

# CHAPTER I

## INTRODUCTION

### 1. Rationale and background

The development of medical technology and treatment improves health status and increases life expectancy of people around the world (Brach et al., 2004). In Thailand, the structure of population has also been changed rapidly. It has been estimated that the increment rate of older adults of the country would be 18 percents in 2020 (Jitapunkul, 1993). Within Khon Kaen municipality, the number of older adults aged over 65 has been increased from 6,289 in the year 2003 to 8,808 in the year 2009 (40% increased) ([www.kkmuni.go.th](http://www.kkmuni.go.th)). However, one of important issues that mostly concern in older adults is the changes of age-related functional decline, particularly in older adults who are over 65 years of age (Rose & Gamble, 2006). These changes are complex and involve many systems which often affect the ability of balance control and the ability to conduct daily activities independently (Howley & Franks, 2003).

The changes of the vestibular, visual and somatosensory systems with advancing age may provide diminish or inappropriate feedback to the postural control center (Mazzeo et al., 1998; Langly and Mackintosh, 2007). Muscle effectors may also lack the capacity to respond appropriately to disturbing force due to the loss of muscle mass, reduction of contractile speed, decrease in muscle strength, and change in muscle power (Mazzeo et al., 1998; Paterson et al., 2007). The changes of these systems have potential to affect balance control and induce fall.

Factors inducing fall include medication use (particularly sedatives), cognitive status, postural hypotension, environmental hazards, vision, physical illness, aging, history of fall, and lower extremity dysfunction (Mazzeo et al, 1998; Fuller, 2000; van der Wiel et al., 2003). Although fall risk is multifactorial, balance control is an important component of the overall risk profile that can be improved. Maki et al. (1994) indicate that balance impairment increases risk of fall in older adults. Furthermore, balance impairment is accounted as an index of fall prediction (Hawk

et al., 2006; Tinetti et al., 1988). Fall has been indicated as one of the major health problems in older adults and its impact has many negative consequences on physical and psychological functions (Hawk et al., 2006; Hendriks et al., 2008). Physical consequences of fall include mild to severe injuries such as bruise, scrape, head trauma, soft tissue injuries, joint dislocation and fractures, especially hip fractures (Convinsky et al., 2001; Brotherton et al., 2007). Evidences suggest that an incidence of hip fracture increases with age advancing (Coming et al., 1997; Lofthus et al., 2001). Older adults who sustain a hip fracture reduce ability to perform activities of daily life independently and require assistive devices (Osnes et al., 2004). These affect their quality of life, life satisfaction or physical well-being (Campbell et al., 1976; Osnes et al., 2004). In addition, falls can also induce negative psychological consequences such as decreased self-confidence to ambulate safely and increased self-imposed functional limitation due to fear of future fall (Brown, 1999; Scheffer et al., 2008). As a result, the assessment of balance control and fall is crucial to direct appropriate interventions to enhance ability to be independently of older adults.

Regular exercise confers health benefits, and improves physical functions and mental status of individuals (Brach et al., 2004; Charuchit et al., 2008; Ballard et al., 2004; Shumway-Cook et al., 1997). However, more than 60% of older adults do not participate in regular exercise (Brach et al., 2004). These individuals may conduct routine physical activities at a different degree of intensity, frequency and accumulated duration a day. Recently, the American Heart Association (AHA) and American College of Sports Medicine (ACSM) suggested that older adults should perform regular physical activity (3-5 times a week), at a moderate to vigorous level of intensity, for 20-30 minutes a day (Nelson et al., 2007). According to this suggestion, the number of Thai older adults, who have insufficiently routine physical activity (accumulated duration of moderate physical activity less than 30 minutes a day) is increased, particular over 70 years of age and living in urban areas (Porapakham et al., 2006).

Although the terms physical activity and exercise are sometimes used interchangeably, these terms have different meanings. Physical activity is defined as any bodily movements produced by the contraction of skeletal muscles that result in increased energy expenditure, whereas exercise is defined as planned, structured and

repetitive bodily movements in order to improve and maintain one or more components of physical fitness (American College of Sports Medicine, 2006). Hence, exercise is one type of physical activity, but not all physical activity is exercise (Brach et al., 2004). Thus, an investigation on effects physical activity and exercise on balance performance and fall would provide critical information to promote physical ability of older adults. This study compared the ability of balance control, fall and quality of life among insufficiently active, lifestyle active and exercise older adults.

## **2. Objective of the study**

The objective of this study was to compare the ability of balance control, fall and consequences of fall, and quality of life between insufficiently active and regular active older adults. In regular active, the study also investigated the differences between older adults who regularly conducted physical activity and participated in exercise programs.

## **3. Research question**

Were there differences in balance control, incidences and consequences of fall, and quality of life among insufficiently active, lifestyle active and exercise older adults?

## **4. Hypothesis of the study**

Regular active older adults had better ability of balance control and quality of life with less incidences and consequences of fall than insufficiently active older adults. Among active older adults, regular exercise older adults had better ability of balance control and quality of life with less incidences and consequences of fall than regular physically active older adults.

## **5. Scope of the study**

This study compared the ability of balance control, fall and quality of life of well-functioning older adults who were active and insufficiently active, aged 65-80 years, both males and females from several communities in Khon Kaen province, Thailand.

## **Terminologies and definitions used in this study**

### *Insufficiently active subjects*

Insufficiently active subjects referred to older adults who performed exercise 0-1 times/week or, with the duration to perform daily physical activity less than 30 minutes, or the intensity, as measured by Borg scale, less than 10 (Mazzeo et al., 1998; Porapakham et al., 2006).

### *Physical activity subjects*

Physically or lifestyle active subjects referred to older adults who performed exercise less than 3 times/week, with the duration to perform daily physical activity at least 30 minutes, and the intensity, as measured by Borg scale, at least 11 (Mazzeo et al., 1998; American College of Sports Medicine, 2006; Porapakham et al., 2006).

### *Exercise subjects*

Exercise subjects were older adults who had accumulated duration of routine physical activity less than 30 minutes a day. They had to participate in exercise programs at least 3 times/week, with the duration of exercise at least 30 minutes, and the intensity, as measured by Borg scale, at least 11 (Mazzeo et al., 1998; American College of Sports Medicine, 2006).

## **6. Benefits of the study**

Results of the study contributed crucial information to direct appropriate interventions for maximizing the ability to be independently older adults.