercise Questionnaire (SSEQ) that developed by Chinuntuya (2011).



## MATERIALS AND METHODS

### Materials

Data collection was performed by deploying instruments consisting of five questionnaires. There were Demographic Data Survey Form, Self-reporting of Physical Activity Questionnaire (SPAQ), Barriers to Exercise Scale (BES), Perceived Self-Efficacy for Exercise Questionnaire (PSEEQ), and Social Support for Exercise Questionnaire (SSEQ). These instruments were adapted to Indonesian culture and have been translated into Indonesia language. The permission to use the questionnaires was approved by authors.

#### 1. Instruments

##### 1.1 Demographic Data Survey Form

The Demographic Data Survey Form was developed by the researcher, which was deployed to collect personal data of the research participants that includes, gender, age, educational level, income, living arrangement, and physical data like body weight, height, and blood pressure. BMI was calculated by dividing weight of participants (in kilograms) by square of height (in meters). Participants was categorized in to underweight (BMI <18.5), normal weight (BMI = 18.5-24.9), overweight (BMI = 25-29.9), and obesity (BMI ≥ 30).

Perceived health status was subject to participant's response to a single question “How would you rate your overall health at the present time?” on scale rating of '1' to '4' with '1' indicating poor health, and '4' indicating excellent health. The questions answered by filling in blanks and ticking in choice boxes.

## 1.2 The modified Self-reporting of Physical Activity Questionnaire (SPAQ)

Physical activity was assessed by using the SPAQ which was originally developed by Visuthipanich (2009) to gauge the physical activity level among the older people. This assessment is on scale rating made up of four sub-scales (55 items) that cover information on household, occupation, leisure and transportation, physical activities engaged during the past 7 days, while the intensity of physical activity is categorized into low intensity (33 items), moderate intensity (14 items), and vigorous intensity (8 items). This questionnaire was modified by the researcher to be 34 items that fit the lifestyle of older people in Indonesia and obtained more accurate assessment of their physical activities.

The modified SPAQ contains questions put to individual participants and their responses was determined by the total number of hours per week that older people engaged in each activity and assessed on the basis of Likert-like scale. Sample questions like “In the past 7 days, did you take care of other person (for example - children, elderly patient or disable person), by cleaning, feeding, serving food and milk?” and if participants respond ‘Yes’, the follow-on question would be “For how many hours per week?” In case of participants getting into difficulty of giving any activity number of hours per week, the questions were changed to “For how many times a week?” and “How many hours each time?” Subsequently, the total hours per week was calculated by multiplying frequency in a week with duration of each activity. The amount of involvement time was assigned a pre-assigned value, whereby: 0-1 hour = 0.5; >1-3 hours = 2; > 3-5 hours = 4; >5-7 hours = 6; >7-9 hours = 9; and >9 hours = 10. If duration of involvement was not indicated, the value number was 0.

The weekly score of duration of physical activities was calculated based on number of hours per week by summing up hours per week of all activities the participant was involved in. While, the energy expenditure was calculated by multiplying the total hours of the respective activity performed over the previous seven days by the Metabolic Equivalent value ( $\text{MET-Hr/wk} = \text{Total hr./wk} \times \text{MET}$ ). Physical activity was divided into adequate and inadequate physical activity based on WHO guideline. Adequate physical

activity was indicated by MET per week with score 100 and above, while inadequate physical activity was indicated by MET per week less than 100.

### 1.3 The Barriers to Exercise Scale (BES)

Perceived barrier to physical activity was assessed on numerical scale using the BES Assessment sheet originally developed by Melillo et al. (1997). BES Assessment Sheet contains 13 items each of which is assigned a Likert scale of 1 to 4: from 1 = strongly disagreed to 4 = strongly agreed by older adults. Sample statements in the BES Assessment sheet are “I feel the same whether I am physically active or not”, participants can tick off their choice ranging from 1 = strongly disagree, 2= disagree, 3 = agree, and 4 = strongly agree. The BES score was obtained by summing scores of all 13 items which could range from 13 to 52. Participants were categorized in no barrier if all item of questionnaire answered by strongly disagree or disagree. However, based on Melillo et al. (1997), perceived barrier was classified into 3 level, low barrier (13-26), moderate barrier (27-39), and high barrier (40-52).

### 1.4 Perceived Self-Efficacy for Exercise Questionnaire (PSEEQ)

PSEEQ was used to assess on numerical basis perceived self-efficacy to perform physical activity. PSEEQ was developed by Chinuntuya (2001) consisting of 12 items. This questionnaire assesses the confident level of people, with sample statements like “I could perform physical activity/ exercise even though I was feeling tired”, to which participant can respond with how it is perceived, ranging from 0 (cannot do) to 10 (certain can do). A total score of perceived self-efficacy for physical activity, with possible ranging from 0 – 120, was computed by summing all items and categorized into 3 levels of perceived self-efficacy (0-40 = low, 41-80 = moderate, and 81-120 = high) (Kraitaworn, 2011).

### 1.5 The Social Support for Exercise Questionnaire (SSEQ)

The SSEQ was developed by Chinuntuya, (2001) and was adopted in this study to assess social support for physical activity. SSEQ comprises of 11 items consisting of emotional support (4 items), tangible support (4 items), and informational support (3 items) from each respective older people's family and friends with regard to physical activity. For example, statement likes "Encouraging me to perform physical activity". Family and friends were assessed as two separate entities with scores of 1 (never), 2 (sometime), and 3 (often). The score was reversed for item number 3. The total score for the social support (combined scores of family's support and friends' support) could vary from 22 - 66, which was determined by summing all items across the board. The higher the total score is the greater the indication of one's social support for performing physical activity. Based on total score, social support was categorized in to low (22-44) and high (45-66) (Kraitaworn, 2011).

### 2. Translation

After researcher obtained permission from the owner of original questionnaires, the questionnaires were translated into Indonesian language by translator competent in English and Indonesian languages and preferably with good knowledge and well-versed with basic terminology in health-related profession. Translators must use simple, clear, and concise language in formulating each and every question (Cha et al., 2007). Then, the questionnaire in Indonesian language was translated back into English by translator with no prior knowledge of the questionnaire itself. The reversed translation into English was reviewed by the researcher and major advisor with the original instrument to identify and resolve any misinterpreted concept on the translator's part, as well as any discrepancies between the original English questionnaire and the translated one. This procedure is undertaken to ensure a complete and accurate translated version of the questionnaires, and any differences were subject to fine-tuning to achieve the best possible and correct final version of the translation.

### 3. Validity

The questionnaires, both in English and Indonesian languages were subject to critical analysis by three experts including two gerontological experts and one public health expert. Item objectives congruent index (IOC) was used to measure the content validity. The scale consists of three point rating scale (+1 = clearly measuring, 0 = unclear, and -1 = clearly not measuring). The score was calculated by mean score in each item from three experts. The content validity is acceptable if the mean score in each item is higher than 0.5 (Rovinelli and Hambleton, 1977).

In this study, SPAQ was modified based on culture of Indonesia older people and IOC score. Original SPAQ consists of 54 items. The 18 items were deleted because it was not appropriate in Indonesian culture. Based on IOC score from three experts, there were two items had mean score lower than 0.5. The items “playing tennis” and “playing table tennis” were deleted. Other questionnaires in this study including BES, PSEEQ, and SSEQ were used as the original version. Based on IOC score, the scores of each item were higher than 0.5. It means that all items in these questionnaires were valid.

### 4. Reliability

As for reliability, the translated version or the questionnaires in Indonesian language was tested with a pilot sample of 30 older people of similar characteristics to the target population to ensure that, participants are clearly understand the questions and statements. Reliability of the questionnaires was verified by Cronbach’s Alpha. For a newly developed instrument a Cronbach’s alpha of 0.70 or higher is considered acceptable (Burns and Grove, 2009). All the questionnaires in this study were acceptable with Cronbach’s alpha is more than 0.70. The Cronbach alpha of SPAQ was .703, BES was .721, PSEEQ was .923, and SSEQ was .884.

## Methods

This part describes research methodology which consisted of hypothesis, study design, population and sample, data collection, data analysis, and ethical consideration.

### 1. Hypotheses

The hypotheses were set based on the specific objectives of the study. The hypotheses were as follows:

1.1 Age, gender, BMI, perceived health status, educational level, income, living arrangement, and occupation have effect on physical activity among older people with hypertension.

1.2 Perceived barrier has effect on physical activity among older people with hypertension.

1.3 Perceived self-efficacy has effect on physical activity among older people with hypertension.

1.4 Social support has effect on physical activity among older people with hypertension.

### 2. Study Design

This research study was undertaken by deploying a cross-sectional design which examines data at one point in time (Polit and Beck, 2008). This study aims to identify factors predicting likelihood of physical activity among older people with hypertension. Data was collected once from the participants to identify their physical activities as well as factors predicting these physical activities among older people with hypertension.

### 3. Population, Samples, and Sampling technique

This research study was conducted in Bantul District of Yogyakarta Province. Bantul district has been selected because this particular district, according to the Provincial Health Department of Yogyakarta, (2012), had the highest incidence of hypertension in 2011 with 1.473 cases among older people age 60 and over.

#### 3.1 Population

The population of this study was older people age 60 and over with hypertension in Bantul, Indonesia. The maximum age was not limited to understand the physical activity in the age range of older people.

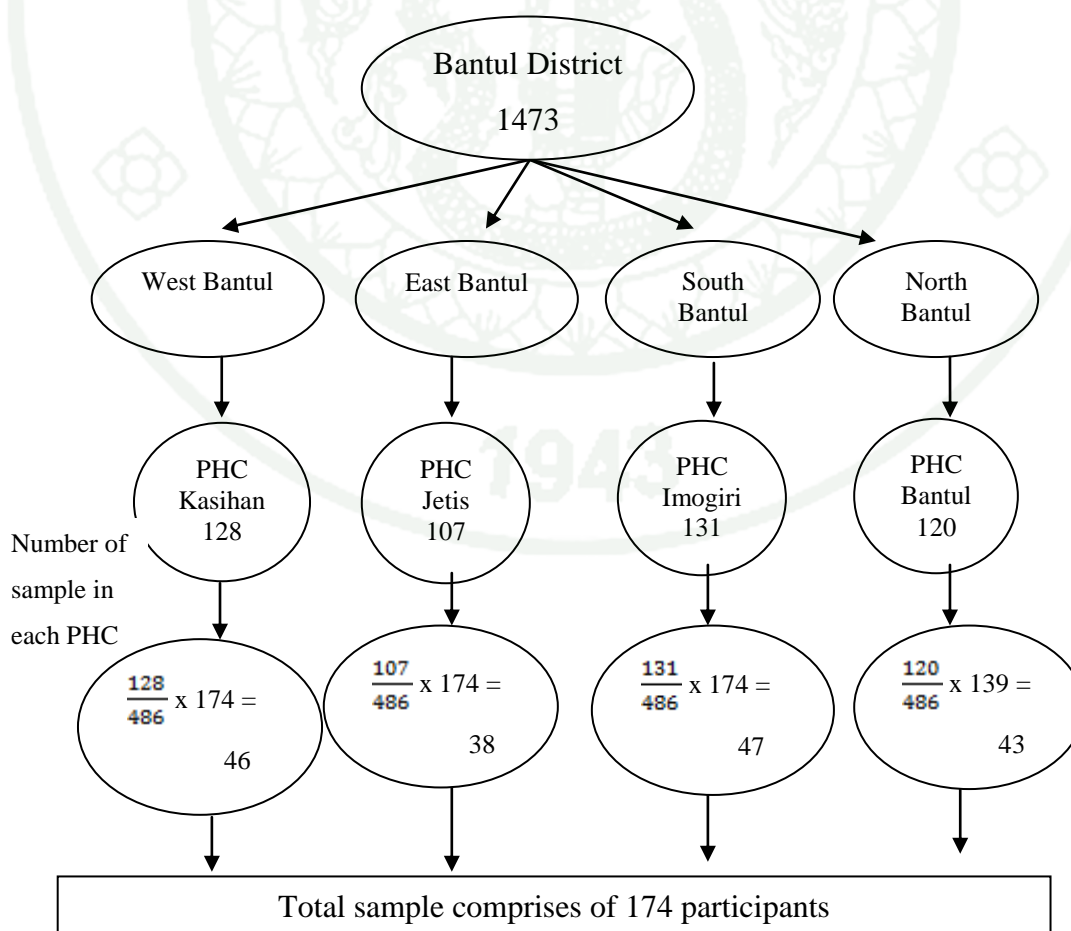
#### 3.2 Samples

This study adopted Green's (1999) rules to calculate sample size for multiple regressions. The calculation of the sample size is based on the power level of statistic, alpha, effect size and the number of predictor. The previous study about predictor factor of physical activity in older people with borderline hypertension explained that the study used effect size = 0.15 with the power level = 0.80. This study will use power level = 0.80, effect size = 0.15 (Cohen, 1988), alpha = 0.05 and number of predictors = 11. Based on the calculation, the ideal sample size of this study would comprise 139 participants and with a 25% allowance for anticipation of some missing data, the total sample size in this study finally becomes 174 participants.

The inclusion criteria set for recruiting participants for this study were : a) Age between 60 years old and over, b) Diagnosed with hypertension based on PHC's medical records, c) independence in activity daily living (score of Katz index are 6), and d) Willingly volunteer to participate in this study. While the exclusion criteria set are: a) Suffering from cognitive impairment based on PHC's medical records (score of Short Orientation Memory Concentration Test less than 20) and b) Being hospitalized during data collection.

### 3.3 Sampling technique

Bantul district is geographically divided into four community areas: the West, the East, the North, and the South. Bantul district has sixteen Public Health Centers (PHCs): 4 PHCs are located in the West community area, 4 PHCs in the East community area, 4 PHCs in the North community area, and the remaining 5 PHCs in the South community area. For this study, sampling of subjects was carried out using multi-stages sampling method by taking proportionate sampling in each PHC. Researcher was randomly pre-select one PHC in the West, South, East, and North community areas. The numbers of cases of older people with hypertension were accounted in different PHC as follows: 128 people in PHC Kasihan (the West community area), 107 in PHC Jetis (the East community area), 137 in PHC Imogiri (the South community area), and 120 in PHC Bantul (the North community area). Participants were recruited from each of these selected PHCs based on the proportion number (see figure 3).



**Figure 3** Sampling Technique

#### 4. Data collection

Data collection process can be described in four steps as follows: Firstly, researcher submitted thesis proposal to Kasetsart University and Ethics Review Committee for Research Involving Human Subjects through Boromarajonani College of Nursing Nopparat Vajira (BCNNV) for approval prior to conducting this research study.

Secondly, after receiving permission letter from BCNNV to proceed, researcher informed and sent the letter to the Head Officer attached to the Indonesian Ministry of Health (MoH) in charge of Bantul district and the Board for Regional Planning and Development (BAPPEDA) of Bantul district to request for permission. Upon approval granted, written permission from MoH and BAPPEDA of Bantul District was sent to the designated Public Health Centers (PHCs). The researcher has then make appointments to introduce herself to the Head of each PHC to present this research study by explaining the topic, purpose, benefit, and plan of this study. After securing permission from the Head of each PHC, the researcher met the nurses responsible for older patients including those with hypertension to explain the topic, purpose, benefit, and plan of study and seeking help from the nurses in recruiting participants who diagnosed with hypertension and received treatment at PHC. The nurses gave researcher schedule of participants to visit PHC.

Thirdly, researcher followed the activity of PHC especially in geriatric clinic whereupon the nurse introduced the researcher to the participants and thereby providing opportunity for the researcher to explain the purpose, benefit, and plan of this study to the participants based on information sheet when the participants come to PHC. Participants willingly volunteer to participate, were asked to sign two identical informed consent forms provided by the researcher, one duly signed consent form each was kept by participant and the researcher. Researcher also personally assured the participants of keeping their identities confidential. Participants were also informed that completing the questionnaires via a one-on-one interview, required approximately 40-45 minutes of his/her time. Researcher conducted the interview with the participants using the prepared questionnaires. Researcher measured the weight and height of participants by

measurement tool that provide in kilogram for weight and centimeters for height. Then, researcher measured blood pressure of the participants.

Fourthly, upon completion of the questionnaires via interviews with the participants, the researcher then checked the questionnaires for any missing data. Each questionnaire was saved in a sealed envelope. Last but not least, the researcher was hand a token gift to each participant as gesture of appreciation of their participation at the end of this data collection activity.

## **5. Data analysis**

Data analysis was performed using Statistical Package for the Social Sciences (SPSS Student Version 16.0) for Windows as provided by Kasetsart University. Data analysis includes data screening procedures, preliminary examination of data, assumption testing of primary data analysis, and primary data analysis.

### **5.1 Data screening procedures**

The distributional characteristic of the data is considered to the statistical test (Pallant, 2010). It was important to check the data, thus can be corrected before primary analysis begins. In this procedure, data were checked for missing data and extremes values. In this study missing data were not found. Univariate statistics were computed to assess range of the values, mean, standard deviation for continuous variables, while frequency and percentage for categorical variables.

### **5.2 Preliminary examination of data**

Normality assumption was used to evaluate continuous variables by using Kolmogorov-Smirnov criterion with  $p > 0.05$  (Pallant, 2010). Based on Kolmogorov-Smirnov criterion, the continuous variables of this study including BMI, perceived self efficacy, and physical activity were normally distributed. Therefore, parametric statistic methods were used.

### 5.3 Assumption testing of primary data analysis

The relationship between all variables was analyzed using parametric statistic methods. Bi-serial coefficients was the basis of identifying the relationship and how significant of such relationship between dichotomous variables including gender, living arrangement, income, occupation and physical activity. Spearman correlation coefficient was used to identifying the relationship between ordinal variable including education level and perceived health status with physical activity. While, Pearson's product moment correlation coefficient was used to determine the relationship between interval variables including BMI, perceived barrier of physical activity, perceived self-efficacy of physical activity, social support and physical activity. All independents variables were examined the correlation with each other with multicollinearity. Multicollinearity exist when the independent variable are highly correlated with  $VIF \geq 10$  (Pallant, 2010). This study showed the correlation all of independent variables were less than 10.

Furthermore, the assumption of multiple linear regression including normality, linearity and homoscedasticity were checked by regression standardized residual plot. In this study, the plot distributions were equally along the center line and distributed around the midpoint. Based on standardized residual values, this study showed no issues with outliers. Finally, all assumptions of multiple linear regression were met.

### 5.4 Primary data analysis.

The socio demographic data and all variables were analyzed using frequency and percentage. Continuous variables were re-coded into categorical. Further analysis by multiple linear regression using backward method was undertaken to assess the probable predictors towards physical activity. Education level and perceived health status were transformed into dichotomous variables. Statistically significant inference for any conclusion was pre-set at  $p < 0.05$  (Confident level 95%).

## 6. Ethical Consideration

This study was approved by Ethical Review Board (ERB) of Boromarajonani College of Nursing Nopparat Vajira (ERB No. 35/2014). The ERB approval is required prior to seeking approval by MoH and BAPPEDA of Bantul district. Permissions in writing from Provincial authority of MoH, as well as from BAPPEDA of Bantul district are needed to proceed with conducting the research in those areas under responsibility of PHC in Bantul district. Upon obtaining all required permission, researcher met Heads of PHCs to present in details the topic, purpose, benefit, and plan of this study, thereafter researcher met the nurses responsible for caring older patients and again to explain the topic, purpose, benefit, and plan of this study, as well as seeking help from the nurses to identify potential participants.

Researcher was given schedule of participants to visit PHC by nurses. When the participants come, nurse introduced the researcher to the participants and researcher clearly informed participants about the purpose, benefits, and method of the study based on information sheet. Researcher approached each participant one by one. Participants were permitted to read the information sheet and inform consent by their self and or researcher read for participants whose cannot read. Participants were given opportunity to ask questions relating to the study. Participants, have agreed voluntarily to participate in this study, were given information sheet and consent form, both documents having been translated into Indonesian language by competent translator and have been approved for use prior to be handed out to the participants. The consent form clearly declared that participation is completely voluntary and also included a statement to the effect that participant's withdrawal from this study are permitted any time without need to provide reason and with no consequences, also do not influence the services of PHC. The consent form was made in two copies and was signed by researcher and volunteering participant to attest mutual understanding and agreement between the participant and the researcher. Researcher and participant each keep one copy of the signed consent form.

Participants were allowed to skip any questions should they feel uneasy to answer and were provided time to take a rest if they feel tired to answer the questions. In the end

of interview, researcher gave participants a small gift from Thailand as a sign of my appreciation for your willingness to participate in this study.

Researcher was obligated to keep the participants' identities confidential and to ensure that participant's name did not appear on any documents (Anonymity) whereby coded identity was used in list of participant's name on the questionnaire. The identities of all participants were known only to the researcher. The researcher was also obligated to keep confidential all the answers and responses given in the questionnaires and no sharing or disclosure of information was made unless it is made to the committee of advisors. Result of this study did not relate specifically to the community area of participants. Result of this study was provided as total picture. Personal computer with access protected by password was used to analyze the data in keeping with security of the data. Files of hard copy documents were kept securely locked up in the filing cabinet for two years and only the researcher and the advisors can access the filing cabinet. After two years, data sheets will be destroyed. The researcher collaborated with nurses at PHCs as well as with health volunteers in their respective community area to ensure that no participant should feel uncomfortable at any time during their participations. The researcher distributed one copy each of the final report of this study to all the institutions kindly granted permission to the researcher to conduct this study.

## RESULTS AND DISCUSSION

### Results

This cross-sectional research was conducted to examine factors predicting the physical activity among older people with hypertension who lived in Bantul, Indonesia. Each participant was interviewed using the structured questionnaires. The results of this study are presented in 4 parts which consisted of, first study of general characteristic of the participants. Second, descriptive explanation regarding to variables including physical activity, perceived health status, perceived barrier, perceived self-efficacy, social support among older people with hypertension. Third, correlation coefficients matrix between independent variables and physical activity were examined. Fourth, the statistical test of predictors of physical activity was identified to achieve the objectives of the study.

#### 1. General characteristic of the participants

This part explains the general characteristic of the general characteristic of the participants including gender, age, religion, level of education, occupation, income, living arrangement, level of hypertension, and Body Mass Index (BMI).

Participants of this study were male 46.6 % and female 53.7%, with age 60 to 85 years old (mean = 66, SD = 5.729) and 72.4% in stage 1 hypertension. The majority of the participants were 60-70 years old (82.2%) and the religion of participants was mostly Islam (94.8%). Half of the participants' education was elementary school and no formal education (50%). Fifty two point three percent of the participants were unemployed, while 77.6% perceived enough income. Most of the participants were living with their spouse and children (62.1%). More than two-third of the participants were categorized in stage one hypertension which had blood pressure 140-159/90-99. Moreover, the majority of participants had body mass index in normal weight category (62.6%) followed by overweight (20.7%).

**Table 3** Number and percentage of participants by demographic characteristic (n=174)

Characteristic		Number	Percent (%)
Gender	Male	81	46.6
	Female	93	53.7
Age	60-70	143	82.2
	71-80	29	16.7
	>80	2	1.1
	Mean = 66 SD = 5.729 Min = 60 Max = 85		
Religion	Islam	165	94.8
	Christian	5	2.9
	Catholic	4	2.3
Level of education	No formal education	28	16.1
	Elementary school	59	33.9
	Junior high school	27	15.5
	Senior high school	47	27.0
	Other	13	7.4
Occupation	None	91	52.3
	Farmer	54	31.0
	Merchant	22	12.6
	Handyman	7	4.1
Income	Not enough	39	22.4
	Enough	135	77.6
Living arrangement	Alone	10	5.7
	With spouse	19	10.9
	With children	35	20.1
	With spouse and children	108	62.1
	With relatives	2	1.1

**Table 3** (Continued)

Characteristic		Number	Percent (%)
Level of hypertension	Stage 1 hypertension	126	72.4
	Stage 2 hypertension	48	27.6
BMI	Underweight (<18.5)	25	14.4
	Normal (18.5-24.9)	109	62.6
	Overweight (25-29.9)	36	20.7
	Obesity ( $\geq 30$ )	4	2.3
Mean = 22.26 SD = 3.487			
Min = 14.61 Max = 33.33			

## 2. Description of variables

This part describes variables that were included in this study apart of general characteristic. The variables were physical activity, perceived health status, perceived barrier, perceived self-efficacy, and social support.

Physical activity was divided into two categorized based on WHO classification including inadequate and adequate physical activity. Classification was based on summation energy expenditure per weeks in each activity. Percentage of the participants who perform adequate physical activity was higher than the participants who perform inadequate physical activity. Perceived health status was categorized into four levels of older people perception about their health, including excellent, good, poor, and fair. More than one-third of participants perceived their health in good status (46.6%) and then followed by participants who perceived their health in fair status (46.0%) (see table 4).

All of the participants reported had barrier to perform physical activity with mean = 32.49 of the total score of 52 (SD = 4.667). Mostly participants had moderate perceived barrier (87.9%) (see table 4). The majority of participants perceived that feeling ache was the most barriers to perform physical activity (88.0%). Participants' perception about their health was the barrier to perform physical activity in 83.3% of the total participants. Furthermore, more than half of participants (79.3%) also agreed that less of strength was

the barrier to physical activity. Seventy six percent of the participants also agreed that they did not do physical activity because feeling depressed. Meanwhile, most of the participants (82.7%) did not agree that they did not perform physical activity because they did not interest in. In addition, fear of falling was not the barrier for 71.8% of the total participants to execute physical activity (see appendix).

The majority of the participants (57.5%) were classified in moderate level of self-efficacy (see table 4). Mean score of perceived self-efficacy was 56.71 of the total score of 120 (SD = 23.554). Most participants (77.6%) felt that they were less confidence to perform physical activity when they had ache and pain. 70.1% were also less confidence when they need to increase the duration of activity. 69.5 % of the participants had less confidence to do physical activity when they have other thing to do and 65.5% when they felt anxious or sad. However, more than half of participants (63.8%) felt high confidence even though they had to perform physical activity alone. More than one-third of total participant (40.8%) reported high confidence to perform physical activity when they felt cannot do it well and fear of falling (see appendix).

The majority of the participants had low social support to execute physical activity (see table 4). Mean of the social support score was 35.89 of the total score of 66 (SD = 7.558). Two-third of the total participants (64.9%) stated that their family never provides equipment or facilities to perform physical activity as well as from their friends (83.3%). More than half of participants (63.2%) felt that their family did not take them to the place for exercise as well as from their friend (76.4%). In addition, the majority of the participants reported that sometime they was given information about benefit and kinds of performing physical activity by their family (53.4%) and their friends (55.8%).

**Table 4** Number and percentage of variables (n=174)

Variables	Number	Percentage (%)
Physical Activity	77	44.2
Inadequate (<100)	97	55.8
Adequate ( $\geq$ 100)		
(Mean = 116.10, SD = 58.71 Range=3.75-248.75)		
Perceived health status		
Excellent	5	4.6
Good	80	46.0
Fair	81	46.6
Poor	8	2.9
Perceived barrier		
Low	17	9.8
Moderate	153	87.9
High	4	2.3
(Mean = 32.49, SD = 4.667, Range=16-44)		
Perceived self-efficacy		
Low	46	26.4
Moderate	100	57.5
High	28	16.1
(Mean = 56.71, SD = 23.554, Range=12-120)		
Social support		
Low	156	89.7
High	18	10.3
Mean = 35.89, SD = 7.558, Range= 22-66		

**Table 5** Mean, SD, Min and Max of Physical Activity based on MET

Types of Physical Activity	Light Activity				Moderate Activity				Vigorous Activity			
	Mean	SD	Min	Max	Mean	SD	Min	Max	Mean	SD	Min	Max
Household	35.9	2.7	0.0	170.8	31.2	2.2	0.0	97.5				
Occupational	1.2	3.6	0.0	20.0	10.9	1.9	0.0	76.0				
Leisure time and exercise	16.4	9.4	0.0	43.0	12.4	13.7	0.0	55.0	1.6	5.8	0.0	48.0
Transportation	5.3	6.8	0.0	20.0	1.1	4.6	0.0	30.0				

### 3. Relationship between independent variables with physical activity.

This part gives explanation the statistical test for correlation between personal factors (gender, age, BMI, level of education, income, living arrangement, occupation, and perceived health status), perceived barrier, perceived self-efficacy, and social support with physical activity. After the normality test was checked, parametric statistic methods were used in this study. Point-biserial analysis was used to examine the relationship between gender, income, living arrangement, and occupation with physical activity. Spearman's rank was used to examine level of education and perceived health status with physical activity. While, Pearson's product moment was used to examine the relationship between age, BMI, perceived barrier, perceived self-efficacy, and social support with physical activity.

Table 6 shows 7 independent variables including age, level of education, income, living arrangement, perceived barrier, perceived self-efficacy, and social support were statistically correlate with physical activity in older people with hypertension in Bantul, Indonesia ( $p < .01$  and  $p < .05$ ). Perceived self-efficacy was the variable with strongest correlation with physical activity ( $r = .292$ ). Level of education, income, living arrangement, perceived self-efficacy, and social support had positive correlation with physical activity ( $r = .252, .209, .164, .164, .292, .279$  respectively). Those results mean higher education, income, perceived self-efficacy, and social support were correlated with higher score of physical activity and living with others was correlated with higher score of physical activity.

Age and perceived barriers had negative correlation with physical activity ( $r = -.284, -.286$ ). It explains that if that increased of perceived barrier were correlated with decreased of physical activity. However, 4 independent variables including gender, Body Mass Index, occupation, and perceived health status were not statistically correlated with physical activity in older people with hypertension in Bantul, Indonesia.

**Table 6** Relationship between gender, age, BMI, level of education, income, living arrangement, occupation, perceived health status, perceived barrier, perceived self-efficacy, and social support with physical activity in older people with hypertension (n=174)

Variables	1	2	3	4	5	6	7	8	9	10	11	12
1. Gender <sup>a</sup>		-.039	.029	-.193*	-.377**	-.220**	-.114	.003	-.015	-.035	-.142	.013
2. Age <sup>b</sup>			-.192*	-.285**	-.285**	-.177*	-.228**	-.096	.198**	-.198**	-.141	-.284**
3. BMI <sup>b</sup>				.092	.058	.207**	.026	.061	.030	.054	.016	.100
4. Education level <sup>c</sup>					.091	.391**	.141	.210**	-.339**	.208**	.278**	.252**
5. Occupation <sup>a</sup>						.403**	.179*	.071	-.064	.153*	.060	.078
6. Income <sup>a</sup>							.099	.217**	-.195*	.137	.178	.209**
7. Living arrangement <sup>a</sup>								.116	-.110	.181*	.100	.180*
8. Perceived health status <sup>c</sup>									-.338**	.048	.179	.101
9. Perceived barrier <sup>b</sup>										-.266**	-.254**	-.286**
10. Perceived self-efficacy <sup>b</sup>											.328**	.292**
11. Social support <sup>b</sup>												.279**
12. Physical activity												

**Note:** a Point-Biserial; b. Pearson's product moment; c. Spearman's rank

\* p < .05; \*\* p < .01

#### 4. Predictor of physical activity

This part provides description of statistical test for predictors of physical activity in older people with hypertension in Bantul, Indonesia. In order to obtain the objectives which to examine the effect of personal factors (gender, age, BMI, level of education, income, living arrangement, occupation, and perceived health status), perceived barrier, perceived self-efficacy, and social support on physical activity, multiple linear regression with backward method was used.

**Table 7** Model of predictive factors for physical activity in older people with hypertension (n=174)

Factors	$\beta$	SE	Beta	t	p
Gender	5.461	9.369	.047	.583	.561
Age	-1.778	.825	-.174	-2.155	.033
BMI	.618	1.230	.037	.503	.616
Level of education	1.393	3.884	.031	.359	.720
Occupation	-6.218	10.201	-.053	-.610	.543
Adequacy income	14.695	10.897	.116	1.349	.179
Living arrangement	2.816	4.721	.044	.596	.552
Perceived health status	-3.276	7.204	-.035	-.455	.650
Perceived barrier	-1.918	1.034	-.153	-1.854	.066
Perceived self-efficacy	.372	.193	.149	1.932	.055
Social support	1.167	.607	.150	1.922	.056

$R^2 = 0.212$   
Adjusted  $R^2 = 0.159$

The first regression model entered 11 variables to multiple regression (see table 7), exposed that only one variable was statistically affect physical activity. However, 11 variables including gender, age, Body Mass Index, level of education, occupation, adequacy income, living arrangement, perceived health status, perceived barrier, perceived self-efficacy, and social support can explain 15.9% of the variation of physical activity in older people with hypertension in Bantul, Indonesia (Adjusted  $R^2 = .159$ ).

**Table 8** Final model of predictive factors for physical activity in older people with hypertension (n= 174)

Factors	$\beta$	SE	Beta	t	p
Age	-2.031	.732	-.198	-2.774	.006
perceived barrier	-2.071	.926	-.165	-2.236	.027
perceived self-efficacy	.393	.188	.158	2.092	.038
social support	1.222	.579	.157	2.112	.036
$R^2 = 0.193$					
Adjusted $R^2 = 0.174$					

The final regression model, derived from multiple regression analysis with backward method revealed that only 4 variables including age, perceived barrier, perceived self efficacy, and social support were significantly affect physical activity among older people with hypertension in Bantul, Indonesia (see table 8). Age was negatively affect physical activity with a statistically value of  $b = -2.031$  ( $p < .01$ ). It means that if age of older people increased 1 year, the score of physical activity in older people will be decreased 2.031, when the other variables controlled.

Perceived barrier was negatively affect the score of physical activity with  $b = -2.071$  ( $p < .05$ ). It means that if score of perceived barrier increase 1 score, the score of physical activity in older people will be decreased 2.071. Whereas, perceived self-efficacy was positively affect physical activity with a statistically value of  $b = 0.393$  ( $p < .05$ ). It means that if the older people increase their perceived self-efficacy 1 score, the score of physical activity in older people will increase 0.393. Then, social support was positively affect physical activity with a statistically value of  $b = 1.222$  ( $p < .05$ ). It means that if the score of social support for older people increase 1 score, the score of physical activity in older people will increase 1.222.

Based on table 8, 17.4% of the variation of physical activity in older people with hypertension in Bantul, Indonesia can be explained by four independent variables including age, perceived barrier, perceived self-efficacy, and social support (Adjusted  $R^2 = .174$ ). The strongest predictor for physical activity was age ( $\beta = -.198$ ) and followed by

perceived barrier ( $\beta = -.165$ ), perceived self-efficacy ( $\beta = .158$ ), and social support for physical activity ( $\beta = .157$ ).

In summary, there are four variables including age, perceived barriers, perceived self-efficacy, and social support can predict physical activity in older people with hypertension in Bantul, Yogyakarta. Even though others variables including education level, income, and living arrangement was correlated with physical activity. These factors also influenced physical activity through perceived barrier, perceived self-efficacy, and social support.

## Discussion

The discussion of this study has been organized into three parts for clarity: the first part discusses the general characteristic of the selected participants of this of study and moving on to the second part which focuses on relevant factors predicting physical activity among older people with hypertension in Bantul, Indonesia, as well as presenting correlations between the variables. The third and final part discusses the strength and the limitation of this study.

### 1. General Characteristics

In this study, the participants' age-range was 60-85 years old with the averaged age being 66 years, with male and female participants almost being the same in numbers. The selected group of participants happened to be closely representative both in term of age and gender characteristics of the population of older people living in Bantul, Indonesia. According to Yogyakarta Ministry of Health (2014), the pyramid of the older people population shows that old people aged 60 to 65 years are the largest group in number, which is followed by the second largest group aged 66 to 70 years and then come the group of people aged 71 to 75 years. Most of the participants were living with their spouse and children. The culture of Indonesia is such that it is common for older people to live with their children or relatives. The level of education of the majority of the participants was equivalent to elementary school and no formal education. The old-aged people in this area did not have any occupation as such and were regarded as old-aged

people in their retirement according to Indonesian Ministry of Labor and most of the old-aged female was staying at home being housewife. Most of the participants indicated they earned sufficient income and only came to the public health center (PHC) for physical checkup which included taking blood pressure measurement and the majority of them were found to be in stage 1 hypertension.

## **2. Factors predicting physical activity among older people with hypertension in Bantul, Indonesia**

This study has identified the importance of various factors that influence physical activity among older people with hypertension in Bantul, Indonesia. The findings revealed four factors affecting physical activity among older people with hypertension, these factors were: age, perceived barrier, perceived self-efficacy, and social support. Backward method in multiple linear regression was used to identify the greatest value of Adjusted  $R^2$  and the best model in the analysis. With backward method in multiple linear regression being used in the analysis, these four factors could explain 17.4% of variance of the physical activity. Whereas, gender, Body Mass Index (BMI), occupation, level of education, income level, living arrangement, and perceived health status had not indicated to have any effect on physical activity among older people with hypertension.

Amongst all four factors, age had indicated as the strongest predictor of physical activity when other variables were kept under control. Age bore a negative relationship with physical activity and the result indicated that when age increased, level of physical activity would decrease. The decreased level of physical activity with increasing age was expected, which was consistent with findings in other previous studies. This finding was also supported by previous study of Poolsawat (2006) which had found that as people getting older, they reported less physical activity. Moreover, study by Giuli et al. (2012) explained that decreased participation in physical activity was found among the old-aged people. With increase in age, people tend to bear with decreases in physical strength, endurance, and flexibility which certainly had impact on their physical activity. Study conducted by Milanović et al. (2013) had found reduction in physical activity level among the old-aged people was caused by reduced muscle strength and changes in body-fat percentage, flexibility, agility, and endurance in the old-aged people and with increased

attention to this group of old-aged people, working towards adequate increase of physical activity could be achieved.

Perceived barrier was identified as the second factor predicting physical activity among the older people with hypertension, and perceived barrier had an inverse correlation with physical activity implying that the old-aged people perceiving more barriers to physical activity tended to engage themselves less in physical activity. This finding was congruent with finding by Patel et al. (2013) of perceived barrier affecting physical activity. Study by Polsawat (2006) had also found that perceived barriers could explain 1.7% variance in physical activity. Based on the findings of perceived barrier in this study, older people's perception about themselves with aching, perception about their health, and feeling of declining physical strength were accounted for most of their barriers against engaging themselves in physical activity. This was supported by finding of Gobbi et al. (2012) which explained that with the old-aged people, barriers to physical activity commonly included emotional as well as physical aspects such as an unpleasant sensation of aching, feeling of declining strength, and fear of incurring physical injury. Perceived barrier to engage themselves in health-enhancing activities could either be realistic or unrealistic barriers but it would certainly keep the old-aged people from engaging in any activities. Perceived barriers were identified as relevant elements in explaining healthy behavior among the old-aged people (Pender et al., 2011).

Perceived self-efficacy was another predictor of physical activity among the older people. The older people with greater perception of self-efficacy were reported to flare better in the physical activity score. Perceived self-efficacy implies people's self-belief in their ability to carry out specific behavior under certain situation (Bandura, 1986 as cited in Pender et al., 2011). When the people's own judgment of abilities to accomplish certain physical activity increased, their confidence to perform that physical activity would increase, and finding by Laffery (2006) stated that people with more confidence in their own ability to perform certain physical activity reportedly engaged in adequate physical activity and would continue to engage themselves in that physical activity on a regular basis. This particular finding in the study was consistent with finding of study done by Smith et al. (2007) that described self-efficacy as a factor of greater significance than others in predicting the level of performance of physical activity among the old-aged

people. In this study, most of the old-aged people became less confident when they experienced with pain or aching while performing physical activity. Pain and aching would certainly restrict their movement which was supported by finding of the study by Morris et al. (2008) suggesting that limitation in physical function significantly correlated to perceived self-efficacy to follow a healthy behavior. Perceived self-efficacy was an important factor to motivate older people with hypertension to follow a healthy behavior.

In addition, social support could also be a factor predicting level of physical activity with respect to age, perceived barriers, and perceived self-efficacy. Support given by others influenced older people to accept and engage themselves in health-promoting activities. The increased physical activity of people receiving greater social support was to be expected and was consistent with other previously conducted studies. Study by Lee (2006) reported that old-aged people needed support from family and others to raise their confidence and facilitating them to engage in health-promoting activities. Another study by Idowu, et al. (2012) described that support from family and friends were a positive stimulus to raise the level of physical activity among the old-aged people. This study has suggested one way of giving social support by providing physical exercise equipment or facilities to meet the need of older people to engage them in regular physical activity. Although older people should be encouraged to be independent but support from others was also needed to ensure that they maintained their regular and adequate physical activity.

In spite of having identified these four factors, another finding of this study was that gender had shown no statistical significance in predicting the level of physical activity among the older people with hypertension. This finding was in contrast to finding of the previous study by Kanyoni (2009) which clearly stated that among the old-aged people, female and male had shown differences with their levels of engaging in physical activity. This inconsistency could be explained of the decreased physical activity in virtue of advancing age both equally in male as well as female. Another study by Milanović et al. (2013) had found that reduced level of physical activity among the old-aged people was similar for both men and women due to the aging process. Moreover, among the old-aged people in this study, females tended to do household chore while males tended to stay with their leisure time and exercise activities which resulted in no difference between their

score of physical activity. Similarly, this was also supported by finding of study by Gobbi et al. (2012) which found no difference in physical activity among the old-aged people male or female.

For educational level, in contrary to the hypothesis, that educational level was not explain the variation in physical activity among the older people with hypertension. However, this study showed that higher educational level among the older people resulted in higher level of participation in physical activity. This inconsistency with the hypothesis was explained by virtue of the correlation between educational level and perceived barriers. While the older people with higher education tended to be more exposed to information about physical activity but greater perceived barriers would also deter the older people from getting these information and this was supported by the finding of study by He et al. (2005) which described that perceived barrier was deterring the old-aged people in high education group from searching for information related to healthy activities in order to enhance their knowledge. Whereas findings by Azevedo et al. (2007) had documented that when old-aged people did not cling onto any barriers, those with higher level of education were more likely to participate in leisure-time physical activity. Moreover, higher educational level did not guarantee that older people would be more knowledgeable about healthy activities. Study by Lim and Taylor (2005) found among the old-aged people with low level of education that they had considerable knowledge of what were considered healthy activities. It is therefore important to enhance knowledge, as well as positive attitude, about physical activity, and not just considering the level of education.

While occupation did not exhibit any statistical significance for predicting physical activity among the older people with hypertension and this particular finding differed from the hypothesis of this current study. Having an occupation did not have any bearing on physical activity. This finding reaffirmed study by Lim and Taylor (2005) which found the level of physical activity among the old-aged people remained the same whether or not they were unemployed or employed, however bearing in mind the fact that this study was conducted in rural area where most of the old-aged people still work as farmer. Finding by Lestari (2011) reasoned this indifference that majority of the old-aged people in rural area remained farmers as they retired. For this study, the level of physical activity was being studied and assessed in terms of household, occupation, transportation, leisure-time

activity and exercise and although the older people were unemployed, they still engaged themselves in physical activity in the household chore and leisure-time activity.

The issue of adequacy of income, the finding did not show this to be indicative of bearing any effect on physical activity among the older people with hypertension which contrasted with the hypothesis. It was suggested that the effect of this factor on physical activity could be overshadowed by other factors, most likely to be perceived self-efficacy and although the old-aged people did not have sufficient income but they had high confidence of their abilities and so adequate level of physical activity would be achieved. Study by Willey et al. (2010) explained that adequate level of physical activity was by no mean the result of the older people having sufficient income. Adequate income level influenced the financial status of the older people, which, in turn, related to physical activity performance among the older people, but did not highlight differences in the level of physical activity, if any.

Similarly, with living arrangement, the finding did not show this to be indicative of bearing any effect on physical activity among the older people with hypertension and this was supported by finding of study by Willey et al. (2010) which assessed both the older people living alone by themselves and those living with family, neither living arrangement had shown any difference as far as their engagement in physical activity was concerned. Nevertheless, living arrangement would still affect the older people's physical activity which could be explained by virtue of the strong relationship between living arrangement and other variables affecting their physical activity, specifically self-efficacy which implied that older people living with family or others tended to have higher self-confidence to engage in physical activity than the older people living alone by themselves. This finding was consistent with finding from previous study conducted by Lin et al. (2010) which found older people living with spouse tended to engage in higher level of physical activity because of their greater self-efficacy.

This study also clarified that Body Mass Index (BMI) did not bear any significant affects on physical activity in the older people with hypertension which was consistent with finding of study by Tesfaye et al. (2007) that mentioned physical activity was not influenced by the people's physical status of underweight, normal, overweight or obesity.

Whereas adequate physical activity could be achieved by virtue of the muscular strength of the older people but this was not influenced by BMI. Finding by Stenholm et al. (2013) explained that there was no difference in muscular strength between obesity people and normal weight people.

Finding of one previous study mentioned that a better perceived health status was another factor which could predict a higher level of physical activity among the older people (Giuli et al., 2012). In contrary to that, however, this study had revealed that perceived health status was not a factor predicting level of physical activity among the older people with hypertension. This finding was supported by previous finding by Kaleta et al. (2006) that explained that physical activity level exhibited no differences among the older people either with perception of good health status or perception of poor health status. However, this study found that better perceived health status exhibited certain correlation with lower perceived barrier and could be one of the predictors of physical activity. Study by Martinez et al. (2012) described the older people with perceived poor health status were those feeling weak, being afraid of pain, and consequently being pessimistic of negative impact toward their physical activity. When older people overcome their barrier, perception of their health status would improve, rather than evidence of an increase of their physical activity.

The result of this study was consistent with Pender's Health Promotion Model (2011) which stated that the older people's behavior related to health, especially physical activity was influenced by perceived barriers, perceived self-efficacy, and social support. Pender adopted a multi-dimensional nature approach with health promotion. Health promotion involves the individual, family, community, socio-economic, cultural, and environmental dimensions (Pender et al., 2011). By virtue of these inter-related factors, older people could raise their physical activity by following this health promotion activity which ultimately could maintain health condition of among the older people and prevent them from chronic illnesses.

### **3. Strength**

In particular, Pender's Health Promotion Model (2011) was adopted as guideline for this study and was considered appropriate to older people Indonesia particularly in Bantul. This study deployed a set of questionnaire with acceptable standard of reliability and was designed to be appropriate to cultural value of Indonesian people. One-on-one interview was adopted as being the most appropriate method of data collection among the older people as well as preventing any possibility of missing data. Furthermore, multi-variance analysis requires normality and linearity of the data set, and so for this study, data were screened for multivariable normality by examining their skewed and kurtosis values as well as the Kolmogorov-smirnov value. All the criteria requirements for the analysis were met in this study.

### **4. Limitations of this study**

Although all the objectives had been met in this study, but nevertheless, there were limitations. First, as the samples in this study were selected for a specific purpose, the sample might not be truly representative of the population of older people, even though the samples were randomly selected in each area and reflected certain similarity to the demographic characteristics of Bantul, Indonesia. Second, data were collected in Public Health Center (PHC) where participants received their treatment and under such environmental circumstances. It might be influence the older people's responses to the questionnaire, even though the researcher clearly stated that their answers would bear no impact on healthcare services given to them. Moreover, under these circumstances, the finding could not be generalized for the population of the older people given that there were other older people who did not come to PHC. Third, the questionnaires consisted of many items, the interview procedure allowed for rest time to the participants to avoid any burden to the older people in answering the question.

## CONCLUSION AND RECOMMENDATIONS

### Conclusion

The aim of this descriptive correlation study was to examine the factors predicting level of physical activity among the older people with hypertension in Bantul, Indonesia. The factors which could predict level of physical activity among the older people with hypertension were age, perceived barrier, perceived self-efficacy, and social support. These findings supported the hypothesis of this study. As age increased, physical activity would decrease, coupled with higher perceived barrier which tended to influence the decrease in physical activity. However, greater perceived self-efficacy as well as social support would induce higher physical activity. In conclusion, all these four factors can jointly predict level of physical activity among older people with hypertension accounting for 17.4%. However, others factors including educational level, income adequacy, and living arrangement cannot be completely overlook as factors bearing affects on physical activity, even though these factors cannot contribute significantly by themselves towards predicting physical activity but these factors contributed some meaningful correlation to other significant factors which provided prediction of the level of physical activity among the older people.

Pender's Health Promotion Model was considered appropriate model applicable to health-related behavior among the older people in Bantul, Indonesia. In addition, the findings of this study could be considered as guiding references for any implementation of strategies to raise physical activity among the older people living with hypertension in Bantul, Indonesia. The findings could also provide guiding procedure on how to devise intervention program, as well as program to overcome various barriers, improving self-efficacy, and inducing social support towards promoting physical activity and preventing onset of the chronic diseases among the older people in Bantul, Indonesia. Result of this study could also provide information on identifying any particular group needing special focus for intervention in order to raise their level of physical activity

## Recommendations

This section broadly outlines recommendations for future research study based on the findings of this study as well as implications for nursing practice and education.

### 1. Nursing research

Since the behavior of human beings is rather complicated and therefore multi-dimension as well as combination of theoretical framework is needed to be considered for further research together with an integrated format of personal, interpersonal, and environmental factors to describe factor affecting physical activity among the older people. Moreover, study of factors affecting physical activity by focusing on gender and different age-groups are needed to identify truly contributing factors.

### 2. Nursing practice

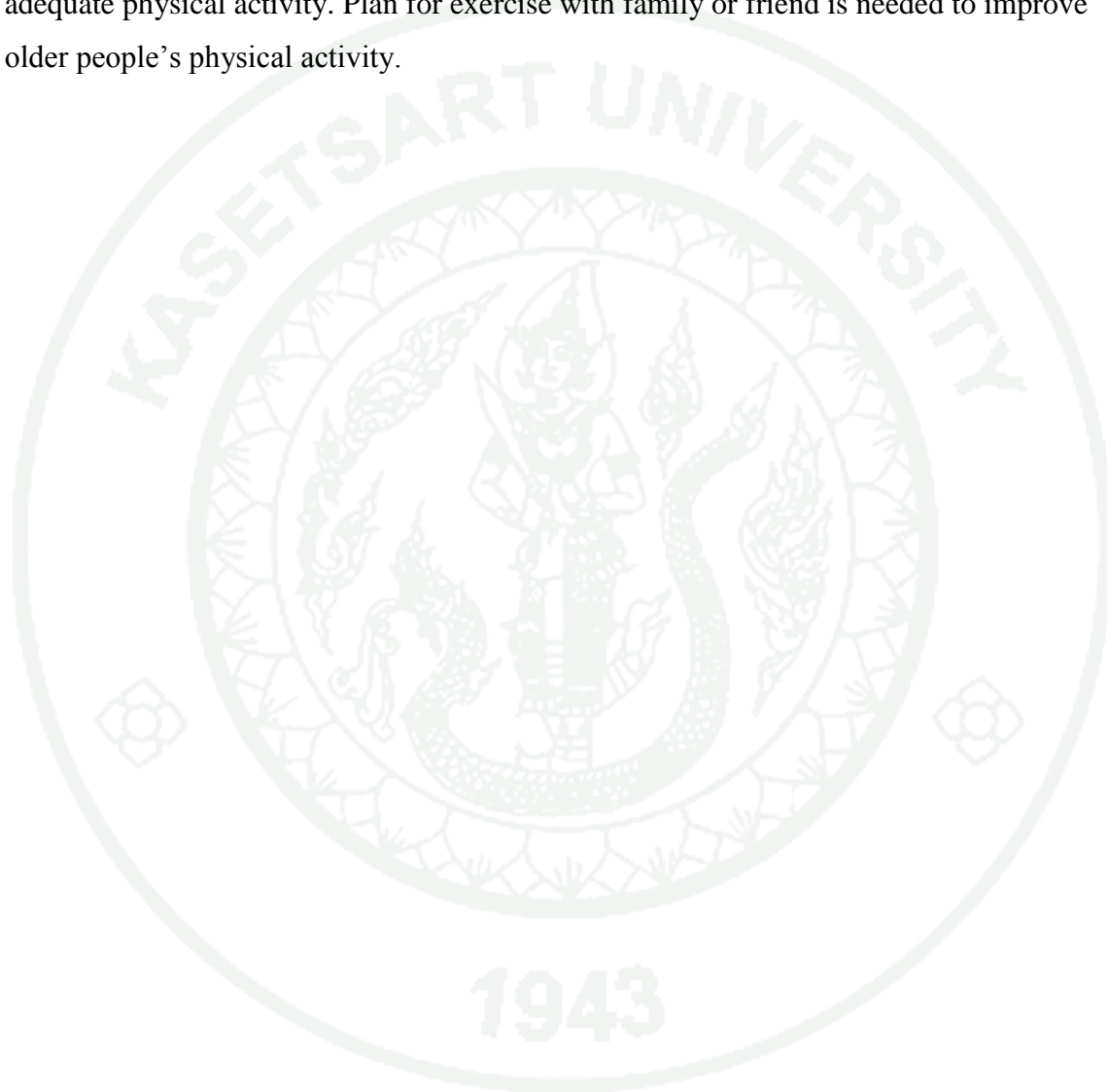
Perceived barrier and perceived self-efficacy were found in this study to be strong predictors of physical activity among the older people with hypertension and in order to capitalize on this finding, programs to overcome the barriers and improve self-efficacy are needed to raise the level of physical activity among the older people. Healthcare provider should provide educational program to overcome these barriers including how to prevent ache and pain during physical activity. Activity to make a better perception about health should be provided. Last but not least, healthcare provider should devise peer-support program to encourage among the older people with inadequate level of physical activity.

### 3. Nursing Education

Nursing educator can use this finding as a substance to teach nursing students related to health behavior in older people. Nursing educator can teach health promotion behavior especially physical activity in older people with hypertension with concerning to these factors.

#### 4. Family and Community

Based on this finding, social support was predictor of physical activity in older people. Family and friends should encourage and facilitate older people to perform adequate physical activity. Plan for exercise with family or friend is needed to improve older people's physical activity.



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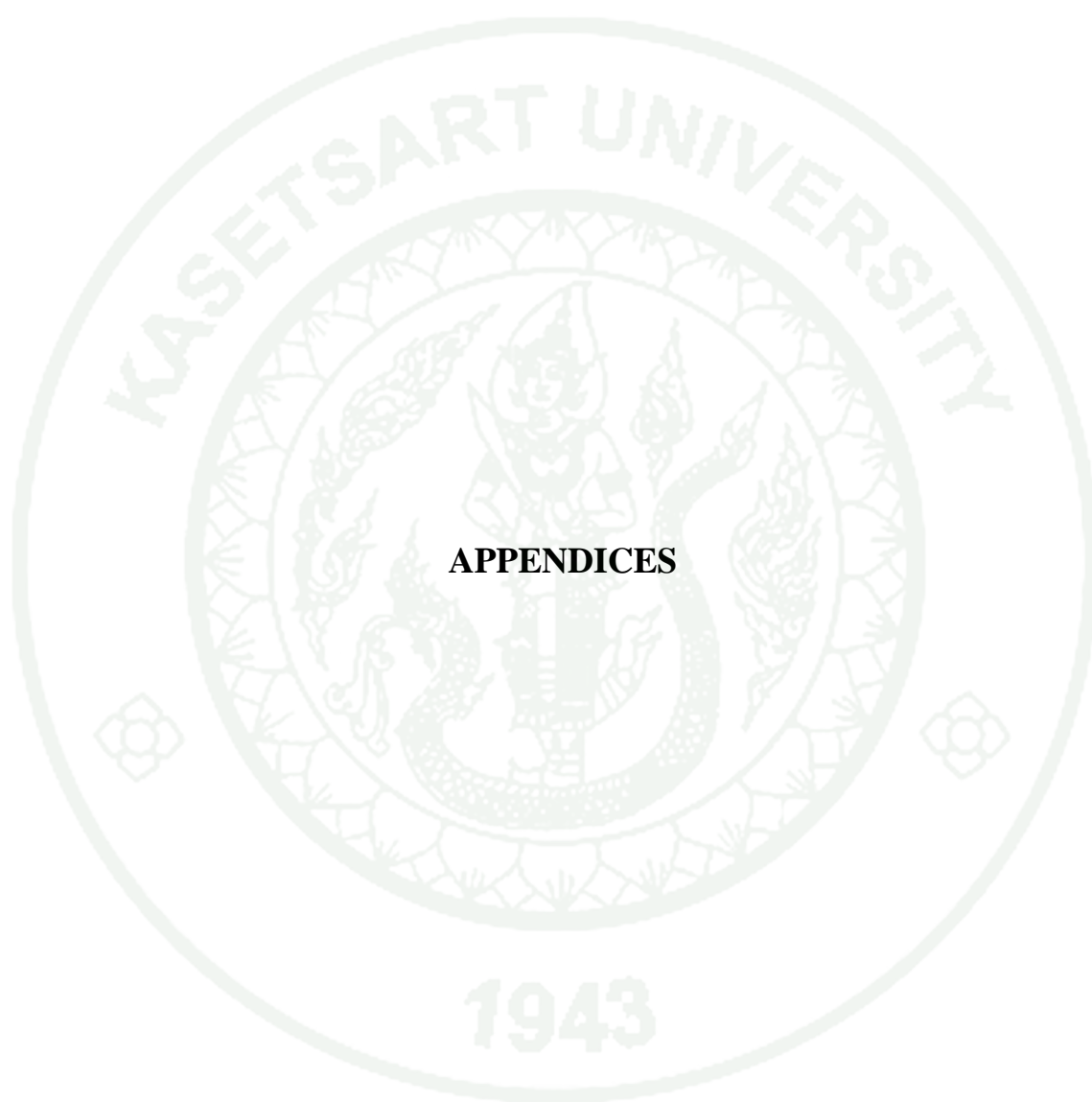
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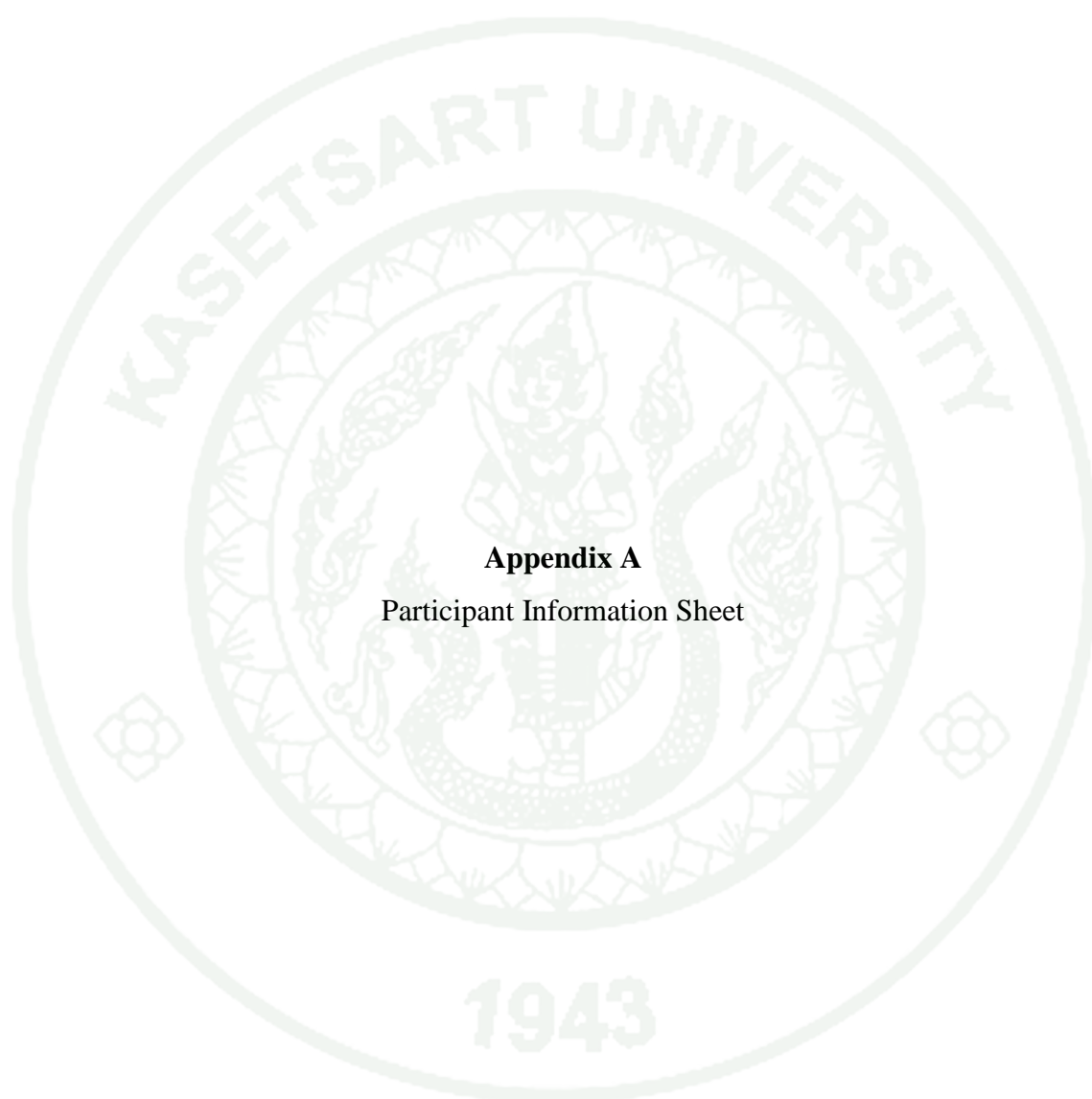
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**APPENDICES**



**Appendix A**  
Participant Information Sheet

**INFORMATION SHEET**

**Title of research project:** Predictors of Physical Activity among Older People with Hypertension in Bantul, Yogyakarta, Indonesia.

**Principle Researcher's Name:** Nindita Kumalawati Santoso.

**Position:** Student in Master of Nursing Science (Family and Community) of Boromarajonani College of Nursing Nopparat Vajira, an Affiliated Institution of Kasetsart University, Bangkok, Thailand

**Office address:** STIKES Alma Ata Yogyakarta, Jl. Ring Road Barat Daya 1 Tamantirto, Kasihan, Bantul, Yogyakarta, Indonesia

**Home address:** Cangkring, Sumberagung, Jetis, Bantul, Yogyakarta, Indonesia

**Telephone (office):** (0274) 4342288, **Telephone (home):** (0274) 3154573

**Cell phone:** (Indonesia) + 6285743461011  
(Thailand) +66824212923

**E-mail:** ninditakumala@yahoo.com

You are being invited to take part in a research project. Before you decide to participate it is important for you to understand why the research is being done and what it will involve. Please take time to read or listen the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

This research project involves older people with hypertension in Bantul, Yogyakarta to ask about their physical activity and factor related to physical activity including personal information of older people, barriers that you feel in doing physical activity, your confidence to engage in physical activity and support from your family or friend to motivate you to do physical activity.

The purpose of this research project is to know the factor predicting physical activity including personal information, barriers, confidence, and support among older people with hypertension in Bantul, Yogyakarta, Indonesia. The duration of this research project is 2 months from July to August 2014.

The characteristics of participants in this study are older people with hypertension age between 60 years old and over who live in Bantul, Yogyakarta, independence in activity daily living, and willingly volunteer to participate in this research project. However older people whose less of remembering and being hospitalized during data collection will be excluded from this study. This research project needs 174 participants.

Firstly, after obtained approval from Ethics Review Committee for Research Involving Human Subjects of Boromarajonani College of Nursing Nopparat Vajira (BCNNV) and got permission from Ministry of Health (MoH) and Board for Regional Planning and Development (BAPPEDA) of Bantul district, researcher make appointments to introduce herself to the Head of each PHC to provide brief information of this research study by explaining the topic, purpose, benefit, and plan of this research project. The nurses who have responsibility for older people will be asked to find participants who diagnosed with hypertension and received treatment at PHC. Then, researcher follows activity in geriatric clinic of PHC. The nurses introduce the researcher to the participants and thereby providing opportunity for the researcher to explain the purpose, benefit, and plan of this research project to the participants when the participants come to PHC.

Researcher will recruit participants from four PHC including PHC Kasihan, PHC Jetis, PHC Imogiri, and PHC Bantul. 38-47 older people with hypertension will be invited to be participants in each PHC.

You are invited in this research project because this research project will identify the factors predicting physical activity among older people age 60 years old and over with hypertension whose independence in activity daily living in Bantul district. You have met the inclusion criteria of this research project. Your provided information will be benefits to understand the physical activity and its related factors in older people with hypertension.

### **Procedure upon Participants:**

First, you are welcomed to go through the purpose, procedures, participant`s right and benefits of the study, either by reading in the provided information sheet or orally providing information by me as a researcher. Please agree to participate in this study by signing the two copies of informed consent, each will be kept by participants and the researcher. Second, I will measure of your weight and height by measurement tool that provide in kilogram for weight and centimeters for height. I will measure your blood pressure. Then, I will ask your personal information including age (will be measured in year), educational level, income, living arrangement, occupation and how do you feel about your health condition.

Lastly, I will ask questions about your frequency and duration of physical activity, barriers, confidence and support to perform your physical activity. It`s will take time approximately 40-45 minutes.

Researcher has guaranteed that procedures acted upon me would be exactly the same as indicated in the information. Any of personal information will be kept confidential. You are completely voluntary. Researcher will allow you to withdrawal from this study any time without need to provide reason and with no consequences. You have the right deny. There will no bad impact upon you and it does not influence the services of PHC. You will be allowed to skip any questions if you feel uneasy to answer and researcher will provide time to take a rest if you feel tired to answer the questions.

Results of the study will be reported as total picture. Any of personal information which could be able to identify will not appear in the report. The personal information and questionnaires will be saved in locked cabinet and only researcher and advisor can access the cabinet. Personal computer protected by password will be used to analyze the data. After the end of the project, personal data will be destroyed. The process of collecting data will be accompanied by nurse who is take responsibility for older people in PHC and capable in Indonesian language and local language.

**Process of providing information**

You will be provided this information by me as researcher. You will be permitted to read the information or researcher will read for you. It is up to you to decide whether or not to take part. If you do decide to take part you will be given this information sheet to keep and be asked to sign two consent form, each for you and researcher. All the information will be provided in to Indonesia language.

**Screening process found person not meet criteria**

If the process of screening potential participants found a person not meet inclusion criteria and in need of help or advice, researcher will explain the inclusion criteria to be a participant for this research project and explain why the person do not meet the criteria. Researcher will help them for any service or their need.

**Indicate Risk/Harm and Benefit**

There is no risk involved in this study except your valuable time. If there is unpleasant and uncomfortable during answering the question, you can stop to answer the questions. There is no direct benefit to you also. However, the results of the study may help us to give a better understanding about physical activity among older people with hypertension in Bantul, Yogyakarta, Indonesia. This study could be a guide for policy maker to develop appropriate programs to promote physical activity among older people with hypertension. In the end of interview, researcher will give you a small gift form Thailand as a sign of my appreciation for your willingness to participate in this study.

**Right of Refusal to Participate and Withdrawal**

You are free to choose to participate in the study or you may refuse to without any loss of benefit which you are otherwise entitled to. You will receive the same standard of interview with other participants in the study. You may also withdraw any time from the study without any adverse effect from the PHC or from me as a researcher. You may also refuse to answer some or all the questions if you do not feel comfortable with those questions. You are also free to ask any questions if there is unclear information.

**Available Sources of Information:**

If you have any further questions or would like to obtain more information you may contact me as a principal researcher (Nindita Kumalawati Santoso), Master of Nursing Science Program, Boromarajonani College of Nursing Nopparat Vajira, affiliated institution of Kasetsart University Thailand, on following phone number +66824212923 (Thailand) or +6285743461011 (Indonesia). I can be reached at all the time. If I have new information regarding benefit on risk/harm, you will be informed as soon as possible.

If you are not treated as indicated in the information sheet, you can report to the Ethics Review Committee for Research Involving Human Research Subjects, Boromarajonani College of Nursing Nopparat Vajira 681 Ramintra Road, Khannayao, Bangkok 10230, Thailand, Tel. 02-540-6500 ext 257, 246.

If you are willing to be the participant in this study, please fill in the participant consent form. In this great opportunity I would like to thank you for taking time to read this information sheet. Your participation in this study will be highly valued and much appreciated.

Thank you for reading or listening this information.

With Best Regards,  
Nindita Kumalawati Santoso



**Appendix B**  
Informed Consent

## INFORMED CONSENT

**Date** ...../...../.....

**Code number of participant** .....

I who have signed here below agree to participate in this research project  
 Title “Predictors of Physical Activity among Older People with Hypertension in Bantul,  
 Yogyakarta, Indonesia”

Principle Researcher’s Name: Nindita Kumalawati Santoso

Contact address: Cangkring, Sumberagung, Jetis, Bantul, Yogyakarta, Indonesia

Telephone: (Indonesia) +628743461011 and (Thailand) + 66824212923

I have been informed about rationale, objective, methods, risk/ harm and benefit of the project, what I will be engaged with in details. The researcher has explained to me and I clearly understand with satisfaction.

I willingly agree to participate in this project and consent the researcher to indicate what will be performed upon participant response to questionnaires for 30-40 minutes. I understand that the information will be kept confidentiality and my name will not be disclosed in any case. My personal information and questionnaires will be saved in locked cabinet, only researcher and advisor can access the cabinet. Personal computer protected by password will be use to analyze the data. After the end of the project, personal data will be destroyed

I have the right to withdraw from this research project at any time as I wish with no need to give any reason. This withdrawal will not have any negative impact upon me. I will still receive the usual service from PHC.

Researcher has guaranteed that procedures acted upon me would be exactly the same as indicated in the information. Any of my personal information will be kept confidential. Results of the study will be reported as total picture. Any of personal information which could be able to identify me will not appear in the report.

If I am not treated as indicated in the information sheet, I can report to the Ethics Review Committee for Research Involving Human Research Subjects, Boromarajonani College of Nursing Nopparat Vajira 681 Ramintra Road, Khannayao, Bangkok 10230, Thailand, Tel. 02-540-6500 ext 257, 246.

I also have received a copy of information sheet and informed consent form.

Sign.....

Sign.....

(.....)

(.....)

Researcher

Participant

Sign .....

(.....)

Witness



**Appendix C**  
Questionnaires

## DEMOGRAPHIC DATA

**Direction:** Please check in the box or write down the answers in the blank.

1. Gender  Male  Female
2. Age.....years
3. Height.....Centimeters
4. Weight.....Kilograms
5. Blood pressure .....mmHg
6. Education
 

<input type="checkbox"/> No formal education	<input type="checkbox"/> Diploma
<input type="checkbox"/> Primary school	<input type="checkbox"/> Bachelor degree
<input type="checkbox"/> Junior high school	<input type="checkbox"/> Other, please specify
.....	
<input type="checkbox"/> Senior high school	
7. Occupation
 

<input type="checkbox"/> No occupation	
<input type="checkbox"/> Occupation, please specify .....	
8. Income
 

<input type="checkbox"/> Not enough	<input type="checkbox"/> Enough with saving
<input type="checkbox"/> Enough without saving	
9. Who lives with you?
 

<input type="checkbox"/> No one	<input type="checkbox"/> Spouse and children
<input type="checkbox"/> Spouse	<input type="checkbox"/> Other, please specify .....
<input type="checkbox"/> Children	
10. How would you rate your overall health at the present time?"

Poor health	Fair	Good	Excellent

## QUESTIONNAIRE 1

### (Physical Activity)

This questionnaire is about activities that the participants may have done in the past 7 days.

#### Instructions

I will read the question for you, please revise the activities you did in the past 7 days and:

Step I: If the participants did the activity

a) Check (×) the “**Yes**” box.

b) Ask about “**how many times**” in the past 7 days they did it, and write their response in the space provided.

c) Check (×) how many “**total hours**” in the past 7 days they did the activity (Please check the number of total hours closed to the whole number).

Step II: If they did not do the activity,

please check (×) “**No**” and turn to the next item.

**Example:** To calculate total hours for each activity in the past 7 days

“Mrs. Ani usually cleans her grandchild every day. She takes one hour to brush the teeth and to clean the whole body of grandchild. Therefore, she takes total 7 hours per week to perform this activity.”

In the past 7 days, did you.....	How many TOTAL hours a week did you usually do it?					
1. Take care other person (Children Elderly or disable person), such as cleaning, feeding, serving food and milk?  <input checked="" type="checkbox"/> Yes How many TIMES a week <input type="checkbox"/> No	0-1 Hour	More than 1 to 3 hours	More than 3 to 5 hours	<del>More than 5 to 7 hours</del>	More than 7 to 9 Hours	More than 9 hours
In the past 7 days, did you.....	How many TOTAL hours a week did you usually do it?					
1. Take care other people (Children, elderly or disable person). - cleaning, feeding, serving food and milk - take other person to walk for pleasure or exercise - take to see the doctor? <input type="checkbox"/> Yes How many TIMES a week <input type="checkbox"/> No	0-1 Hour	More than 1 to 3 hours	More than 3 to 5 hours	More than 5 to 7 hours	More than 7 to 9 Hours	More than 9 hours

In the past 7 days, did you.....	How many TOTAL hours a week did you usually do it?					
2. Prepare and cook food? <input type="checkbox"/> Yes How many TIMES a week <input type="checkbox"/> No	0-1 hour	More than 1 to 3 hours	More than 3 to 5 hours	More than 5 to7 hours	More than 7 to 9 Hours	More than 9 hours
3. Clean dishes or other equipments? <input type="checkbox"/> Yes How many TIMES a week <input type="checkbox"/> No	0-1 hours	More than 1 to 3 hours	More than 3 to 5 hours	More than 5 to7 hours	More than 7 to 9 Hours	More than 9 hours
4. Broom, vacuum, mop or clean a bathroom? <input type="checkbox"/> Yes How many TIMES a week <input type="checkbox"/> No	0-1 hours	More than 1 to 3 hours	More than 3 to 5 hours	More than 5 to7 hours	More than 7 to 9 Hours	More than 9 hours
5. Wash clothes (machine)? <input type="checkbox"/> Yes How many TIMES a week <input type="checkbox"/> No	0-1 hours	More than 1 to 3 hours	More than 3 to 5 hours	More than 5 to7 hours	More than 7 to 9 Hours	More than 9 hours
6. Wash clothes (manual)? <input type="checkbox"/> Yes How many TIMES a week <input type="checkbox"/> No	0-1 hours	More than 1 to 3 hours	More than 3 to 5 hours	More than 5 to7 hours	More than 7 to 9 Hours	More than 9 hours
7. Iron? <input type="checkbox"/> Yes How many TIMES a week <input type="checkbox"/> No	0-1 hours	More than 1 to 3 hours	More than 3 to 5 hours	More than 5 to7 hours	More than 7 to 9 Hours	More than 9 hours
8. Clean windows or gutter, refrigerator, bicycle or car ? <input type="checkbox"/> Yes How many TIMES a week <input type="checkbox"/> No	0-1 hours	More than 1 to 3 hours	More than 3 to 5 hours	More than 5 to7 hours	More than 7 to 9 Hours	More than 9 hours
9. Clean pet or pet's cage? <input type="checkbox"/> Yes How many TIMES a week <input type="checkbox"/> No	0-1 hour	More than 1 to 3 hours	More than 3 to 5 hours	More than 5 to7 hours	More than 7 to 9 Hours	More than 9 hours
10. Feed pet? <input type="checkbox"/> Yes How many TIMES a week <input type="checkbox"/> No	0-1 hour	More than 1 to 3 hours	More than 3 to 5 hours	More than 5 to7 hours	More than 7 to 9 Hours	More than 9 hours
11. Repair electric or other equipments machines, or part of the house? <input type="checkbox"/> Yes How many TIMES a week <input type="checkbox"/> No	0-1 hour	More than 1 to 3 hours	More than 3 to 5 hours	More than 5 to7 hours	More than 7 to 9 Hours	More than 9 hours
12. Do light gardening, such as - Water plant using rubber pipe, dipper, bucket? - Cutting leaves? <input type="checkbox"/> Yes How many TIMES a week <input type="checkbox"/> No	0-1 hour	More than 1 to 3 hours	More than 3 to 5 hours	More than 5 to7 hours	More than 7 to 9 Hours	More than 9 hours

In the past 7 days, did you.....	How many TOTAL hours a week did you usually do it?					
13. Do moderate to heavy gardening, such as: - Mow grass with scissors? - plant tree? <input type="checkbox"/> Yes How many TIMES a week <input type="checkbox"/> No	0-1 hour	More than 1 to 3 hours	More than 3 to 5 hours	More than 5 to 7 hours	More than 7 to 9 Hours	More than 9 hours
14. Do light occupation (administrator or counselor)? <input type="checkbox"/> Yes How many TIMES a week <input type="checkbox"/> No	0-1 hour	More than 1 to 3 hours	More than 3 to 5 hours	More than 5 to 7 hours	More than 7 to 9 Hours	More than 9 hours
15. Do moderate occupation (teaching)? <input type="checkbox"/> Yes How many TIMES a week <input type="checkbox"/> No	0-1 hour	More than 1 to 3 hours	More than 3 to 5 hours	More than 5 to 7 hours	More than 7 to 9 Hours	More than 9 hours
16. Do heavy occupation (employee with heavy work, such as carry heavy stuff)? <input type="checkbox"/> Yes How many TIMES a week <input type="checkbox"/> No	0-1 hour	More than 1 to 3 hours	More than 3 to 5 hours	More than 5 to 7 hours	More than 7 to 9 Hours	More than 9 hours
17. Do volunteer work, such as - community leader of the elderly club or religion activities? - health, guard, or general volunteer? <input type="checkbox"/> Yes How many TIMES a week <input type="checkbox"/> No	0-1 hour	More than 1 to 3 hours	More than 3 to 5 hours	More than 5 to 7 hours	More than 7 to 9 Hours	More than 9 hours
18. Do religion activities, such as attend church, praying or reading bible, or Islamic activity? <input type="checkbox"/> Yes How many TIMES a week <input type="checkbox"/> No	0-1 hour	More than 1 to 3 hours	More than 3 to 5 hours	More than 5 to 7 hours	More than 7 to 9 Hours	More than 9 hours
19. Do wood working, needlework, drawing, knitting or other arts or crafts? <input type="checkbox"/> Yes How many TIMES a week <input type="checkbox"/> No	0-1 hour	More than 1 to 3 hours	More than 3 to 5 hours	More than 5 to 7 hours	More than 7 to 9 Hours	More than 9 hours
20. Read/ use a computer? <input type="checkbox"/> Yes How many TIMES a week <input type="checkbox"/> No	0-1 hour	More than 1 to 3 hours	More than 3 to 5 hours	More than 5 to 7 hours	More than 7 to 9 Hours	More than 9 hours
21. Watch Television? <input type="checkbox"/> Yes How many TIMES a week <input type="checkbox"/> No	0-1 hour	More than 1 to 3 hours	More than 3 to 5 hours	More than 5 to 7 hours	More than 7 to 9 Hours	More than 9 hours
22. Play light game, such as cards, with other people? <input type="checkbox"/> Yes How many TIMES a week <input type="checkbox"/> No	0-1 hour	More than 1 to 3 hours	More than 3 to 5 hours	More than 5 to 7 hours	More than 7 to 9 Hours	More than 9 hours

In the past 7 days, did you.....	How many TOTAL hours a week did you usually do it?					
23. Play a traditional musical instrument? <input type="checkbox"/> Yes How many TIMES a week <input type="checkbox"/> No	0-1 hour	More than 1 to 3 hours	More than 3 to 5 hours	More than 5 to7 hours	More than 7 to 9 Hours	More than 9 hours
24. Walk leisurely for exercise or pleasure? <input type="checkbox"/> Yes How many TIMES a week <input type="checkbox"/> No	0-1 hour	More than 1 to 3 hours	More than 3 to 5 hours	More than 5 to7 hours	More than 7 to 9 Hours	More than 9 hours
25. Walk fast or briskly for exercise? <input type="checkbox"/> Yes How many TIMES a week <input type="checkbox"/> No	0-1 hour	More than 1 to 3 hours	More than 3 to 5 hours	More than 5 to7 hours	More than 7 to 9 Hours	More than 9 hours
26. Jog or run? <input type="checkbox"/> Yes How many TIMES a week <input type="checkbox"/> No	0-1 hour	More than 1 to 3 hours	More than 3 to 5 hours	More than 5 to7 hours	More than 7 to 9 Hours	More than 9 hours
27. Ride a bicycle? <input type="checkbox"/> Yes How many TIMES a week <input type="checkbox"/> No	0-1 hour	More than 1 to 3 hours	More than 3 to 5 hours	More than 5 to7 hours	More than 7 to 9 Hours	More than 9 hours
28. Do aerobic calisthenics? <input type="checkbox"/> Yes How many TIMES a week <input type="checkbox"/> No	0-1 hour	More than 1 to 3 hours	More than 3 to 5 hours	More than 5 to7 hours	More than 7 to 9 Hours	More than 9 hours
29. Do light strength training (such as hand-held weights of 2 kg or less or elastic bands)? <input type="checkbox"/> Yes How many TIMES a week <input type="checkbox"/> No	0-1 hour	More than 1 to 3 hours	More than 3 to 5 hours	More than 5 to7 hours	More than 7 to 9 Hours	More than 9 hours
30. Do moderate to heavy strength training (such as hand-held weights of more than 2 kg)? <input type="checkbox"/> Yes How many TIMES a week <input type="checkbox"/> No	0-1 hour	More than 1 to 3 hours	More than 3 to 5 hours	More than 5 to7 hours	More than 7 to 9 Hours	More than 9 hours
31. Play badminton (pleasure or exercise)? <input type="checkbox"/> Yes How many TIMES a week <input type="checkbox"/> No	0-1 hour	More than 1 to 3 hours	More than 3 to 5 hours	More than 5 to7 hours	More than 7 to 9 Hours	More than 9 hours
32. Walk with carry heavy stuff? <input type="checkbox"/> Yes How many TIMES a week <input type="checkbox"/> No	0-1 hour	More than 1 to 3 hours	More than 3 to 5 hours	More than 5 to7 hours	More than 7 to 9 Hours	More than 9 hours

In the past 7 days, did you.....	How many TOTAL hours a week did you usually do it?					
33. Ride motorcycle or car? <input type="checkbox"/> Yes How many TIMES a week <input type="checkbox"/> No	0-1 hour	More than 1 to 3 hours	More than 3 to 5 hours	More than 5 to 7 hours	More than 7 to 9 Hours	More than 9 hours
34. Do other types of physical activity not previously mentioned (Please specify)?  _____	0-1 hour	More than 1 to 3 hours	More than 3 to 5 hours	More than 5 to 7 hours	More than 7 to 9 Hours	More than 9 hours
<input type="checkbox"/> Yes How many TIMES a week <input type="checkbox"/> No						

## QUESTIONNAIRE 2

### (Perceived Barrier)

**Instruction:** I will read the question for you and mark on your answer regarding to your feeling in performing physical activity. Physical activity refers to all activities in daily life comprising occupational, household, transportation and leisure time (exercise, sport and recreation) activity.

No	Items	Answer			
		Strongly disagree	Disagree	Agree	Strongly agree
1	I feel the same whether I am physically active or not.	Strongly disagree	Disagree	Agree	Strongly agree
2	I am concerned that I will hurt or strain myself if I am too physically active	Strongly disagree	Disagree	Agree	Strongly agree
3	I sometimes get tightness in my chest when I exert myself.	Strongly disagree	Disagree	Agree	Strongly agree
4	I have too little time for exercise	Strongly disagree	Disagree	Agree	Strongly agree
5	I do not have the strength to exercise	Strongly disagree	Disagree	Agree	Strongly agree
6	If my health were better, I would be more active	Strongly disagree	Disagree	Agree	Strongly agree
7	I am not interested in exercise	Strongly disagree	Disagree	Agree	Strongly agree
8	It is difficult to exercise when I ache	Strongly disagree	Disagree	Agree	Strongly agree
9	It is difficult to exercise if I feel depressed	Strongly disagree	Disagree	Agree	Strongly agree
10	Lack of transportation limits my exercise options	Strongly disagree	Disagree	Agree	Strongly agree
11	Bad weather prevents me from exercising	Strongly disagree	Disagree	Agree	Strongly agree
12	I sometimes get short of breath when I exercise	Strongly disagree	Disagree	Agree	Strongly agree
13	Fear of falling prevents me from exercising.	Strongly disagree	Disagree	Agree	Strongly agree

### QUESTIONNAIRE 3 (Perceived Self Efficacy)

**Direction:** I will read the question for you and rate how sure that you can perform your physical activity under various situations. Physical activity refers to all activities in daily life comprising occupational, household, transportation and leisure time (exercise, sport and recreation) activity.

The degree of confidence ranging from 0 (cannot do at all) to 10 (certain can do).

No	Situation	0	Degree of Confidence									
			1	2	3	4	5	6	7	8	9	10
1	I could perform physical activity/ exercise even if when I was tired	0	1	2	3	4	5	6	7	8	9	10
2	I could perform physical activity/ exercise even if when I had to perform alone	0	1	2	3	4	5	6	7	8	9	10
3	I could perform physical activity/ exercise even if when I felt anxious or sad	0	1	2	3	4	5	6	7	8	9	10
4	I could perform physical activity/ exercise even if when I felt lazy	0	1	2	3	4	5	6	7	8	9	10
5	I could perform physical activity/ exercise even if when I felt I cannot do it well	0	1	2	3	4	5	6	7	8	9	10
6	I could perform physical activity/ exercise even if when I had ache and pain	0	1	2	3	4	5	6	7	8	9	10
7	I could perform physical activity/ exercise even though I feared of falling	0	1	2	3	4	5	6	7	8	9	10
8	I could perform physical activity/ exercise even if when I need to increase the duration of this activity	0	1	2	3	4	5	6	7	8	9	10
9	I could perform physical activity/ exercise even if when the weather is not good	0	1	2	3	4	5	6	7	8	9	10
10	I could perform exercise even if when I had no equipment	0	1	2	3	4	5	6	7	8	9	10
11	I could perform exercise even if when I need to go outside or had other things to do	0	1	2	3	4	5	6	7	8	9	10

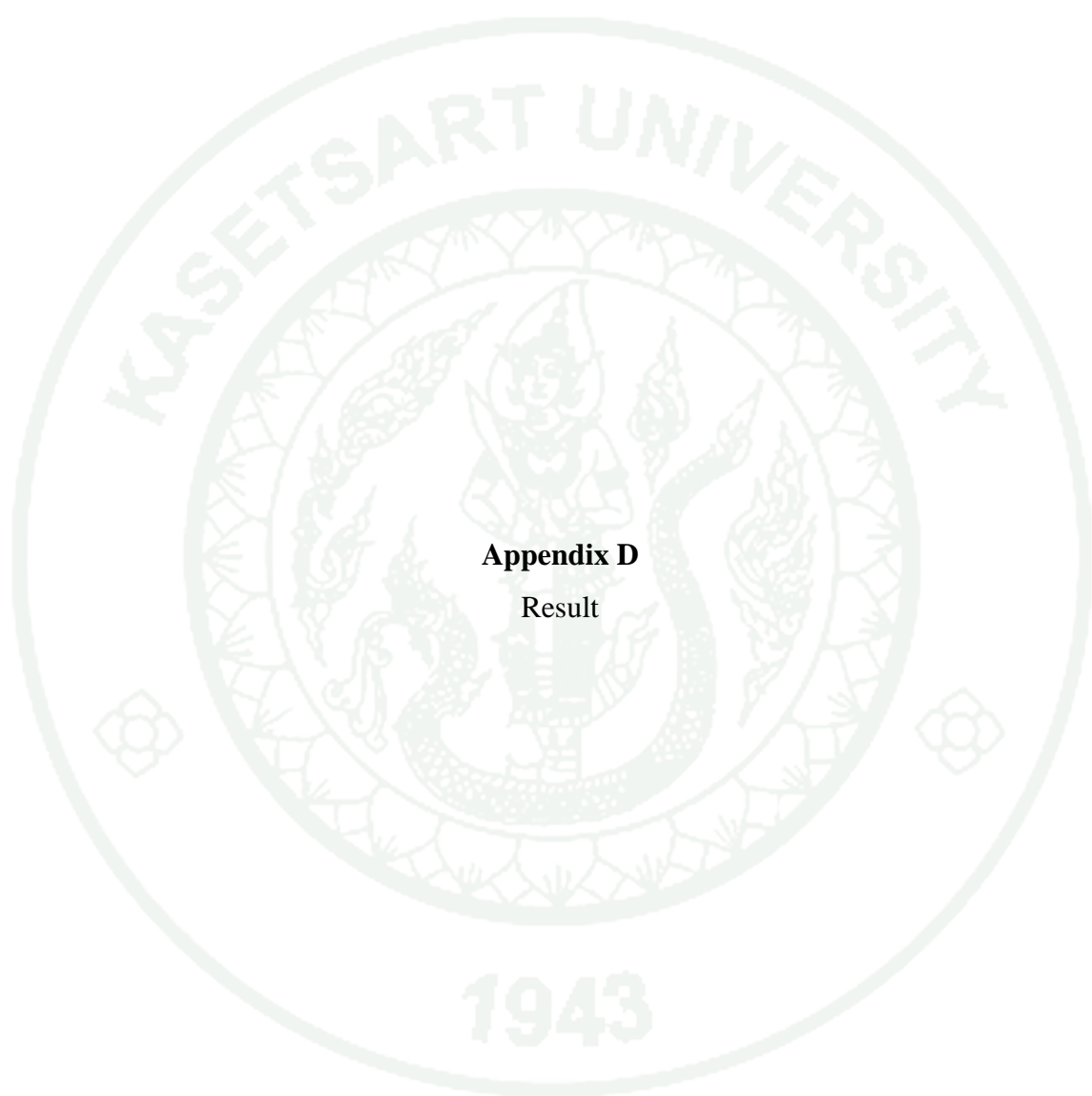
12	I could perform physical activity/ exercise even if when this activity is difficult	0	1	2	3	4	5	6	7	8	9	10
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**QUESTIONNAIRE 4**  
**(Social Support)**

**Direction:** I will read the question for you and mark your answer if you have ever got the following support from your family and your friends to perform physical activity. Physical activity refers to all activities in daily life comprising occupational, household, transportation and leisure time (exercise, sport and recreation) activity.

No	Item	Family			Friend		
		Never	Some time	Often	Never	Some time	Often
1	encouraged me to perform physical activity/ exercise						
2	admired me when performing physical activity/ exercise						
3	complained me when performing physical activity/ exercise						
4	listened to me and gave me an encouragement when you had the problem						
5	provided equipment or facilities for performing physical activity/ exercise						
6	take me to the place for performing exercise						
7	gave me money for performing exercise						
8	offered to perform physical activity/ exercise with me						
9	planned for performing physical activity/ exercise						
10	Gave me a suggestion about how to manage the problem from performing physical activity/ exercise						
11	gave me information regarding benefits and kinds of performing physical activity/ exercise						



**Appendix D**  
Result

**Appendix Table D1** Percentage of participants classified by types and duration of light activity (n=174)

Types of physical activity	Duration per week		
	Do not do (%)	>0-3 hour (%)	>3 hours (%)
<b>Household activity</b>			
Take care of other people	52.9	16.1	31.0
Preparing and cooking food	33.9	19.0	47.1
Cleaning dishes and equipment	26.4	27.5	46.1
Ironing	64.9	21.9	13.2
Feeding pet	50.0	27.6	22.4
Repairing electrical or part of house	73.0	19.5	7.5
Light gardening	49.4	23.5	27.1
Mean = 14.53 SD = 10.87			
<b>Occupation activity</b>			
Light occupation	86.2	6.3	7.5
Mean = 0.58 SD = 1.81			
<b>Leisure time activity and exercise</b>			
Religious activity	36.2	48.9	14.9
Wood working, needlework, or other arts	84.5	3.5	12.0
Reading or using computer			
Watching television	81.6	7.4	11.0
Playing light activity games	12.6	11.4	76.0
Playing traditional music	92.5	5.2	2.3
Walking leisurely	97.7	1.7	0.6
Mean = 10.38 SD = 5.83	69.5	19.5	11.0
<b>Transportation activity</b>			
Riding motorcycle or car			
Mean = 2.67 SD = 3.38	51.7	10.9	37.4
Mean = 28.16 SD = 1.46 Min = 2.50 Max = 81.50			

**Appendix Table D2** Percentage of participants classified by types and duration of moderate activity (n=174)

Types of physical activity	Duration per week		
	Do not do (%)	>0-3 hour (%)	>3 hours (%)
<b>Household activity</b>			
Sweeping, mopping, and cleaning bathroom	24.1	32.7	43.2
Washing clothes by machine	80.5	5.7	13.8
Washing clothes manually	35.1	26.4	38.5
Cleaning windows, gutters, refrigerator, bicycle or car	50.0	35.6	14.6
Cleaning a pet or pet's cage	60.9	24.1	15.0
Moderate gardening or farming	60.9	24.2	14.9
Mean = 9.98 SD = 6.89			
<b>Occupation activity</b>			
Moderate occupation	91.4	2.3	6.3
Heavy occupation	74.1	5.2	20.7
Mean = 1.99 SD = 3.49			
<b>Leisure time activity and exercise</b>			
Active in elderly club	89.1	5.7	5.2
Walking fast or briskly	91.4	7.5	1.1
Riding a bicycle	50.6	21.2	28.2
Aerobic for older people	86.8	9.2	4.0
Light strength training	93.1	3.4	3.5
Moderate strength training	93.7	5.2	1.1
Playing badminton	94.8	3.4	1.8
Mean = 3.28 SD = 3.68			
<b>Transportation activity</b>			
Walking with heavy items	90.8	5.1	4.1
Mean = 0.37 SD = 1.52			
Mean = 15.61 SD = 9.54 Min = 0.0 Max = 46.00			

**Appendix Table D3** Percentage of participants classified by types and duration of vigorous (n=174)

Types of physical activity	Duration per week		
	Do not do (%)	>0-3 hour (%)	>3 hours (%)
Leisure time activity and exercise			
Jogging or run	88.5	9.8	1.7
Mean = 0.27 SD = 0.97 Min = 0.00 Max = 8.00			

**Appendix Table D4** Percentage of participants classified by perceived barrier for physical activity (n=174)

Types of barrier	Agree (%)	Not agree (%)
Feel the same whether physically active or not.	43.1	56.9
Concern that it will hurt or strain if too physically active	53.5	46.5
Sometimes get tightness in their chest	39.1	60.9
Have too little time for exercise	62.6	37.4
Do not have the strength to exercise	79.3	20.7
If their health were better, they would be more active	83.3	16.7
Not interested in exercise	17.3	82.7
Feel ache	88.0	22.0
Feel depressed	76.5	23.5
Lack of transportation	47.7	52.3
Bad weather	73.5	26.5
Sometimes get short of breath	37.9	62.1
Fear of falling	28.2	71.8

**Appendix Table D5** Percentage of participants classified by situation of perceived self efficacy for physical activity (n=174)

Situation to perform physical activity	Can do with less confidence (%)	Can do with high confidence (%)
When tired	62.1	37.9
Alone	36.2	63.8
Felt anxious or sad	65.5	34.5
Feel lazy	64.4	35.6
Feel cannot do it well	59.2	40.8
Have ache and pain	77.6	22.4
Fear of falling	59.2	40.8
Need to increase the duration of activity	70.1	22.9
The weather is not good	64.9	35.1
No equipment	60.9	39.1
Have other things to do	69.5	30.5
Feel difficult	64.4	35.6

**Appendix Table D6** Percentage of participants classified by types of social support for physical activity (n=174)

Types of support	Never (%)	Sometime (%)	Always (%)
Encourage			
Family	21.8	46.0	32.2
Friend	56.3	32.2	11.5
Admire			
Family	28.7	54.1	17.2
Friend	42.0	47.1	10.9
Complain			
Family	59.9	39.9	13.2
Friend	67.8	19.5	12.7
Listen and give an encouragement when had the problem			
Family	28.7	50.0	21.3
Friend	47.7	44.3	8.0
Provide equipment or facilities			
Family	64.9	26.5	8.6
Friend	83.3	14.4	2.3
Take to the place for performing exercise			
Family	63.2	32.8	4.0
Friend	76.4	21.3	2.3
Give money			
Family	60.9	31.1	8.0
Friend	88.5	10.4	1.1
Offer to perform physical activity/ exercise			
Family	42.5	48.9	8.6
Friend	57.5	37.3	5.2

**Appendix Table D6** (Continued)

Types of support	Never (%)	Sometime (%)	Always (%)
<b>Plan for performing physical activity/ exercise</b>			
Family	41.4	51.7	6.9
Friend	56.9	40.8	2.3
<b>Give a suggestion how to manage the problem</b>			
Family	25.9	48.3	25.8
Friend	33.3	54.1	12.6
<b>Give information regarding benefits and kinds of performing physical activity/ exercise</b>			
Family	24.7	53.4	21.9
Friend	31.6	55.8	12.6



**Appendix E**  
Approval Letter



ERB No. 3.5 / 2014

## ETHICAL REVIEW BOARD

Baromrajonnani College of Nursing Nopparat Vajira

681 Ramintra Road, Khannayao, Bangkok 10230, Thailand, Tel. 02-540-6500 ext 222

Certificate of Approval The Institutional Review Board of the Baromrajonnani College of Nursing Nopparat Vajira 681 Ramintra Road, Khannayao, Bangkok Thailand, has approved the following study which is to be carried out in compliance with the international guidelines for human research protection as Declaration of Helsinki, The Belmont Report.

**Study Title:** Predictors of Physical Activity among Older People with Hypertension in Bantul, Yogyakarta, Indonesia

**Study Center:** Indonesia

**Principal Investigator:** Ms. Nindita Kumalawati Santoso

**Document Reviewed:**

1. Principal Investigator (PI)
2. Proposal Version1
3. Patient Information Sheet Version2

Signature.....

(BENJAMAS SIRIKAMONSATHIAN)

Chairperson of Ethical Review Board

Signature.....

(SUSHEEWA WICHAIKULL)

Secretary of Ethical Review Board

Date of Approval: 4 July 2014

Approval Expire Date: 3 July 2015

**PEMERINTAH KABUPATEN BANTUL**  
**BADAN PERENCANAAN PEMBANGUNAN DAERAH**  
**( B A P P E D A )**  
 Jln. Robert Wolter Monginsidi No. 1 Bantul 55711, Telp. 367533, Fax. (0274) 367796  
 Website: bappeda.bantulkab.go.id Webmail: bappeda@bantulkab.go.id

**SURAT KETERANGAN/IZIN**  
**Nomor : 070 / Reg / 2676 / PT / 2014**

**Menunjuk Surat** : Dari : Sekretariat Daerah DIY Nomor : 070/Reg/N/2617/2014  
 Tanggal : 17 Juli 2014 Perihal : Ijin Penelitian

**Mengingat** : a. Peraturan Daerah Nomor 17 Tahun 2007 tentang Pembentukan Organisasi Lembaga Teknis Daerah Di Lingkungan Pemerintah Kabupaten Bantul sebagaimana telah diubah dengan Peraturan Daerah Kabupaten Bantul Nomor 16 Tahun 2009 tentang Perubahan Atas Peraturan Daerah Nomor 17 Tahun 2007 tentang Pembentukan Organisasi Lembaga Teknis Daerah Di Lingkungan Pemerintah Kabupaten Bantul;  
 b. Peraturan Gubernur Daerah Istimewa Yogyakarta Nomor 18 Tahun 2009 tentang Pedoman Pelayanan Perijinan, Rekomendasi Pelaksanaan Survei, Penelitian, Pengembangan, Pengkajian, dan Studi Lapangan di Daerah Istimewa Yogyakarta;  
 c. Peraturan Bupati Bantul Nomor 17 Tahun 2011 tentang Ijin Kuliah Kerja Nyata (KKN) dan Praktek Lapangan (PL) Perguruan Tinggi di Kabupaten Bantul.

**Diizinkan kepada**  
 Nama : **NINDITA KUMALAWATI SANTOSO,S.KEP.NS**  
 P. T / Alamat : **Stikes Alma Ata YK , Jl. Ringroad Barat Daya No. 1 Tamantirto Yogyakarta**  
 NIP/NIM/No. KTP :  
 Tema/Judul Kegiatan : **PREDICTORS OF PHYSICAL ACTIVITY AMONG OLDER PEOPLE PEOPLE WITH HYPERTENSION IN BANTUL YOGYAKARTA INDONESIA**  
 Lokasi : **Puskesmas Kasihan, Puskesmas Jetis, Puskesmas Imogiri, Puskesmas Bantul**  
 Waktu : **18 Juli s.d 18 Oktober 2014**

**Dengan ketentuan sebagai berikut :**

1. Dalam melaksanakan kegiatan tersebut harus selalu berkoordinasi (menyampaikan maksud dan tujuan) dengan institusi Pemerintah Desa setempat serta dinas atau instansi terkait untuk mendapatkan petunjuk seperlunya;
2. Wajib menjaga ketertiban dan mematuhi peraturan perundangan yang berlaku;
3. Izin hanya digunakan untuk kegiatan sesuai izin yang diberikan;
4. Pemegang izin wajib melaporkan pelaksanaan kegiatan bentuk *softcopy* (CD) dan *hardcopy* kepada Pemerintah Kabupaten Bantul c.q Bappeda Kabupaten Bantul setelah selesai melaksanakan kegiatan;
5. Izin dapat dibatalkan sewaktu-waktu apabila tidak memenuhi ketentuan tersebut di atas;
6. Memenuhi ketentuan, etika dan norma yang berlaku di lokasi kegiatan; dan
7. Izin ini tidak boleh disalahgunakan untuk tujuan tertentu yang dapat mengganggu ketertiban umum dan kestabilan pemerintah.

Dikeluarkan di : B a n t u l  
 Pada tanggal : 18 Juli 2014

Kepala,  
 Kabid Dalitbang

**Tiau Sakti S.SS. M.Hum**  
 NIP.19700105 199903 1 006

**Tembusan disampaikan kepada Yth.**

- 1 Bupati Bantul (sebagai laporan)
- 2 Ka. Kantor Kesatuan Bangsa dan Politik Kab. Bantul
- 3 Ka. Dinas Kesehatan Kab. Bantul
- 4 Ka. Puskesmas Kasihan
- 5 Ka. Puskesmas Jetis
- 6 Ka. Puskesmas Imogiri
- 7 Ka. Puskesmas Bantul
- 8 Ka. Stikes Alma Ata Yk
- 9 Yang Bersangkutan (Mahasiswa)



**Appendix F**  
Statement Letter



## **E.L.R.A**

**Examination & Language Research Based on Al-Qur'an**

Jl.Indramayu Kav.no 52 Antapani Phone 022-70912801 or email to [elra4universe@gmail.com](mailto:elra4universe@gmail.com)

### **TRANSLATOR'S CERTIFICATE**

I hereby certify that I have translated the document attached to this certificate "**Predictors of Physical Activity Questionnaire**" using the very best of my knowledge while respecting the original content faithfully as an authorized translator of ELRA.

Bandung, Indonesia, July 1, 2014.

  
**Adhia Nugraha**  
ID:001201080981773



YAYASAN  
ENGLISH BEST FOUNDATION  
ENGLISH COM

Denpasar, Bali - Indonesia  
Jl. ~~Mahadewa~~ No. 96 ~~Denpasar~~  
Denpasar Barat, Bali - Indonesia

Telp. (0361) 2786029 email: [ec.educenglish@yahoo.com](mailto:ec.educenglish@yahoo.com)

 English Com Bali

### DECLARATION LETTER OF TRANSLATION

#### To Whom it May Concern

I, the undersigned

Name : I MADE SUWITRA, S.S., M.HUM  
 Profession : English Teacher/Lecturer  
 Indonesian Teacher for Foreigners, Translator & Interpreter at  
 English Best Foundation (English Com Bali), Denpasar -Bali,  
 Indonesia  
 Education : Master's in Linguistics, Postgraduate Studies, ~~Udayana~~  
 University (2010)

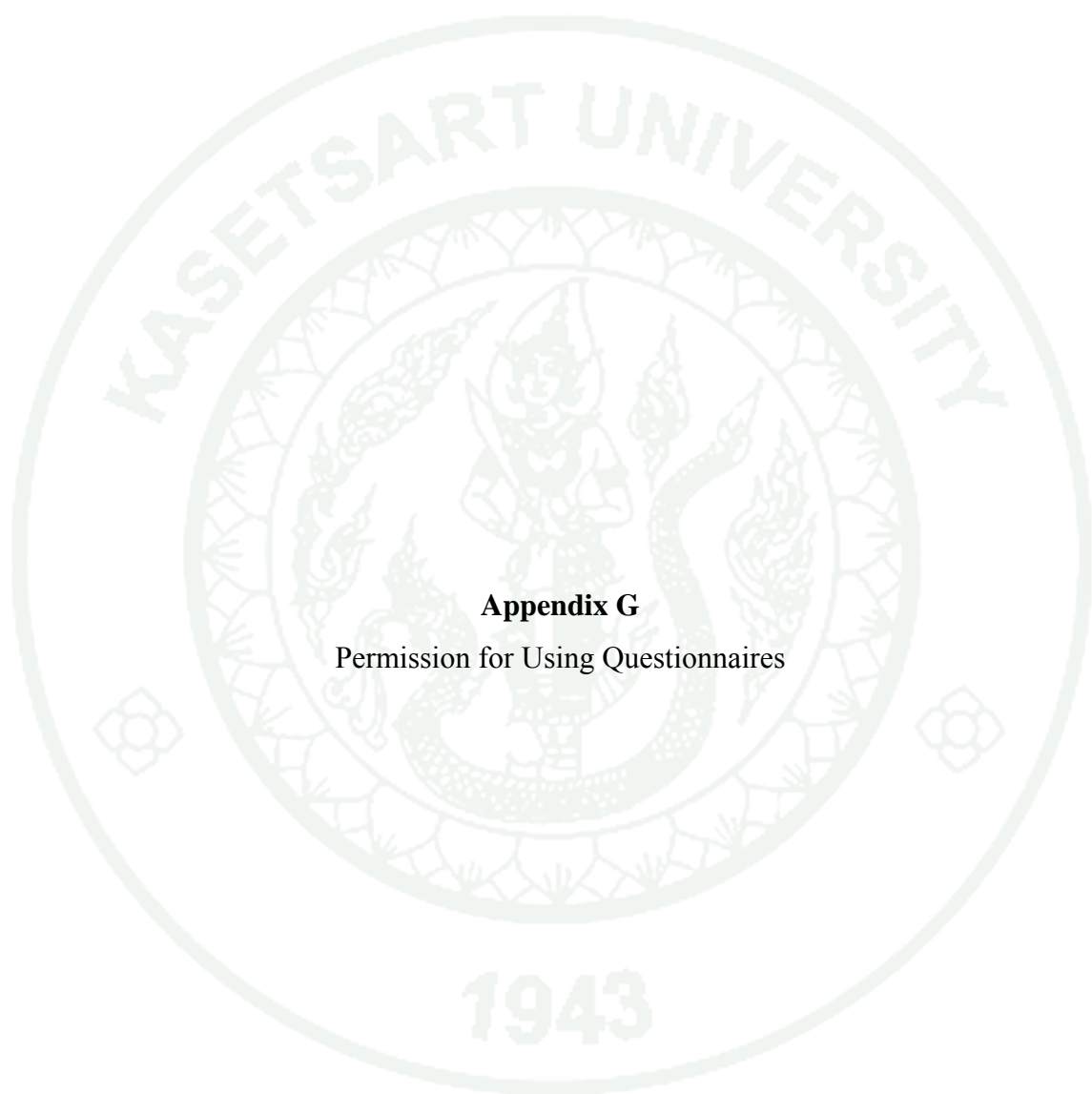
hereby declare that it is true that I was appointed as an authorized translator for Mrs Nending Kumalawati Santoso. The letter that I have translated from Indonesian to English is: Questionnaire for the Research, title: Predictors of Physical Activity among Older People with Hypertension in Bantul, Yogyakarta, Indonesia.

I also hereby guarantee that to the best of my knowledge and belief the translation of the questionnaire is a true and correct English Language Version. Thus, this Declaration Letter is truly drawn up and it can be applied where necessary.

Denpasar -Bali, 3 July 2014  
Truly Yours,



I MADE SUWITRA, S.S., M.HUM



**Appendix G**  
Permission for Using Questionnaires

vanida chuapram  
To me  
11 Feb

Dear NIndita,

I am glad to allow you to use my SPAQ.

After you have any progress, please let me know so that I can send you the information. Or you would like me to send you my dissertation, please let me know.

with warm regards,

Vanida

**From:** Nindita Kumalawati Santoso <ninditakumala@yahoo.com>  
**To:** "fahchua@yahoo.com" <fahchua@yahoo.com>  
**Sent:** Monday, February 10, 2014 8:34 PM  
**Subject:** ask about permission

----- Forwarded Message -----

Dear Dr. Vanida Visuthipanich,

I am Nindita from Indonesia. I am Master of Nursing Science student in Boromarajonani College of Nursing Nopparat Vajira. I am interested to study about physical activity in older people. Now, I am looking for the measures. I have read your paper about physical activity questionnaire development. If you don't mind, would you like to give me the information if I want to use your questionnaire? how can I get the permission and the guideline?

Thank you.

My best regards,  
Nindita

Melillo, Karen  
To me  
2 Jan

Good morning, Nandita:

Thank you for reaching out. If you do make the determination to use this scale, I would be most pleased to learn about your data collection and data analysis and outcomes from this instrument use.

Best of luck to you –

I'd be interested in learning more about your University and the academic program in which you are completing your MS degree.

Sincerely,

Dr. Karen Devereaux Melillo

**Karen Devereaux Melillo, PhD, ANP-C, FAANP, FGSA, Professor**  
Director and Chair, School of Nursing  
College of Health Sciences

*University of Massachusetts Lowell*  
*Health and Social Sciences Building, Suite 200*

*113 Wilder Street, Office 215 - Lowell, MA 01854-3058*

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**From:** Nindita Kumalawati Santoso [mailto:ninditakumala@yahoo.com]  
**Sent:** Wednesday, January 01, 2014 12:15 PM  
**To:** Melillo, Karen  
**Subject:** ask about permission

Dear Dr. Karen Melillo,

I am Nindita. I am master of nursing student in Kasetsart University, Thailand. I am interested to study about predictors of physical activity among older people in Indonesia. I plan to study about perceived barriers as one of my variables. I have read articles and journals used your scale (Barriers to Exercise Scale). If you don't mind, would you like to give me some information or suggestion for using this scale?

Thank you

My best regards,

Nindita

On Wednesday, 19 February 2014, 15:29, Phachongchit Kraithaworn  
 <[phachongchit.kra@mahidol.ac.th](mailto:phachongchit.kra@mahidol.ac.th)<mailto:[phachongchit.kra@mahidol.ac.th](mailto:phachongchit.kra@mahidol.ac.th)>> wrote:  
 Dear Nindita

Thank you for interesting in my research paper. This attached file is all my questionnaire both in Thai and English language.

For me myself, you can use these questionnaires. I would like to recommend you to modify these questionnaires in order to fit with your population.

Also self efficacy and social support questionnaire should be added the direction "with moderate intensity within the duration 30 minutes three time a week"

Please fell free to contact me if you need more information.  
 Phachongchit Kraithaworn

---

จาก: Nindita Kumalawati Santoso

[[ninditakumala@yahoo.com](mailto:ninditakumala@yahoo.com)<mailto:[ninditakumala@yahoo.com](mailto:ninditakumala@yahoo.com)><mailto:[ninditakumala@yahoo.com](mailto:ninditakumala@yahoo.com)>>]

ส่ง: 18 กุมภาพันธ์ 2014 21:33

ถึง: Phachongchit Kraithaworn

เรื่อง: Asking about your dissertation

On Tuesday, 18 February 2014, 21:25, Nindita Kumalawati Santoso  
 <[ninditakumala@yahoo.com](mailto:ninditakumala@yahoo.com)<mailto:[ninditakumala@yahoo.com](mailto:ninditakumala@yahoo.com)>>mailto:[ninditakumala@yahoo.com](mailto:ninditakumala@yahoo.com)>> wrote:

Dear Dr. Phachongchit Kraithaworn,

I am Nindita from Indonesia. I am Master of Nursing Science student in Boromarajonani Collage of Nursing Nopparat Vajira. I am interested to study about physical activity in older people and I am looking for the measures now. I have read your research about physical activity too. if you don't mind, would you like to give me information how to access the perceived self efficacy questionnaire and perceived social support questionnaire? I already accessed the references that you provided in your dissertation, but i can't find the correspondence to ask the permission.

Thank you,

My best regards,  
 Nindita

## CURRICULUM VITAE

**NAME** : Miss Nindita Kumalawati Santoso

**DATE OF BIRTH** : June 12<sup>nd</sup>, 1987

**PLACE OF BIRTH** : Bantul, Yogyakarta, Indonesia

<b>EDUCATION</b>	<b>: YEAR</b>	<b><u>INSTITUTE</u></b>	<b><u>DEGREE</u></b>
	2009	Diponegoro University	Bachelor of Science in Nursing (BSN)
	2011	Diponegoro University	Professional Nurse (Ns.)

**POSITION** : Student in Master of Nursing Science Program, Boromarajonani College of Nursing Nopparat Vajira, an Affiliated Institution of Kasetsart University, Bangkok, Thailand.

**SCHOLARSHIP** : Directorate General of Higher Education, Ministry of Research, Technology, and Higher Education, Republic of Indonesia.

**HOME ADDRESS** : Cangkring, Sumberagung, Jetis, Bantul, Yogyakarta, Indonesia.

**OFFICE ADDRESS** : STIKES Alma Ata Yogyakarta, Jl. Ring Road Barat Daya 1, Tamantirto, Kasihan, Bantul, Yogyakarta, Indonesia.  
(ninditasantoso12@gmail.com)