CHAPTER I

INTRODUCTION

1.1. Background and Rationale

Musculoskeletal disorders (MSDs) are the main public health problems generally found in the working population (Fjell et al., 2005; Hill et al., 2008; Messing et al., 2008; Janwantanakul et al., 2009; Pensri et al., 2009; Werner et al., 2010). Thai health survey from 2003 to 2007 found that the most prevalent illness were respiratory tract diseases (40.9%), musculoskeletal diseases (11.4%), and gastrointestinal diseases (9.4%), respectively. The Surveillance center on health and public health problem (Udomprasertgul et al., 2010) collected data between 2007 to 2009 on Chulalongkorn staff and found that musculoskeletal problem was one of the top ten general health complaints in Chulalongkorn personnel (4.7%) and also be the main cause of sick leave from working (6.3%). In addition, there were increasing the sick leave among the staff in every year since 2007 (4.4%) until 2009 (6.3%). The data collected from Chulalongkorn Health Service Center revealed that the Chulalongkorn University personnel visited doctor with musculoskeletal problems in the highest rates (18.4%) when compared with other diseases or non-communicable diseases (i.e. Hypertension) (Udomprasertgul et al., 2010). The effects of musculoskeletal problems are generalized among workers with many factors consisting of poor posture with high physical workload, prolong sitting posture, prolong standing posture, poor ergonomic control, individual behavior factors, and psychological factors (Poosanthanasarn and Lohachit, 2005; Buranatreved and Sweatsriskul, 2005; Fjell et al., 2005; Hill et al., 2008; Messing et al., 2008; Janwantanakul et al., 2010; Pensri et al., 2010; Werner et al., 2010). The consequence of MSDs mostly affects working performance. In addition, it may contribute to negative effect including economic and psychological problems (Janwantanakul et al., 2006).

There are several studies about work-related with MSDs in Thailand. Previous studies found the high prevalence of MSDs among industrial workers,

agricultural workers, electronic workers, dentists, salesperson workers, and office workers. For example, Poosanthanasarn and Lohachit, (2005), studying MSDs among industrial workers, found that the most health complaint among employees was muscular discomfort (32.2%); it was significant higher than other complaints. The factors associated with MSDs including high physical workload, prolong sitting, prolong standing, repetitive movement, and poor ergonomic control without preventing device could induce injuries or trauma during working (Poosanthanasarn and Lohachit, 2005; Chavalitsakulchai and shahnavaz, 1993). Buranatreved and Sweatsriskul, (2005), studying MSDs among agricultural workers, reported that the farmers had high prevalence of musculoskeletal problems (66.4%) which were caused from the poor posture especially in lifting heavy pumping hoses. The study among electronic workers (Theobald, 2012) also showed that the main health problem of workers was bodily ache (80%) more than eye problem (60%). Chowanadisai et al., (2000), studying MSDs among dentists, found that musculoskeletal diseases (78%) were the main health problems more than percutaneous injuries (50%). The risk factors for muscular pain included the poor prolong posture, repetitive hand movement, and vibration load from medical device. Pensri et al., (2010), studying MSDs among salespersons who worked in department stores, found that prolong standing during the working time period for almost 10 hours per day without the sitting place affected musculoskeletal symptoms especially in the lower extremities part.

Considering in office workers, the prevalence of musculoskeletal disorders commonly found at head/neck region (42%), low back region (34%), upper back region (28%), wrists/hands region (20%), shoulders region (16%), ankles/feet region (13%), knees (12%), hips (6%), and elbows (5%), respectively (Janwantanakul et al., 2008). Janwantanakul et al., (2008) showed that prolong sitting and high computer use with uncomfortable posture were the important factors that could affect commonly pain at the spine regions. Furthermore, the workers who reported low level of job dissatisfaction in psychological factors showed the association with the prevalence of spine regions pain (Janwantanakul et al., 2009). The prolong sitting posture affected the highest prevalence of head/neck

pain (42%) (Janwantanakul et al., 2009), while the prolong standing affected the highest prevalence of ankles/feet pain (35%) (Pensri et al., 2009).

Musculoskeletal diseases are commonly found on Chulalongkorn staff (18.4%) when compared with other diseases. Previously, there were some studies investigated MSDs at spine region among young staff and middle-age staff. However, few studies focused on the pre-retirement age staff which is the first step that turns to be aging.

The situation analysis of aging population in Thailand report (Somrongthong and Yamarat, 2011) found that the numbers of aging population had been increasing in every year since 1990 (11.5%) until 2010 (15.3%) and there is a tendency to increase in the future with a prediction of approximately 15.3% in 2020. The consequence of increasing numbers of aging population in every year leads to the decreasing rate of working population and can affect the difficulty to the management systems to provide public utility including the health service insufficiency. According to the report about aging diseases, the result showed the top three diseases commonly found in aging group with the sum among three diseases over 50% (54.9%) consisting of cardiovascular disease, endocrine system disease, and musculoskeletal disease, respectively.

The most common musculoskeletal problems among older adults were found in the knee region because of the degenerative disease and foot problem (Hill et al., 2008; Pensri et al., 2009; Messing et al., 2010; Werner et al., 2010). Foot pain was commonly found in the older group with the prevalent rate of approximately 20-37% among community-dwelling older adults (Dunn et al., 2004; Golightly et al., 2010; Thomas et al., 2011). There was high prevalence of foot pain among the working population aged 50 and above (Hill et al., 2008; Messing et al., 2010; Werner et al., 2010). The main risk factors included poor working posture, general shoewear, abnormal foot type, and undistributed weight of plantar pressure relating to the weakness of foot and ankle muscles. In addition, toe flexor muscles weakness could reduce the control of body weight shifts during walking attributed to the slow speed of walking. The effect of slow walking speed increased plantar pressure especially in toes region which affected both foot pain and the risk of falling

(Dawson et al., 2004; Tencer et al., 2004; Dufour et al., 2009). Consequently, foot pain can cause the low level of quality of life among older adults (Werner et al., 2010; Mickle et al., 2011).

Epidemiological information is useful to prevent older workers from occupation-related injury; however, to the best of our knowledge, studies in musculoskeletal disorders at foot region are very few at present. In previous studies, they used only self-reported questionnaires among the working population and there were no physical assessment of the foot structure (Garrow et al., 2004; Hill et al., 2008; Messing et al., 2008; Werner et al., 2010) Therefore, the present researcher wanted to conduct the study in an older worker group, using the Chulalongkorn University as the selected area since almost 35 percentage of all Chulalongkorn University personnel are more than 50 years old. Moreover, a previous study of musculoskeletal disorders (MSDs) at spine region revealed that Chulalongkorn University personnel had a high prevalence of MSDs (Pensri et al., 2012).

This is the first study of musculoskeletal foot pain among an older working population. Therefore, the aims aims of this study were to examine the prevalent rate of MSDs at foot region during the past month in pre-retirement aged of Chulalongkorn University personnel, and to explore the consequence of foot pain with regard to the overall quality of life, as well as to determine the relationship between various factors of individuality, occupation, health behavior, and anthropometry and the occurrence of foot pain in this sample group.

1.2. Research Questions

- What is the prevalence of foot pain during the past month in pre-retirement aged measured by self-reported questionnaire?
- Are there the associations among individual factors, work-related physical factors, health behavioral factors, anthropometric factors and the presence of MSDs during the past month at foot region?
- Are there significant differences in physical health scores and mental health scores between subjects with foot pain and subjects without foot pain?

1.3.Research Hypotheses

- There are the associations among individual factors, work-related physical factors, health behavioral factors, anthropometric factors and the presence of MSDs during the past month at foot region.

- There are significant differences in physical health scores and mental health scores between subjects with foot pain and subjects without foot pain.

1.4.   Research Objectives

- To present the frequency of MSDs at foot region in pre-retirement aged at Chulalongkorn University.

- To describe the factors associated with foot pain.

- To explore the associations among individual factors, work-related physical factors, health behavioral factors, anthropometric factors and the presence of MSDs during the past month at foot region.

- To compare the scores of physical health and mental health between subjects with foot pain and subjects without foot pain.
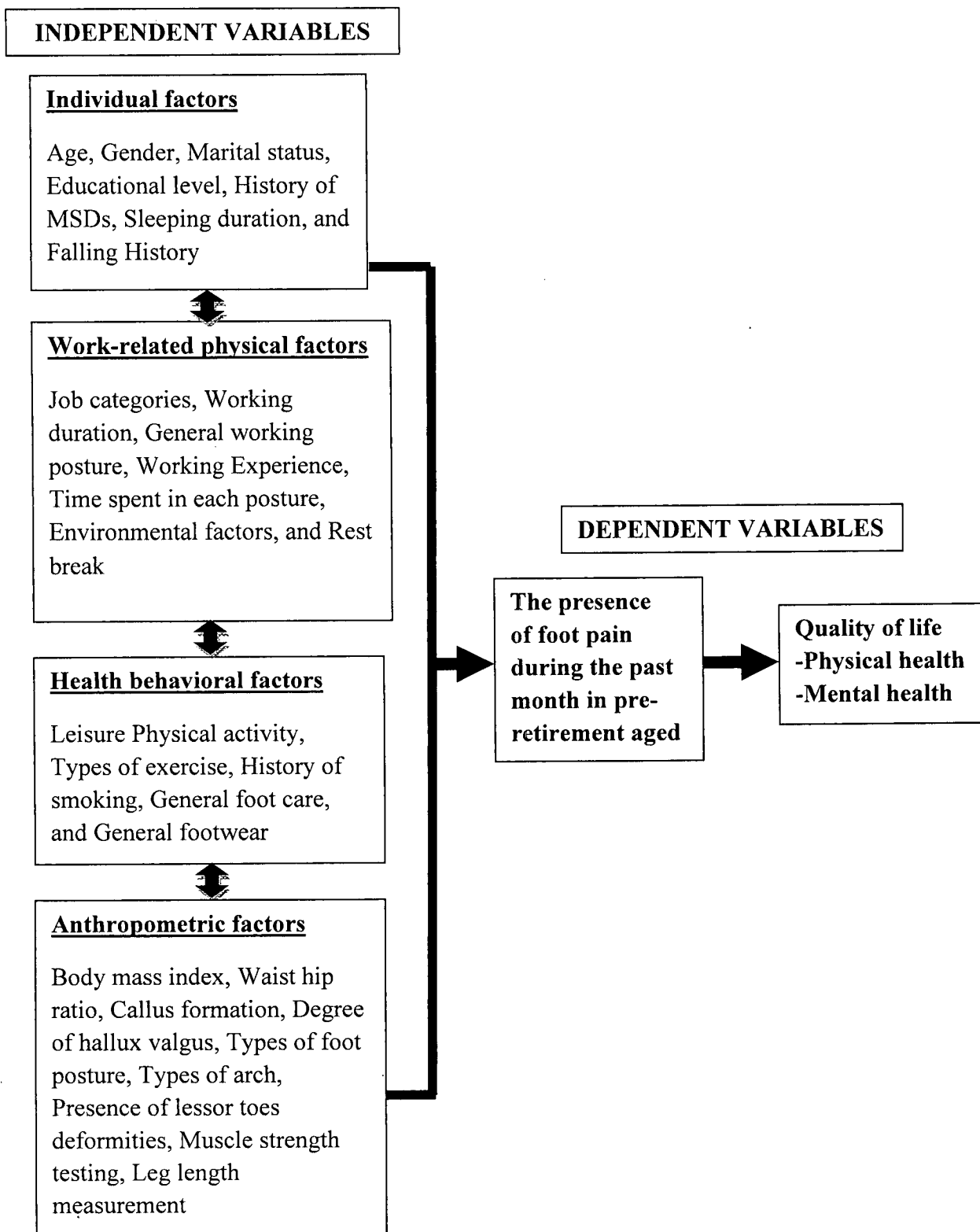
1.5. Conceptual Framework

INDEPENDENT VARIABLES

Individual factors

Age, Gender, Marital status,
Educational level, History of
MSDs, Sleeping duration, and
Falling History

Work-related physical factors

Job categories, Working
duration, General working
posture, Working Experience,
Time spent in each posture,
Environmental factors, and Rest
break

Health behavioral factors

Leisure Physical activity,
Types of exercise, History of
smoking, General foot care,
and General footwear

Anthropometric factors

Body mass index, Waist hip
ratio, Callus formation, Degree
of hallux valgus, Types of foot
posture, Types of arch,
Presence of lessor toes
deformities, Muscle strength
testing, Leg length
measurement

DEPENDENT VARIABLES

The presence
of foot pain
during the past
month in pre-
retirement aged

Quality of life
-Physical health
-Mental health

Figure 1: Conceptual Framework of the present study

1.6. Operational Definitions

From the present of study, the following terms are defined as:

1.6.1 Pre-retirement aged means people with aged range between 50 and 60 years who have not stopped employing completely from the workplace (Manorath and Maton, 2009; Chuenchoksan and Nakornthab, 2008).

1.6.2 Foot pain means the persons who have foot pain during the last month and have at least 1 score of the Manchester foot pain and disability index (MFPDI); therefore, the persons who have no foot pain during the last month and have 0 score of the MFPDI are defined as the subjects without foot pain (Garrow et al., 2000).

1.6.3 Quality of life refers to the scores of mental component summary (SF-12 MCS) and physical component summary (SF-12 PCS) using the 12-item short-form health survey (SF-12) questionnaire in Thai version.

1.6.4 Individual factors refer to age, gender, marital status, education level, history of MSDs in other areas (low back, hip/thigh, knee, and foot pain), sleeping duration, and falling history.

a) Age means the numbers of year that someone has lived.

b) Gender refers to male and female.

c) Marital status refers to the current marital status of the pre-retirement aged which divided into single, married, widowed, divorced, and separated.

d) Education level means the highest level of education which divided into secondary school, high school, diploma, undergraduate, and post-graduate.

e) History of MSDs means the regions of body with ache, pain and discomfort more than 1 day during the last 12 months (Kuorinka et al., 1987).

f) Sleeping duration means self-reported approximately time for sleeping (Janwantanakul et al., 2009).

g) Falling history means the people who have ever been falling at least 1 time for the last 12 months (Spink et al., 2011).

1.6.5 Work-related physical factors refer to the job categories, working experience, general working posture, time spent in each posture, environmental factors, and time break duration.

a) **Job categories** mean the current position of someone.

b) **Working duration** refer to the avarage time for working (hours per week).

b) **Working experience** means the numbers of year that someone works in that workplace.

c) **General working postures** affected foot pain refer to prolong sitting, prolong standing, lifting (more than 5 kg), walking for long distance (more than 2 km), and stair climbing.

d) **Time spent in each posture** refers to the duration for each working posture which divided into walking, standing, and walking.

e) **Environmental factors** refer to enough lighting, no disturbing voice, appropriate temperature, and good air ventilation.

f) **Time break duration** refers to the duration of time without working.

1.6.6 Health behavioral factors refer to leisure physical activity, types of exercise, history of smoking, general footwear, and general foot care.

a) **Leisure physical activity** refers to the continuously body movement at least 30 minutes until fatigue level (or high energy intake level). The exercise should be carried out about 30 minutes for 3-5 times per week (WHO, 2012).

b) **Types of exercise** are divided into weight-bearing and non weight-bearing exercise.

c) **Smoking history** refer to the smoker and non-smoker persons.

d) **General footwear** refer to the components of heel counter softness, adjustable fixation, normal heel height, sole flexion point, firm insole, and appropriate size (Menz and Sherrington, 2000).

e) General foot care refer to self-foot assessment, nail care, foot cleaning and soaping, socking use, lotion/oil care, foot massage, and general foot exercise to increase range of motion and improve muscle strength.

1.6.7 Anthropometric Variables refer to the physical examinations consisting of body mass index, waist hip ratio, foot problem assessment, foot posture index, types of arch, foot muscles strengths, and leg length measurement.

a) Body mass index (BMI) means the proportion between weight and height (kg/m^2) to determine the degree of body mass index into 4 levels consisting of (WHO, 2008)

- Less than 18.5 kg/m^2 : Underweight
- Between 18.5 to 24.9 kg/m^2 : Normal
- Between 25.0 to 29.9 kg/m^2 : Overweight
- More than 29.9 kg/m^2 : Obesity

b) Waist hip ratio (WHR) means the proportion between waist circumference and hip circumference to determine the abdominal obesity into 2 levels i.e. "Yes" for the female with WHR more than 0.85 and male with WHR more than 0.90; and "No" for the persons with WHR less than the cutting point (WHO, 2008).

c) Foot problem assessment consists of the presence of callus, lessor toe deformities, and hallux valgus deformities (Menz et al., 2001).

d) Foot posture index is used to predict the foot postures consisting of normal foot, pronated foot, highly pronated foot, supinated foot, and highly supinated foot (Keenan et al.,2007).

e) Staheli's arch index (SAI) is used to predict the types of foot arch consisting of normal foot, flat foot, and high arch foot (Staheli et al., 1987).

f) Foot muscles strengths refer to the strength of extrinsic and instrinsic foot muscles (Keysor et al., 2005; Menz et al., 2006).

g) Leg length measurement refers to the distance from the greater trochanter to the floor in standing position (Wilken et al., 2012).