FACTORS ASSOCIATED WITH MUSCULOSKELETAL DISORDERS AMONG RICE FARMERS IN TARNLALORD SUB-DISTRICT PHIMAI DISTRICT NAKHON RATCHASIMA PROVINCE THAILAND

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ปัจจัยที่มีความสัมพันธ์กับอาการผิดปกติทางระบบกระดูกและกล้ามเนื้อของกลุ่มชาวนา ในตำบลธารละหลอด อำเภอพิมาย จังหวัดนครราชสีมา ประเทศไทย

นางสาวฐิตาภรณ์ เหลืองวิลัย

วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาสาธารณสุขศาสตรมหาบัณฑิต
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Thesis Title	FACTORS ASSOCIATED WITH MUSCULOSKELETAL DISORDERS AMONG RICE FARMERS IN TARNLALORD SUB-DISTRICT PHIMAI DISTRICT NAKHON RATCHASIMA PROVINCE THAILAND
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ฐิตาภรณ์ เหลืองวิลัย : ปัจจัยที่มีความสัมพันธ์กับอาการผิดปกติทางระบบกระดูกและกล้ามเนื้อของกลุ่มชาวนา ในตำบลธารละหลอด อำเภอพิมาย จังหวัดนครราชสีมา ประเทศไทย. (FACTORS ASSOCIATED WITH MUSCULOSKELETAL DISORDERS AMONG RICE FARMERS IN TARNLALORD SUB-DISTRICT PHIMAI DISTRICT NAKHON RATCHASIMA PROVINCE THAILAND) อ.ที่ปรึกษาวิทยานิพนธ์หลัก: ผศ. ดร. วัฒน์สิทธิ์ ศิริวงศ์, 67 หน้า.

การศึกษาในครั้งนี้ มีวัตถุประสงค์เพื่อศึกษาปัจจัยที่เกี่ยวข้องกับระบบกระดูกและกล้ามเนื้อ ในชาวนาตำบล ธารละหลอด อำเภอ พิมาย จังหวัด นครราชสีมา โดยมีกลุ่มตัวอย่างทั้งหมด 290คน เครื่องมือที่ใช้ในการเก็บรวบรวมข้อมูล คือ Standard Nordic Questionnaire แบบสัมภาษณ์ข้อมูลการทำนาของชาวนาและอาการปวดระบบกระดูกและกล้ามเนื้อ วิเคราะห์ด้วยสถิติเชิงพรรณนาและสถิติเชิงอนุมาน

ผลการศึกษาพบว่า ชาวนาส่วนใหญ่มีอาการปวดเกี่ยวกับระบบกระดูกและกล้ามเนื้อในขั้นตอนการหว่านข้าวและดำนา (93.1%,82.1% ตามลำดับ) กระบวนการเตรียมดินไถนา มีอาการปวดมากที่สุดที่บริเวณไหล่ คิดเป็นร้อยละ 71.7 ส่วนขั้นตอนการเก็บเกี่ยวมีอาการปวดมากที่สุดในขั้นตอนนี้บริเวณไหล่ คิดเป็นร้อยละ 64.8 และจากการหาความสัมพันธ์พบว่า มี 6 ปัจจัยที่มีผลต่อระบบกระดูกและกล้ามเนื้อจากการทำนา P-value < 0.05 มีความสัมพันธ์อย่างมีนัยสำคัญทางสถิติ คือ เพศหญิง (OR=3.180, 95%CI=1.966-5.143), กลุ่มดัชนีมวลกายผิดปกติ (OR=0.607, 95%CI=0.377-0.977), การศึกษาต่ำกว่าระดับมัธยม (OR=0.535, 95%CI=0.313-0.915), ผู้ที่ไม่สูบบุหรี่ (OR=2.169, 95%CI=1.137-4.141), ประสบการณ์ทำนา 26 ถึง 50 ปี (OR=2.169, 95%CI=1.350-3.483), ผู้ที่มีโรคประจำตัว (OR=2.013, 95%CI=1.202-3.372)

จากผลการศึกษา ลักษณะการทำนาในทุกขั้นตอนมีความเสี่ยงต่อการได้รับอันตรายจากปัจจัยร่วมหลายด้านที่เกี่ยวเนื่องกัน โดยก่อให้เกิดอาการเจ็บปวดทางระบบกระดูกและกล้ามเนื้อ ซึ่งต้องอาศัยการจัดการปรับปรุงอย่างเป็นระบบ รวมไปถึงการให้ความรู้ หรือข้อแนะนำที่ถูกต้องเพื่อลดปัญหาด้านอาการเจ็บปวดทางระบบโครงร่างและกล้ามเนื้อ

สาขาวิชา สาธารณสุขศาสตร์ ลายมือชื่อนิสิต .....

ปีการศึกษา 2556 ลายมือชื่อ อ.ที่ปรึกษาวิทยานิพนธ์หลัก .....

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TITAPORN LUANGWILAI: FACTORS ASSOCIATED WITH MUSCULOSKELETAL DISORDERS AMONG RICE FARMERS IN TARNLALORD SUB-DISTRICT PHIMAI DISTRICT NAKHON RATCHASIMA PROVINCE THAILAND. ADVISOR: ASST. PROF. DR. WATTASIT SIRIWONG, 67 pp.

The aims of this study were to investigate factors association with musculoskeletal disorders among rice farmers to presence the prevalence and explore the association. The participants were rice farmers who are growing rice at least one year experience in Tarnlalord sub-district, Phimai district, Nakhon Ratchasima province. This study was conducted as a cross-sectional design on 290 subjects aged between 20 to 59 years old. Descriptive analysis of data identified most common process that affecting the rice farmer of Tarnlalord sub-district were planting & transplanting process. Paddy preparation process, the highest prevalence was shoulder (71.7%). For harvesting, the highest prevalence was in shoulder pain (64.8%). The analysis used Chi-Square test to find association between 2 groups of factors (individual factors, work-related factors) and total body pain score of MSDs. The results were identified six factors significantly associated with musculoskeletal disorders: female (OR=3.180, 95% CI=1.966-5.143), abnormal BMI group (OR=0.607, 95% CI=0.377-0.977), education below high school (OR=0.535, 95% CI=0.313-0.915), non-smoker group (OR=2.169, 95% CI=1.137-4.141), farming experience 26 to 50 year (OR=2.169, 95% CI=1.350-3.483), have underlying disease (OR=2.013, 95% CI=1.202-3.372).

From presented study, all process of rice growing were affected to musculoskeletal system by several related factors. This requires improved farming management systems in process of rice growing and including education or recommendation to reduce the pain of the musculoskeletal system.

Field of Study: Public Health Student's Signature .....

Academic Year: 2013 Advisor's Signature .....

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This thesis is dedicated with deepest love to my parents. Their love, encouragement and understanding have inspired me to be the best I can do. Thank you for supporting me and allowing me to follow my ambitions throughout my childhood. Thank you for letting me to be the person I am today. Without your endless support I could not have made it this far. And I hope this thesis is the best thing that represents my gratefulness.

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CHAPTER I
INTRODUCTION

1.1 Background and significance of the research problem

Agriculture is one of the major occupations in Thailand. Approximately 35.2 % of the populations in Thailand are agricultural workers of which rice farming accounts as the major agricultural occupation ("Number of employed 2012," 2012). It covers about 60 million km^2 of the total area used for the purpose of farming. More than half of rice farming is located in the northeastern region of Thailand, which covers about 32,881,657 km^2 and produces the total product of 332 kg/km^2. Rice is made up most exports and is considered to be a major food consumed by people in Thailand (Office of agricultural economics Thailand, 2012). Due to increased demand, farming areas are expanding each year and the rice growth cycle is increasing so that more rice could be harvested. Although there are advanced machinery and new technology to help in farming process, farming is generally perceived as a healthy outdoor occupation and self-farming is preferred. They are often exposed and confronted with many occupational health and risk factors including ergonomics problem such as musculoskeletal disorders, lower back pain, muscle fatigue etc. 47% of farmers in Sweden, 37% in the US and 23% in Finland have reported the incidence of health ergonomics (Gupta & Tarique, 2013).

The awareness among occupational health professionals has been growing in the past 10 years of the large burden of illness related to musculoskeletal disorders of the neck and upper limbs(Aas, 2011). Musculoskeletal disorders are the major occupational health problems of worker around the world and are the major cause of work related injuries and disability. Nearly all of occupations may effect by

musculoskeletal disorders. Improving worker productivity, and occupational health and safety (OHS) are major concerns in factory, especially in developing countries. Musculoskeletal disorders are defined as a group of disorders that can affect the body, the musculoskeletal systems, the nerves, tendons, muscle, and joints and supporting tissue, Ergonomic risk factors are the elements of musculoskeletal disorder hazards. The safety health organization explain the large body of evidence supporting the finding that exposure to ergonomic risk factors at the workplace can cause or contribute to the risk of developing a musculoskeletal disorders. In Thailand, the musculoskeletal disease is the first priority of occupational and environmental disease surveillance in departs of disease control of ministry of health in Thailand. From weekly epidemiological surveillance report in 2011 showed that the first group of disease from occupational is musculoskeletal disease 45.0 %(1,898 people/year), toxic effect of contact with venomous animals 24.5% (1,033 people/year), skin disease 20.3% (855 people/year), toxic effect of contact with plants 4.2% (176 people/year), respiratory and lung disease 2.7% (114 people/year), pesticide 1.6% (66 people/year), toxic effect of gas and vapor poisoning 0.9 % (35 people/year)(Siripanich, 2011). The prevalence of musculoskeletal diseases place them in top 5 of all patient visits for all outpatient health care providers under the Ministry of Public Health in 2005-2009 (Health service units, Burea of Policy Thailand, 2012). According to finding in some studies in Thailand, the prevalence of Lower Back Pain during the last 12 month among solid waste collector was 77.5% (Sunisa Chaiklieng, 2012). The prevalence rate of musculoskeletal disorder among Thai traditional massage practitioners during a 12 month period was 81.82% (Pinklow),

among an audio compact cassette plant's workers during 12 month was 39.1 %(low back), 36.2 % (shoulder), 35.2 % (upper back) (Techakamolsuk, 2000).

Farming is the one occupational facing many kind of occupational health hazards. Refers to physical disorder, injuries, or death resulting from activities as farming machine accident, or toxicity from pesticide used indicating important relations between farming conditions, working environment, and accident. The important problem is about musculoskeletal systems. During farmers work in the field they have to work at an uncomfortable posture for long time, repetitive motions, and awkward working posture, Even they have farming machined to supply or they have new technologies that can develop their farm. Frequently due to farm work such as work where the wrist is immoderately bent forward or tilted back, work squatting for long times, work with heavy material, work with hand and wrist repeatedly, or work with tilted or bended back. For some study in Sakon Nakhon's farmer have found that 99.73% of the farmers had body pain from their occupation (Pengseesang, 2010) and for Kon Kaen' farmers have found the prevalence of musculoskeletal pain in seven days were 56.91% in lower back pain, 28.62% in knee, 25.40% in hip pain and 25.04% in shoulder pain (Puntumetakul, Siritaratiwat, Boonprakob, Eungpinichpong, & Puntumetakul, 2011).

Tarnlalord Sub-District, Phimai District, Nakorn Ratchasima Province has the total population of 3,920 people. The quantity male and female respondents are very close (1,983 people are male and 1,937 people are female). There are 14 villages, which totally contain 987 households in Phimai districts. The main occupational is farmer. The total area is 48,008,000 square meters (30,005 Rai) including agricultural area (mostly are for paddy), residential areas, public areas,

forest areas, and other areas (Sub-District Administrative Organization database, 2013). According to the health report from Phimai Hospital shows that there were 325 patients of musculoskeletal disorders in 2012 and 399 patients in 2013 (Phimai Hospital, 2013).

Even though identifying the causes may not be a difficult task, understand why they cause and how they cause is much more difficult as some of these factors are hidden or unobservable. There are many studies present document about the prevalence of various musculoskeletal disorders in non-agricultural like solid waste conductor, factory workers, Thai traditional massage practitioners, an audio compact cassette plant's workers, etc. (Sunisa Chaiklieng, 2012; Techakamolsuk, 2000). But studies in Musculoskeletal disorder in agricultural among farmers in Thailand are very few at present. Therefore, it would be worth to further study on the prevalence of MSDs, the result of this study could be adopted and used to developed health promotion and prevention program for farms with musculoskeletal disorders.

1.2 Research Questions

1.2.1. What is the prevalence of musculoskeletal disorders among rice farmers in Tarnlalord sub-district, Phimai district, Nakhon Ratchasima province?

1.2.2. Are there associations between individual factors and musculoskeletal disorders among rice farmers in Tarnlalord sub-district, Phimai district, Nakhon Ratchasima province?

1.2.3. Are there associations between work-related factors and musculoskeletal disorders among rice farmers in Tarnlalord sub-district, Phimai district, Nakhon Ratchasima province?

1.3 Hypotheses

1.3.1 There is an association between individual factors and musculoskeletal disorders among rice farmer in Tarnlalord sub-district, Phimai district, Nakhon Ratchasima province

1.3.2 There is an association between work-related factors and musculoskeletal disorders among rice farmer in Tarnlalord sub-district, Phimai district, Nakhon Ratchasima province

1.4 Objective

1.3.3 To present the prevalence of musculoskeletal disorders among rice farmer in Tarnlalord Sub-District, Phimai District, Nakhon Ratchasima Province, Thailand

1.3.4 To explore the relationship among individual factors, work-related factors and musculoskeletal disorders of rice farmer in Tarnlalord Sub-District, Phimai District, Nakhon Ratchasima Province, Thailand

1.3.5 To identify the factors associated with musculoskeletal disorders among rice farmer in Tarnlalord Sub-District, Phimai District, Nakhon Ratchasima Province, Thailand

1.5 Conceptual Framework

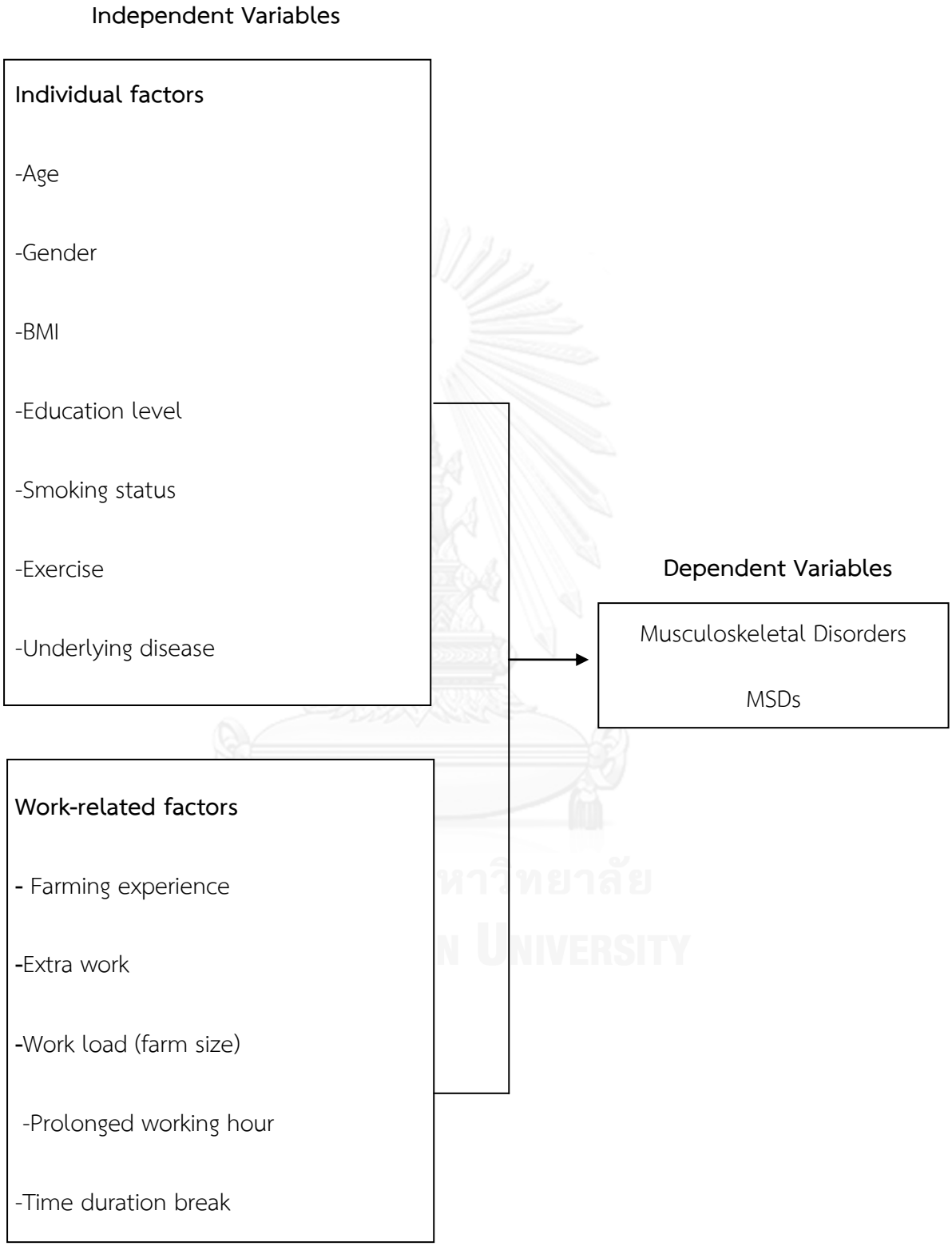

Figure 1: Conceptual framework

1.6 Operational Definitions

1.6.1 Individual factors

a) Age: The numbers of year that rice farmer has lived.

b) Gender: Refers to male or female of farmer.

c) BMI: The proportion between weight and height to determine the degree of body mass index into 4 levels consisting of;

- Less than 18.5= underweight
- Between18.5-24.9 = normal
- Between25.0-29.9 =overweight
- More than 29.9=obesity

d) Education level: The highest level of education which divided into no education, primary school, secondary school, high school.

e) Smoking history: Refer to the smoker and non-smoker persons.

f) Exercise: Any bodily movement that is done in order to become stronger and healthier.

1.6.2 Rice farming process

Including 3 processes:

a) Paddy preparation process: The field, or paddy, is plough so that a sturdy root system will develop to support the plant and give them access to nutrients.

b) Rice planting & transplantation process: The rice seed typically planted in spring. Seeds are often put into seedbeds for germination and early growth. While seeds can be spread directly onto the land, saving time, this result in far lower crop yields. As the seeds germinate, the land is flooded in preparation for transplanting. When the seeds have germinated they are transplanted by hand to the wet rice paddies.

c) Harvesting process: Harvesting by hand is done with sickle or a scythe, the ears of rice are cut at about 20-30 cm. above the ground.

1.6.3 Work-related factors

Work-related factors are the synergistic elements of musculoskeletal disorders including

a) Farming experience: The number of year that farmer work about rice farming

b) Extra work: An activity or interest pursued outside one’s regular occupation and engaged in primarily for pleasure

c) Work load: an area of rice farm that farmer growing rice by own

d) Prolonged working hours: the working times that farmer work consecutively per one time.

e) Time duration break: The duration of times that farmer without rice farm working.

1.6.4 Musculoskeletal disorders

Musculoskeletal Disorders, MSDs, are injuries and disorders that and effect health problems to musculoskeletal system (i.e. nerve, ligaments, discs, muscles, tendons, etc.). Furthermore to confuse, MSDs have many names used to speaking about affect and injuries, including repetitive motion injury, repetitive motion disorder, repetitive stress injury, repetitive stress disorder, ergonomic injury, cumulative trauma disorder, overuse syndrome.

1.6.5 Rice growing season

The duration time of rice growing at Tarnlalord Sub-District, Phimai District, Nakhon Ratchasima Province, Thailand.

1.6.6 Farmer

Farmer whose growing rice at Tarnlalord Sub-District, Phimai District, Nakhon Ratchasima Province, Thailand.

1.7 Expected Benefits

1.7.1 The prevalence of musculoskeletal disorders among rice farmer in Tarnlalord Sub-District, Phimai District, Nakhon Ratchasima Province, Thailand was identified.

1.7.2 The individual factors, work-related factors and musculoskeletal disorders among rice farmer in Tarnlalord Sub-District, Phimai District, Nakhon Ratchasima Province, Thailand were identified.

1.7.3 Factors that associated with musculoskeletal disorders among rice farmers were known.

CHAPTER II
LITERATURE REVIEW

2.1 Farmer

A farmer is a person employ in agriculture, raising living organisms for food or fresh material. They are considered to be the backbone of the Thai economy for very long time. In 1885, Thailand began to export rice to British states for instance: Malaysia and Singapore ("Rice growing process,"). Nowadays, Thailand becomes one of the major rice exporters in the world. (Puntumetakul et al., 2011). The increase in the demand of rice causes higher willingness to produce. However, farmers are exposed to dangerous situations as well as predisposing risk factors associated with MSDs (Gupta & Tarique, 2013).

In the study of risk factors for back pain among male farmer found that farmer high significantly higher prevalence of back pain in comparison with general workers (Park, Sprince, Whitten, Burmeister, & Zwerling, 2001). The study site has total population of 3,920 people (male 1,983 people female 1,937 people). Including 14 villages and 987 households. The main occupation is the farmers, 862 households from all of the populations in Tarnlalord sub-district occupation in farmer (Phimai District Agricultural Extension office, 2012-2013).

2.2 Rice growing process

All farms are rain-fed and most of farms have soil including organic matter content which sandy soil type ("Rice growing process,"). Average rainfall in Thailand each year is around 1,200-1,600 mm. (DreamKanokwan, 2012). Nakhon Ratchasima

Province has slightly lower rainfall of 1,028.5 mm. (Meteorology station, Nakhon Ratchasima province, 2012).

2.2.1. Paddy preparation process

The field, or paddy, is plough so that a sturdy root system will develop to support the plant and give them access to nutrients. The land must be ensure water is used efficiently and to help in controlling weeds. A drainage system that allows the fast removal of water is also made at this time. Fertilizer may also be used to prepare the soil (Copy, 2005).

(a) Man paddy preparation (b) Machine paddy preparation

Figure 2: Paddy preparation process

2.2.2. Rice planting & transplanting process

Rice cycle is generally about 90-120 days, with rice seed typically planted in spring. Seeds are often put into seedbeds for germination and early growth. While seeds can be spread directly onto the land, saving time, this result in far lower crop

yields. As the seeds germinate, the land is flooded in preparation for transplanting. When the seeds have germinated they are transplanted by hand to the wet rice paddies. This transplanting may occur from 20-80 days after planting (Copy, 2005).

(a) Rice planting (b) Rice transplanting

Figure 3: rice planting & transplanting process

2.2.3. Harvesting process

When the rice is ready to be harvested, the paddies must be completely drained and the field allowed drying. Harvesting by hand is done with sickle or a scythe: the ears of rice are cut at about 20-30 cm. above the ground. After cutting, the ears of rice are left to dry on the stubble for two or three days (Copy, 2005).

(a) Man harvesting process (b) Machine harvesting process

Figure 4: Harvesting process

2.3 Musculoskeletal Disorders

Musculoskeletal Disorders or MSDs are injuries and disorders that and effect health problems to musculoskeletal system (i.e. nerve, ligaments, discs, muscles, tendons, etc.). Furthermore to confuse, MSDs have many names used to speaking about affect and injuries, some of them including repetitive motion injury, repetitive motion disorder, repetitive stress injury, repetitive stress disorder, ergonomic injury, cumulative trauma disorder, overuse syndrome (Health).

The muscular system is responsible for the movements of the human attached to the bones of skeletal system are more than 600 named and make up about half of a person's body weight. Including three type of muscle tissue that is 1.) Visceral muscle (founding inside the organ i.e. stomach, intestines and blood vessels, controlled by the unconscious part of brain known as involuntary muscle. 2.) Cardiac muscle can be founding only in the wall and histological of the heart, response for pumping blood, blood supply to deliver oxygen nutrients and to remove waste products) and 3.)Skeletal muscle (Only on voluntarily controlled in human body, controlled by consciously) (Cherney, 2013).

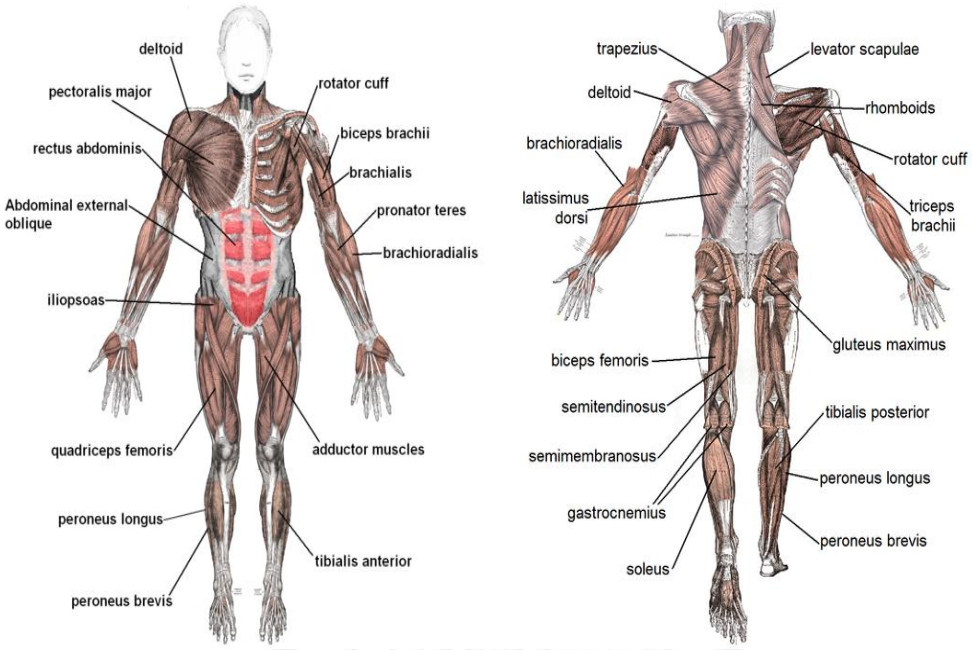

Figure 5: Musculoskeletal of human body

According to the National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS) musculoskeletal symptoms will starting affect in adult when the age around 30-40 years old (NIAMS,2012) (Cherney, 2013). Musculoskeletal disorders related to farmer even there is farming machine, new agricultural machine or there are works with a diverse working environment introduced ("Safe farm work for safety farmers," 2005).

The hazard in the working environment has resulted from multiple ergonomic risk factors. Many researchers conducted earlier have shown that jobs are creating many factors and are one of the major causes of MSD. The symptoms of each person are different depending on the duration, frequency, and the magnitude of the exposure. This is usually measured by job hazard analysis and control process. This measurement helps indicate and identifies the ergonomic factors that may be present in a job. This helps in pointing out all the information needed to figure out

the causes of MSD and the methods of how those factors could be reduced or eliminated.

2.3.1 Contributing factors to developing skeletal disorders (Copy, 2005)

a) Effort of performing high forces might result in tissue overloading. Using of high intensity forces is active within body tissues, especially during lifting or carrying a heavy object, and pushing, pulling, holding, or supporting an object.

b) Musculoskeletal system failure can be occurred by handing loads for long time during the working day.

c) Regardless to weight of object, repetitive motion causes long period of same muscles usage and they may be overloaded, which could result in muscle fatigue, pain, and injuries.

d) In a great working environment, work can be performed mostly in upright position with shoulders lifted up and arms closed to the body. Otherwise, it could result in spinal structure overload, and increasing entire muscles activity.

e) Statistic muscular load is found under conditions where muscles are tensed over long periods of the time in order to keep a certain body posture. Under normal conditions, the permanent change between contraction and relaxation acts as a circulation supporting pump. Continuous contraction restricts the flow of blood from and to the contracted muscle.

f) Inactivated muscles show an extra factor of musculoskeletal disorders development. Muscles are needed to be in an active state to keep their capacity. The facts are also applied to tendons and bones.

g) Monotonous repetitive manipulations with or without an object over long periods of time may lead to musculoskeletal failures. Repetitive work occurs when the same body parts.

h) Strain on the locomotors system may also occur due to the application of vibration. This cause may result from hand-held tools.

i) Actual environment factors such as unpredictable weather conditions play an important role with mechanical loads and increasing the risk of musculoskeletal disorders.

2.4 Factors associated with musculoskeletal disorders

2.4.1 Individual factors

a) Age

Age is an important of musculoskeletal disorders. MSDs also increasing with age from the one reason of naturally muscles, bones, and joint break down but doesn't mean people will getting this disease automatically by age increase. According to the National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS) musculoskeletal symptoms will starting affect in adult when the age around 30-40 years old (Cherney, 2013). In some study have found associated with back pain in farmers that was 45-59 years of age (OR=2.13, 95%CI 1.02-4.43) (Park et al., 2001). And for some study has showed the result that the age less than 45 years among farmer significantly associated with low back injury (OR=3.32, 95% CI 1.75-6.20) (Nancy Sprince et al., 2007).

b) Gender

Study in back pain and agricultural work among farmer of Colorado, a total of 194 farmers reported to have had back pain lasting for 1 week or more (Xiang, Stallones, & Keefe, 1999). The result showed that the prevalence of back pain in males (28.6 %) had higher than females (22.5%). And the lower back was the predominantly affected part of body among both males and females. Xiaotong et al., (1976) studied in back pain among farmers in A northern area of China. The result showed statistically significant in the multivariate model that females were more likely to experience back pain than males (OR=1.22, 95% CI: 1.09-1.36).

c) BMI

BMI = Body mass index was defined as a measurement of the relative of muscle mass and fat in human body, in which can calculate by mass in kilograms is divided by height in meters squared and the result can used as index of obesity (Company, 2000). According to the study from Netherlands, They showed the relation between body mass index and musculoskeletal symptoms in the working population that for high BMI can increased prevalence of musculoskeletal symptoms (overweight: OR=1.13, 95% CI 1.08-1.19 and obesity: OR=1.28, 95% CI: 1.19-1.39) associated with musculoskeletal symptom (Viester et al., 2013).

d) Education Level

Several studies (Lyman, McGwin, Enochs, & Roseman, 1999; Nancy Sprince et al., 2007; NL Sprince et al., 2003) (Zhou & Roseman, 1994), have showed the result that education level associated with musculoskeletal disorders. They

interested in the education level and set this factor to be one of the independent in the study. For example, (Nancy Sprince et al., 2007) studied risk factor for low back pain injury among farmers in Lowa showing association between higher education and lower back pain in the result. Future more the result an association between higher education and back pain are contrast to several studies that showed relationship between formal education and back pain, (Dionne et al., 2001) reported that 16 out of 19 studies showed an association between low levels of formal education and frequency of back pain.

e) Smoking history

According to finding several studies, (Holmberg, Thelin, Stiernstrom, & Svardsudd, 2005) study low back pain comorbidity among male farmers and rural referents from population base. The result has showed smoking was significantly more prevalent among the referent ($P < 0.0001$) and (Leino-Arjas, 1998) interested to study in smoking and musculoskeletal disorders in the metal industry by 10 years follow up, the result showed smoking were significantly associated with the change in all musculoskeletal symptom score during 10 year increasing more among the continuous smoker or follow up smoker than among the never smokers and change in the clinical finding score limbs.

2.4.2 Work-related factors

a) Prolonged working hours

(Hanklang, Kaewboonchoo, Silpasuwan, & Mungarndee, 2012) studied in 272 women rebar workers in Thailand. They interested in prevalence of

musculoskeletal disorders and risk factors among Thai worker in construction- related work and put prolonged working hour to be one factor. Prolonged working hour is a recognized stressor to increased risk to developing musculoskeletal disorders (Nag et al., 2012). The finding showed that workers with prolonged working hours were 7.6 times more likely to develop musculoskeletal disorders than those without (Hanklang et al., 2012).

2.4.3 Rice Farming Process

From the study of risk management of occupational health and safety in rice farmers reported risk analysis in East Java in 2012. Information was procured from observation and interview by used Job Hazard Analysis (JHA). For the result, overall main 6 hazards came from production process including Ergonomic hazard group. Ergonomic hazard comes from various awkward postures and many factors when farmers work. This hazard might cause muscle exhaustion, spine disorders, joint and muscle disorders, Cumulative trauma disorders, or musculoskeletal disorders (Yonelia & Kurniawidjaja, 2013).

a) Paddy preparation process

In this process, farmer must use plough to plowing land for prepare paddy mostly by hand and leg to control plough. The land must be ensure water is used support and control rice weeds (Copy, 2005). Study of (Puntumetakul et al., 2011) about prevalence of musculoskeletal disorders in farmers at Khon Kaen province, the result found that farmer whose participate in study got shoulder pain about 2.0% and arm pain about 0.8%.

b) Rice planting & transplantation process

Refers to work condition of rice planting and rice transplantation process, at first lifting and carrying plant containers by hand and can be cause musculoskeletal injuries. Work must to stoop forward to rice that can contribute to back pain injury. When rice are growth on the ground and farmers have to transplantation them to next process, rice farmers must bend completely forward to weed them**[50].** Study of (Puntumetakul et al., 2011) about prevalence of musculoskeletal disorders in farmers at Khon Kaen province, the result found that the top four of the most prevalence of MSDs in seven days were lower back pain (59.61%, 95%CI= 51.37-62.44), knee pain (28.62%, 95%CI= 23.36-33.66), hip pain (24.50%, 95%CI=20.53-30.26) and shoulder pain (25.08%, 95%CI=20.23-29.92), respectively (Puntumetakul et al., 2011).

c) Harvesting process

In hand harvest of rice, rice farmer must to stoop, grip, lift, carry and dump many times per hour (Baron, Estill, Steege, & Lalich, 2001). Rice farmer must work with awkward posture for long time that is physical risk factor can cause musculoskeletal disorders. According to study about ergonomics problems and risk factors of farmers in Sakon Nakhon Province, The objective of this study were to find out ergonomic problems and risk factors of farmer. Their found that the processes of work statically related to body pain were harvest process and rice transplantation (Pengseesang, 2010).

2.5 Standard Nordic Musculoskeletal questionnaires

The Nordic Musculoskeletal Questionnaire has been commonly used to assess musculoskeletal disorders among various working population (Anton, Rosecrance, Merlino, & Cook, 2002) and was developed from a project funded by Nordic Council of Ministers (Andersson K, 2007). The Nordic musculoskeletal questionnaire has good test-retest reliability and can be used as a structure interviews. There are two type of questionnaire that is a general questionnaire and a specific one focus on some part which interested to study (Crawford, 2007). The questionnaires follow the tradition of some previous medical questionnaire (Andersson K, 2007). However, significantly higher of musculoskeletal problems were reported when the questionnaire was administered as part of a focused study on musculoskeletal topic and work factors than when administered as part of a periodic general health test. Completion is assistance by nine part of body including neck, shoulders, upper back, elbows, low back, wrist/hand, hips/thighs, knees and ankles/feet (Andersson K, 2007).

CHAPTER III

RESEARCH METHODOLOGY

The research design of this study is cross-sectional design. The purpose of this research is to present the prevalence of MSDs and to find association among individual factors, work-related factors and MSDs of rice farmer in Tarnlalord Sub-District, Phimai District, Nakhon Ratchasima Province, Thailand.

3.1 Population and Sample

3.1.1. Population

Household of rice farmer in Tarnlalord Sub-District, Phimai District, Nakhon Ratchasima Province, Thailand (N=862) (Phimai District Agricultural Extension office, 2012-2013).

3.1.2. Sample Size

Sample of this study were rice farmers who live in Tarnlalord Sub-District, Phimai District, Nakhon Ratchasima Province. The sample size was calculated from the formula of Yamane (1967). Total populations were 862 household of rice farmer (Phimai District Agricultural Extension office, 2012-2013).

Formula (Yamane, 1967:886)

$$n = \frac{N}{1 + N(e)^2}$$

n = Sample size

N = Total Population (862 household)

e = the level of precision

Represent $n = \frac{865}{1+862(0.05)(0.05)}$

$= \frac{865}{3.155}$

$= 273.217$

n = 274 person per household of rice farmer

Giving a 5% drop out rate, allowance was made to add to the sampling figures namely to add its sample size.

Therefore the Sample size of this study is 288 rice-farming households

3.1.3. Sampling Technique

As mentioned earlier, rice is normally grown in the northeastern region of Thailand. As result, the Phimai district and Tarnlalord sub-district of Nakorn Ratchasima Province were purposively selected as the study sites. Farmers in those areas were selected by single stage cluster sampling from group of household take care by health volunteer. Moreover, simple random sampling was used to selected household of rice farmers. As a result, every single household have the identical chance to be chosen.

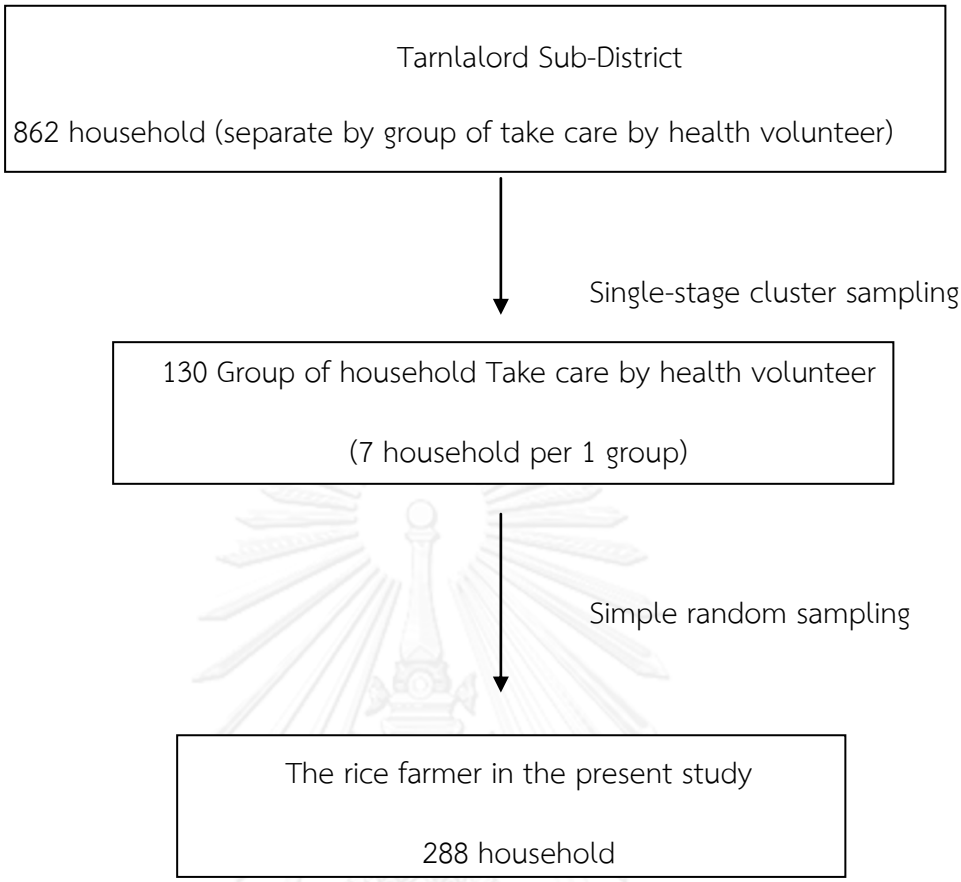

Figure 6 Sampling Technique

3.1.4. Inclusion criteria

- Male or female who are rice farmer occupational aged 20 to 60 years old
- Rice farmer who had 1 year working experience on farming in Tarnlalord Sub-District, Phimai District, Nakhon Ratchasima Province.
- Growing rice by their own
- Willing to participations and can communicate in Thai
- No history of operation of musculoskeletal system

3.2 Measures

3.2.1. Individual factors and work-related factors (e.g. age, gender, BMI, marital status, education level) were measured by general demographic questionnaire in APPENDIX A.

3.2.3. Musculoskeletal disorders were measured by Nordic Musculoskeletal Questionnaires in APPENDIX A.

3.3 Measurement Tools

The content of the survey questionnaire in this study was developed based on literature review and a set of standardized questionnaires. In this study questionnaires were adapted from (Pengseesang, 2010). Questionnaires have 3 part (1) Socio-Demographic Characteristics (2) worked-related MSDs (3) Symptom of musculoskeletal disorders. The validity and reliability of the questionnaire were 0.966 and 0.70 respectively.

3.4 Data collection

The questionnaire was developed based on literature review and selected standardized questionnaire. Firstly, Phimai district and Tarnlalord sub-district within Nakorn Ratchasima was chosen. Then, the covering letters to publicize the research were sent to the Tambon Health Promoting Hospital (Tarnlalord sub-district). Afterwards, the president of Tambon Health Promoting Hospital and health volunteers informed rice farmers about the research by giving the poster announcement to them. A total of 302 households from Tarnlalord sub-district agreed to attend the study during rice growing season. The questionnaire used in the

study was read aloud for every subject. Finally, a pamphlet about musculoskeletal disorders was given to each participant after they had been interviewed.

3.5 Data Analysis

Data were analyzed by using license SPSS statistics for windows.

3.5.1. Descriptive statistics were used to present each independent (frequencies, percentages, and means).

3.5.2. Associations between independent variables and musculoskeletal disorders were analyze using Chi-square test.

3.6 Ethical Consideration

This proposal was submit to Ethical Committee College of Public Health Sciences, Chulalongkorn University. COA No. 054/2557 in APPENDIX B.

CHAPTER IV
RESULT

A cross sectional study was used to present the prevalence of musculoskeletal disorders and identify the factors associated with musculoskeletal disorders among rice farmer in Tarnlalord Sub-district, Phimai district, Nakorn Ratchasima Province. Data collection process was done during Febuary and March 2014. A total of 290 rice farmers were agreed to participate in this study. All of them were included in the data analysis.

4.1 Socio-Demographic information of rice farmers

As already mentioned, 290 cases were obtained from Tarnlalord Sub-district, Phimai district Nakorn Ratchasima Province in this study. As seen in Table 4.1, most of them aged between 46 to 55 years old (39.0%). The percentage of male (29.7) was slightly lower than female (36.2). The BMI was classified into 4 groups: normal, overweight, obesity, and underweight groups. The highest one was the normal group (60.0%), followed by overweight, obesity and underweight group. All most all respondents (92.0) were married, the rest of them were single, widowed, divorced and separated. In term of education, the largest proportion was primary school, where as university level was the least. Monthly income level was divided into 4 categories, most of them had income between 5,000 to 10,000 baht (50.3%) per month, below 5,000 baht were 44.5%, others were income between 10,000 to 15,000 baht (4.8%) and income more than 15,000 baht (0.3%). It is able to find out that all respondents have more than a year of experience. Al most 30 % have been working between 21 to 30 years, 26.6 % between 31 to 40 years, 20.3% between 11 to 20 years, 12.4% between 41 to 50 years and 11.0% between 1 to 10 years. As presented

in the table below, most of them are non-smoker, doing exercise on a regular basis and do not have any underlying disease.

Table 4.1 Socio-Demographic information of rice farmers (n=290)

Socio-Demographic	Number (person)	Percentage (%)
1. **Age (years)**		
25 to 35	25	8.6
36 to 45	86	29.7
46 to 55	113	39.0
>55	66	22.8
Mean=47.55, S.D.=8.684, min=25, max=60		
2. **Gender**		
Male	135	46.6
Female	155	53.4
3. **BMI**		
Underweight	11	3.8
Normal	174	60.0
overweight	88	30.4
obesity	17	5.9
Mean=24.16, S.D.=4.10, min=14.06, max=48.07		
4. **Status**		
Single	14	4.8
Married	269	92.8
Widowed	6	2.1
Divorced/Separated	1	0.3
5.**Education**		
No education	20	6.9
Primary school	196	67.6
Secondary school	45	15.5
High school	28	9.7
Bachelor	1	0.3

Table 4.1 Socio-Demographic information of rice farmers (n=290) (cont.)

Socio-Demographic	Number (person)	Percentage (%)
6.Income (baht)		
<5,000	129	44.5
5,000 to 10,000	146	50.3
10,000 to 15,000	14	4.8
>15,000	1	0.3
7.Farming experience (year)		
1 to 10	32	11.0
11 to 20	59	20.3
21 to 30	86	29.7
31 to 40	77	26.6
41 to 50	36	12.4
Mean=27.78, S.D.=11.81, min=1, max=50		
8.Smoking		
Smoke	47	16.2
Non-smoke	243	83.8
9.Exercise		
Often time	63	21.7
1 to 3 times per month	23	7.9
1 to 2 times per week	43	14.8
3 to 6 times per week	20	6.9
everyday	36	12.4
Non-exercise	104	35.9
10.Underlying disease		
Not Have	200	69.0
have	88	30.0
Don’t know	2	0.7
Total	290	100

4.2 Work-related factors information of rice farmers

The respondents were asked if they are having another job other than farmer, the result showed that almost 80% of total numbers say “yes”. The area of rice cultivation was categorized into difference sizes from more than 16,000 sqm to less than 8,000 sqm, the findings shows that almost haft of total respondents own more than 16,000 sqm. Besides that, Table 4.2 also illustrates more information related to working behavior i.e.: number of working days a week, working hours a day, etc.

Table 4.2 Work-related factors information of rice farmers (n=290)

List	Number (person)	Percentage (%)
1.Extra work		
do	230	79.3
Not do	60	20.7
2.Work load (Farm size)		
less than 8,000 sqm.	74	25.5
between 8,000-16,000 sqm.	98	33.8
More than 16,000 sqm.	118	40.7
3.Working day per week		
<3	86	29.7
3 to 4	46	15.9
>4	158	54.5
Mean=4.367, S.D.=1.77, min=1, max=7		
4.Working hour		
<3.5	34	11.7
3.5 to 6	126	43.4
>6	130	44.8
Mean=6.083, S.D.=1.98, min=1, max=10		

Table 4.2 Work-related factors information of rice farmers (n=290) (cont.)

List	Number (person)	Percentage (%)
5.Break time (time)		
none	26	9.0
1 to 2	199	68.6
2.5 to 3	49	16.9
3.5 to 5	16	5.5
Mean=1.7, S.D.=1.04, min=0, max=5		
6.Time duration break (minute)		
<20	86	29.7
20 to 30	105	36.2
>30	99	34.1
Mean=35.17, S.D.=20.47, min=0, max=120		
Total	290	100

4.3 Rice farming process information of farmers

The farmers in this study theirs have been growing rice by them self. Most of them growing rice once a year (71.4%), others were growing rice twice (28.3%) and three times (0.3%) a years. Owner of land mostly 70.3% had individual, rent and others had 22.4%, 7.2%, respectively. Details are presented in Table 4.3

Table 4.3 Farming information of rice farmers (n=290)

Farming information	Number (person)	Percentage (%)
Crop (per year)		
1	207	71.4
2	82	28.3
3	1	0.3

Table 4.3 Farming information of rice farmers (n=290) (cont.)

Farming information	Number (person)	Percentage (%)
Farm owner		
individual	204	70.3
rent	65	22.4
others	21	7.2
Total	290	100

In paddy preparation process, most of them had done by wheel tractor walking along (78.3%) and for others done by tractor 4 wheel drive (2.4%), hire (15.5%) and 3.8% done by plough. For the period of paddy preparation process, 75% of them reported to be able to complete within 2 days. In planting process, they were done by themselves (93.1%) notably more than by using machine (6.9%) and mostly done within 2 days (82.1%). In transplanting process, almost all had done by themselves (99.7%) and were able to complete in less than 5 days. The combination of machine and sickle was the most reported method in harvesting process (51.4%). Most of rice farmers reported that they were able to finish within a week. In addition, Table 4.4 also presents details about harvest weight, as well as harvest delivery.

Table 4.4 Process of rice farming information of rice farmer (n=290)

	List	Number (person)	Percentage (%)
1.Paddy preparation	plough	11	3.8
	Wheel tractor walking along	227	78.3
	Tractor 4 wheel drive	7	2.4
	hire	45	15.5

Table 4.4 Process of rice farming information of rice farmer (n=290) (cont.)

	List	Number (person)	Percentage (%)
2.Length of paddy	<2	218	75.2
preparation (day)	2.5 to 5	42	14.5
	>5	21	7.2
	Do not know	9	3.1
3.Planting process	By farmer	270	93.1
	By machine	20	6.9
4.Length of planting	<2	238	82.1
(day)	3 to 5	43	14.8
	>5	9	3.1
5.Transplanting process	By self	289	99.7
	Not do	1	0.3
6.Length of transplanting (day)	<5	100	34.5
	5 to 10	89	30.7
	>10	85	29.3
	Not do	16	5.5
7.Harvest process	By machine	81	27.9
	By manual	60	20.7
	By machine + manual	149	51.4

Table 4.4 Process of rice farming information of rice farmer (n=290) (cont.)

	List	Number (person)	Percentage (%)
8.Length of harvesting	1 to 7	92	31.7
(day)	8 to 15	64	22.1
	16 to 30	50	17.2
	>30	12	4.1
	Do not know	72	24.8
9. Harvest weight (kg.)	1 to 2.5	80	27.6
	3 to 5	118	40.7
	>5	16	5.5
	Don’t know	76	26.5
10. Harvest average (kg.)	<50	42	14.5
	51 to 80	96	33.1
	Don’t know	72	24.8
	>80	80	27.6
11.Harvest delivery	By self	110	37.9
	By others	180	62.1
Total		290	100.0

4.4 Prevalence of musculoskeletal disorders in each process of rice growing

As already mentioned, there are 3 major process of growing rice: paddy preparation, planting & transplanting process and harvesting process. In the questionnaire, the intensity of musculoskeletal symptoms was categorized into 9 parts (neck, shoulder, upper back, elbow, lower back, hand, hip, knee, and foot). In the paddy preparation process, shoulder pain was the most reported cases, followed by hip, lower back, neck and so forth. Shoulder pain was also being the most reported case in planting and transplanting process (83.4%), where upper back pain reported to be the least. Last but not least; shoulder pain was once again being the number in harvesting process, which was up to 65%. Details presented in Table 4.5

Table 4.5 Musculoskeletal symptoms in each process and risk factors of growing rice

Part of body			Rice growing process		
			Paddy preparation	Rice planting & transplantation	Harvesting
Neck	Pain	n	130	171	140
		(%)	(44.8)	(59.0)	(48.3)
	No pain	n	160	119	150
		(%)	(55.2)	(41)	(51)
Shoulder	Pain	n	208	242	188
		(%)	(71.7)	(83.4)	(64.8)
	No pain	n	82	48	101
		(%)	(28.3)	(16.6)	(34.8)
Upper back	Pain	n	71	127	100
		(%)	(24.5)	(43.8)	(34.5)
	No pain	n	219	163	190
		(%)	(75.5)	(56.2)	(65.5)

Table 4.5 Musculoskeletal symptoms in each process and risk factors of growing rice (cont.)

Part of body			Rice growing process		
			Paddy preparation	Rice planting & transplantation	Harvesting
Elbow	Pain	n	46	133	53
		(%)	(15.9)	(45.9)	(18.3)
	No pain	n	244	157	237
		(%)	(84.1)	(54.1)	(81.7)
Lower Back	Pain	n	152	199	172
		(%)	(52.4)	(68.6)	(59.3)
	No pain	n	138	91	118
		(%)	(47.6)	(31.4)	(40.7)
Hand	Pain				95
		(%)	(24.5)	(58.3)	(32.8)
	No pain	n	219	121	195
		(%)	(75.5)	(41.7)	(67.2)
Hip	Pain	n	190	200	184
		(%)	(65.5)	(69)	(63.4)
	No pain	n	100	90	106
		(%)	(34.5)	(31)	(36.6)
Knee	Pain	n	115	145	96
		(%)	(39.7)	(50)	(33.1)
	No pain	n	175	145	194
		(%)	(60.3)	(50)	(66.9)
Foot	Pain	n	79	233	40
		(%)	(27.2)	(80.3)	(13.8)
	No pain	n	211	57	250
		(%)	(72.8)	(19.7)	(86.2)

4.5 Body pain score of MSDs

The body pain score of musculoskeletal symptoms was separated into nine parts of body (neck, shoulder, upper back, elbow, lower back, hand/wrist, hip, knee, foot) and the intensity of pain was categorized into 4 level (0=not pain, 1=mild pain, 2=moderate pain, 3=severe pain). The prevalence of musculoskeletal symptoms in all of growing rice process in the study are presented in Table 4.6

Table 4.6 The body pain score of musculoskeletal symptoms

Part of body	Not pain 0	Mild pain 1	Moderate pain 2	Severe pain 3
	n (%)	n (%)	n (%)	n (%)
Neck	41 (14.1)	106 (36.6)	99 (34.1)	44 (15.2)
Left shoulder	48 (16.6)	105 (36.2)	109 (37.6)	28 (9.7)
Right shoulder	30 (10.3)	106 (36.6)	115 (39.7)	39 (13.4)
Upper back	36 (12.4)	91 (31.4)	104 (35.9)	59 (20.3)
Left Elbow	149 (51.4)	91 (31.4)	39 (13.4)	11 (3.8)
Right Elbow	141 (48.6)	85 (29.3)	49 (16.9)	15 (5.2)

Table 4.6 The body pain score of musculoskeletal symptoms (cont.)

Part of body	Not pain 0 n (%)	Mild pain 1 n (%)	Moderate pain 2 n (%)	Severe pain 3 n (%)
Lower Back	20 (6.9)	43 (14.8)	90 (31)	137 (47.2)
Right Hand	88 (30.3)	102 (35.2)	71 (24.5)	29 (10)
Left Hand	105 (36.2)	112 (38.6)	55 (19)	18 (6.2)
Hip	19 (6.6)	36 (12.4)	83 (28.6)	152 (52.4)
Knee	87 (30)	104 (35.9)	59 (20.3)	40 (13.8)
Foot	165 (56.9)	86 (29.7)	34 (11.7)	5 (1.7)

4.6 Association between musculoskeletal symptom and rice growing process

Rice farmers were asked to rate their pain of all 9 parts into 4 different levels (0=not pain, 1=mild pain, 2=moderate pain, 3=severe pain), so the total of full score was supposed to be 36.0. After analysis, the result showed total body pain score in rice farmers of this study were average mean pain score =15.90, min=1, max=34.0. Before finding associations, the total body pain score (TBP) were separated into 2

group that were group 1=total body pain score less than average mean pain score and group 2 = total body pain score higher than average mean pain score. The analysis used Chi- Square test to find association between 2 groups of factors (individual factors, work-related factors) and total body pain score of MSDs. The results were identified six factors significantly associated with musculoskeletal disorders: gender (OR=3.180, 95% CI=1.966-5.143), BMI group (OR=0.607, 95% CI=0.377-0.977), education level (OR=0.535, 95% CI=0.313-0.915), smoking status (OR=2.169, 95% CI=1.137-4.141), farming experience (OR=2.169, 95% CI=1.350-3.483), underlying disease (OR=2.013, 95% CI=1.202-3.372).

Table 4.7 the associated factors and total body pain score of MSDs using Chi-square test (n=290)

Variables	n	Group of TBP		OR	95%CI	p-value
		1**	2***			
		n (%)	n (%)			
Individual factors						
1.Age						
25 to 44	101	53(18.3)	48(16.6)	1.322	0.815-2.146	0.257
45 to 59	189	86(29.7)	103(35.5)			
2.Gender						
Male	135	85(29.3)	50(17.2)	3.180	1.966-5.143	<0.001*
Female	155	54(18.6)	101(34.8)			

Variables	n	Group of TBP		OR	95%CI	p-value
		1**	2***			
		n (%)	n (%)			
3.BMI						
Abnormal group	116	47(16.2)	69(23.8)	0.607	0.377-0.977	0.039*
Normal group	174	92(31.7)	82(28.3)			
4.Education Level						
Below high school	216	95(32.8)	121(41.7)	0.535	0.313-0.915	0.021*
Beyond primary school	74	44(15.2)	30(10.3)			
5.Smoking status						
Smoke	47	30(10.3)	17(5.9)	2.169	1.137-4.141	0.017*
Non-Smoke	243	109(37.6)	134(46.2)			
6.Exercise						
Non-exercise	104	54(18.6)	50(17.2)	1.283	0.793-2.076	0.309
Exercise	186	85(29.3)	101(34.8)			
7.Farm experience						
1 to 25	124	73(25.2)	51(17.6)	2.169	1.350-3.483	0.001*
26 to 50	166	66(22.8)	100(34.5)			
8.Underlying disease						
Do not have + do not know	202	107(36.9)	95(32.8)	1.971	1.178-3.298	0.009*
Have	88	32(11.0)	56(19.3)			

Variables	n	Group of TBP		OR	95%CI	p-value
		1**	2***			
		n (%)	n (%)			
Work-related factors						
1.Extra work						
Not-do	60	22(7.6)	38(13.1)	0.559	0.311-1.004	0.05
Do	230	117(40.3)	113(39.0)			
2.Work load (Farm size=sqm.)						
1,600 to 16,000	172	80(27.6)	92(31.7)	0.870	0.544-1.390	0.559
More than 16,000	118	59(20.3)	59(20.3)			
3.Prolonged working hour						
1 to 5	229	105(36.2)	124(42.8)	0.672	0.381-1.187	0.170
6 to 10	61	34(11.7)	27(9.3)			
4.Time duration break (minute)						
0 to 30	86	90(31.0)	101(34.8)	0.909	0.559-1.478	0.701
More than 30	105	49(16.9)	50(17.2)			

***** *Significant at 0.05 probability level using Chi-square test*

***Group 1=total body pain score less than average mean pain score*

****Group 2 = total body pain score higher than average mean pain score*

CHAPTER V

DISCUSSION

The purpose of this cross-sectional study were to present the prevalence of symptom of musculoskeletal disorders and to determine factors which are significantly associated with symptom of musculoskeletal disorders among rice farmer in Tarnlalord Sub-District, Phimai District, Nakhon Ratchasima Province, Thailand. Data were collected by using questionnaire, which includes 290 rice farmers in Tarnlalord Sub-District, Phimai District, Nakhon Ratchasima Province from March 2013 to April 2013. The measurement tool, the content of the survey questionnaire in this study was developed based on literature review and a set of standardized questionnaires. In this study questionnaires were adapted from (Pengseesang, 2010). A questionnaire consists of 3 parts (1) Socio-Demographic Characteristics (2) worked-related MSDs (3) Health status and body pain. The validity and reliability of this study were 0.966 and 0.70 respectively. Interviews were conducted on a voluntary basis. Chi-square was used in order to examine the associations within variables.

5.1 Prevalence of musculoskeletal disorders among rice farmer

Agricultural jobs are physically strenuous, farmer and farm workers are at particular risk of developing symptoms of musculoskeletal disorders compared with others workers (Leino-Arjas, 1998). Farm workers are exposed to a several of physical hazards (Walker-Bone & Palmer, 2002), Rice farmers are exposed to dangerous situations like excessive bending, twisting, kneeling, carrying load, etc. All these are activating factors associated with symptoms of musculoskeletal disorders. Rice

farmers are involved at least one crop through the year. Work for extended period of time during rice growing process, normally they work in more than 4 days per week more than 6 hour per days and they prolonged working hour 3 to 6 hour. This may thus be exhausted and be tried of muscle. In previous study which case their employment circumstances have low percentage of lower back pain in reported (Walker-Bone & Palmer, 2002). Two-hundred and four rice farmers from 290 in this study were farm owners, may be more motivated to keep gainfully employed and to disregard minor symptoms than other workers.

For the questionnaire, the intensity of musculoskeletal symptoms was separated in nine part of body (neck, shoulder, upper back, elbow, lower back, hand/wrist, hip, knee, and foot) and asked in pain or not pain.

5.1.2 Paddy preparation process

Presented study for the farmers who were mainly involved in paddy preparation process reported overall high frequencies mainly in shoulder pain (71.7%), hip pain (65.5%) and lower back pain (52.4%), respectively. Farmers who growing rice, they need to use plough for preparing land. This involves repetitive hand or shoulder and extension movement done by farmer. And for farmers who use machine ether sitting machine or walking along with, they exposure to vibration by working with machine. Most of rice farmers in this study were done by wheel tractor walking along (78.3%). Vibration from using machine are risk factor for development of low back pain (Boshuizen, Bongers, & Hulshof, 1990) and may also be factor in hip and shoulder pain. One reason for lower back pain, farmer usually sit with their neck and back in rotated posture when driving on sitting machine type,

allowing them to look at the implement they are plowing the field. Boshui zen 1990 study that exposure to whole-body vibration in combination with the twisted posture and prolonged sitting was responsible for the increased risk of low back pain in farmers (Boshuizen et al., 1990).

5.1.2 Planting & Transplanting process

For transplanting and planting process reported overall high frequencies mainly in shoulder pain, neck pain, lower back pain, hip pain, knee pain and foot pain, respectively. The possible reason of pain is pretty evident from using multitask of body. For example rice farmers who do transplanting process, they need to bend the knee, back forward bending. This involves treading a soil along with machine. Moreover these rice farmers also need to carry heavy rice spouts ether machine or basket. These all could explain the involvement of shoulder, neck, lower back, hip, knee and foot pain of rice farmers in this process. The participants were planting and transplanting by themselves, 93.1% and 82.1 %, respectively. The present study showed high prevalence in shoulder pain (83.4%) when compared with others parts of body.

5.1.3 Harvesting process

In recent decades, Thailand has been technical development in harvesting process resulting in new production and devices e.g. machine for automatic harvesting, automatic milling rice. These technical developments on harvesting process of rice farm in recent decades should mean that rice farmers are exposed to lower levels of physical workload an expected decrease in the prevalence of MSDs. However, high frequencies of reported MSDs still seem to be associated with rice

farmer. Study in Sakon Nakorn Province reported that 99.73% of rice farmers had body pain from their occupation and harvest process statistically related to body pain (Pengseesang, 2010). In this study rice farmers mostly had done by both with machine and manual (51.4%). They will use machine first and then follow by manual with sickle. Rice farmers mostly reported to have pain in shoulder (64.8%) followed by hip (63.4%), and lower back (59.3%). Using sickle in harvesting process needs to bend the knee, holding sickle and forward bending for most of the time in the fields. These postures put excessive pressure on shoulder and back. In addition, most of rice farmers need to carry harvested rice and put in a sack. This assuming of prolonged multitasks posture could possibly explain the development of shoulder, lower back and hip pain of rice farmers in harvesting process.

In overall, prevalence of symptom of MSDs was higher in planting & transplanting process. Prevalence among rice farmers in neck (59.0%), shoulder (83.4%), upper back (43.8%), elbow (45.9%), lower back (68.6%), hand (58.3%), hip (69.0%), knee (50.0%), and foot (80.3%). Similarly, the study of Ergonomics problems and risk factor of farmers in Sriwichai sub-district of Sakon Nakhon province (M. S. Pengseesang, 2012) shown prevalence of pain in planting & transplanting process approximately 99.72%. The details of symptom of MSDs in all of process of rice growing in this study are presented in Figure 7.

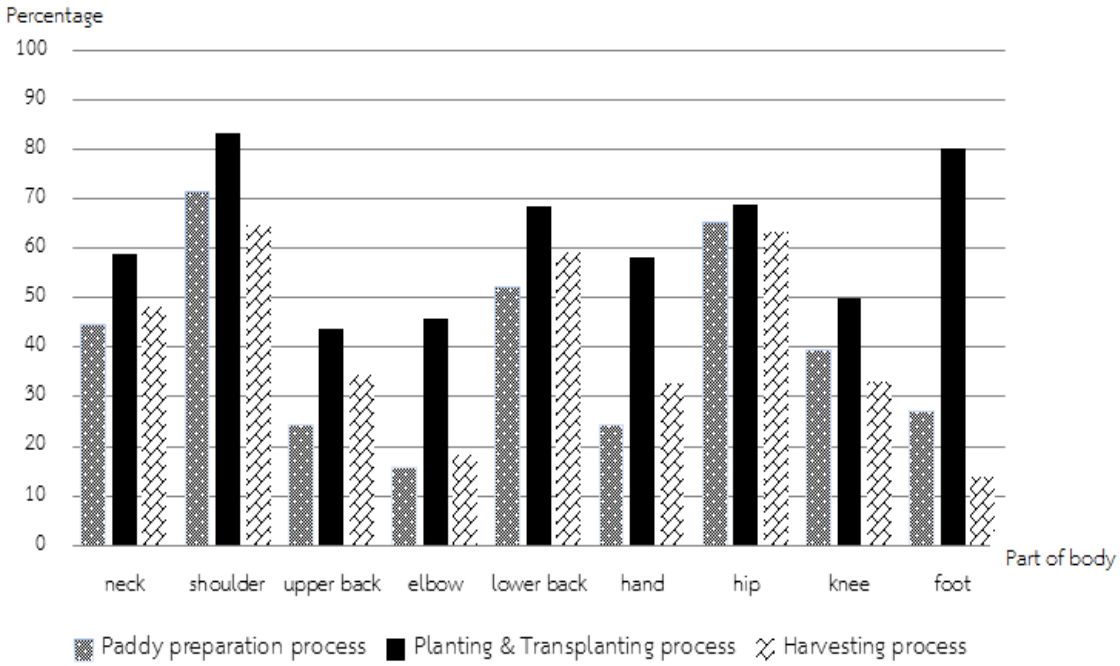

Figure 7 Body pain of all process of rice growing

5.2 Association between factors and the total body pain of MSDs

5.2.1 Individual factors

a) Age

In several study, age were found significant with MSDs (Heiden, Weigl, Angerer, & Müller, 2013; Park et al., 2001). In this study, the result showed no significant association between total body pain score of MSDs and age. The Odd of age group 45 to 59 is 1.322 higher than in age group 25 to 44 (95%CI=0.815-2.146). The result presented group of older age was more likely to develop total body pain score of MSDs than group of younger. MSDs increase in older group of age between 46 to 59 years. This result consists with the result from study among farmers. Study from Lowa farmers had showed the result aged between 45-59 years more likely to develop MSDs than younger (Park et al., 2001).

b) Gender

The result showed significant association between total body pain score of MSDs and gender (P-value=<0.001). The Odd of female is 3.180 higher than in male (95%CI=1.966-5.143). The result presented female rice farmers were more likely to develop total body pain score of MSDs than male. This finding was consistent with finding reported among rice farmers in Pitsanulok, Thailand (Nopkesorn & Supasit Pannarunothai, 2011). The higher prevalence rate might be due to a weaker physical structure of females. Besides that, it is also possible that women had to preform house works on a regular basis other than farming activities. Those factors mentioned above could possibility explain the higher total body pain score of MSDs in female farmers.

c) BMI

The result showed significant association between total body pain score of MSDs and BMI (P-value=0.039). The Odd of normal BMI group is 0.607 lower than in abnormal BMI group (95%CI=0.377-0.977). That means a group of abnormal BMI more likely to have high total body pain score than normal BMI group. According to proportion of abnormal BMI group in this study, the large proportions were overweight and obesity. Consistent with study from Netherlands, they showed the relation between BMI and MSDs in working population that for high BMI can increase prevalence of MSDs (overweight: OR=1.13, 95% CI=1.08-1.19 and obesity: OR=1.28, 95%CI=1.19-1.39).

d) Education Level

The result showed significant association between total body pain score of MSDs and education level (P-value=0.021). The Odd of high education group (beyond primary school) is 0.535 lower than in low education (below high school) (95%CI=0.313-0.915). This result consist with Dionne 2001 found an association between formal education and back pain, reported that 16 out of 19 studies showed an association between low levels of formal education and frequency of back pain (Dionne et al., 2001).

e) Smoking status

The result showed significant association between total body pain score of MSDs and smoking status (P-value=0.017). The Odd of non-smoke group is 2.169 higher than in smoker group (95%CI=1.137-4.141). This result was contrast with study of low back pain among farmers in Sweden (Holmberg et al., 2005). From the study, they showed farmers who are smoked association with low back pain. Difference from this results may be due to the prevalence of smoker because in all of 47 smoker in this study are male. And the result of association between gender and total body pain score of MSDs showed increase in female group. This could be explained association between smoking status and symptoms of MSDs in presented study.

f) Exercise

Exercise has been widely accepted as effective in the treatment and prevention of musculoskeletal disorders (Henchoz & Kai-Lik So, 2008). Although

exercise has a beneficial on MSDs, study in 2009 reported that performing intensive sporting activities were at an increased risk of chronic MSDs (Heneweer, Vanhees, & Picavet, 2009). The result showed no statistically significant relationship was found between these factors and total body pain score of MSDs. The Odd of exercise group in presented study is 1.283 higher than non-exercise group, that mean the total pain score of MSDs in exercise group higher than non-exercise group. The reason may due to time and activities for exercise of rice farmers in this study. Even the proportion of who do exercise is more than who not do exercise but most of them do an exercise less than 1 to 2 times per week, only 12.4% of them do exercise in every day. This reason could be explain why a group of exercise more likely to have high total body pain score of MSDs.

g) Farming experience

The final result showed significant association between total body pain score of MSDs and farming experience (P-value=0.001). The Odd of long experience group (26 to 50 years) is 2.169 higher than in short experience group (95%CI=1.350-3.483). The reason could be explained due to background of rice farmers in this study. Most of them stared occupation in farming as a child or youngster. They expose hazard from process of rice farming in long period of time and the prevalence of pain continuous to rise with age. The study of risk management of occupational health and safety in rice farming farmers reported various hazard including ergonomics come from process of rice growing (Yonelia & Kurniawidjaja, 2013). Another study reported the risk for persistent neck and shoulder complaints increased with years of working (Andersen & Gaardboe, 1993).

5.2.2 Work-related factors

a) Work load

In this study, no statistically significant relationship was found between work load and total body pain score of MSDs. The Odd high workload is 0.870 lower than low workload (95%CI=0.544-1.390). This result contrast with study in 2006, study reported work load was a significant factor with body pain at p-vale=0.021, the OR for high workload was 1.62 compared to low workload (Hartman, Vrielink, Huub, Huirne, & Metz, 2006). The reason could be explained may be due to number of rice farmer in high workload group, which this group was equal numbers of rice farmers in both group of total body pain score.

b) Prolonged working hour

The Odd of prolonged working hour between 6 to 10 hours is 0.672 lower than another group and no significantly between those factors was found. The association between symptoms of MSDs and prolonged working hour is of interest. Our study showing increased total body pain score of MSDs in the group of rice farmers who are prolonged working hour between 1 to 5 hours. This is contrast to another study, the study of musculoskeletal disorders among Thai women construction-related work has showed the Odd ratio was 7.6 times more likely to develop MSDs in prolonged working hours for 4 hours or more group than those without (Hanklang et al., 2012). The reason that could be explain, mostly rice farmers in this study work more than 6 hour per day even they mostly prolonged work not so long. This reason can assume that rice farmer still work hard in a day and can possibly to develop symptom of MSDs.

CHAPTER VI

CONCLUTION RECOMMENDATION AND LIMITATION

A musculoskeletal disorder is commonly found among rice farmers. In the paddy preparation process, shoulder pain was the most reported cases, followed by hip, lower back, neck and so forth. Shoulder pain was also being the most reported case in planting and transplanting process (83.4%), where upper back pain reported to be the least. Last but not least; shoulder pain was once again being the number in harvesting process, which was up to 65%. The overall result from presented study demonstrate that many factors are associated with total body pain score of MSDs in rice farming, that means rice farmers still influence of MSDs from their work. The results were identified six factors significantly associated with musculoskeletal disorders: female (OR=3.180, 95% CI=1.966-5.143), abnormal BMI group (OR=0.607, 95% CI=0.377-0.977), education below high school (OR=0.535, 95% CI=0.313-0.915), non-smoker group (OR=2.169, 95% CI=1.137-4.141), farming experience 26 to 50 year (OR=2.169, 95% CI=1.350-3.483), have underlying disease (OR=2.013, 95% CI=1.202-3.372).

Awareness of rice farmer needs is growing among providers of occupational health and safety services, simple method of farming management should be investigated, and useful information should also provide. The findings about factors associated with symptoms of MSDs of farmers provide useful information in rice farmers group. Future studies to determine the cause-effect relationship between symptoms of MSDs and those important factors are needed.

The limitations were found in several points of this study. First, the cross-sectional study design could not determine the causal relationship or factors of musculoskeletal disorders. Second, the recall bias of musculoskeletal disorders in each process of farming due to limitation of time rice farmer may answers in currently symptoms. Third, the high prevalence of total body pain score may cause from subjective sign and symptom reported because rice farmers were asked to rate theirs body pain score. It was difficult to exclude pain from others work or hobbies.

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APPENDIX

APPENDIX A

แบบสัมภาษณ์

ปัจจัยเสี่ยงที่มีความสัมพันธ์กับอาการผิดปกติทางระบบกระดูกและกล้ามเนื้อของกลุ่มชาวนา ในตำบลธารละหลอด อำเภอพิมาย จังหวัด นครราชสีมา, ประเทศไทย

เก็บข้อมูลเมื่อวันที่.....

คำชี้แจง แบบสัมภาษณ์มี 3 ตอน

ตอนที่ 1 ข้อมูลทั่วไป

ตอนที่ 2 ข้อมูลเกี่ยวกับกิจกรรมการทำนา

ตอนที่ 3 ข้อมูลเกี่ยวกับสุขภาพและการเจ็บป่วยร่างกาย

ตอนที่ 1 ข้อมูลทั่วไป

1.1 *รหัสผู้มีส่วนร่วมในการทำวิจัย* .....

1.2 อายุ .....

1.3 บ้านเลขที่ .....ต.ธารละหลอด อ.พิมาย จ.นครราชสีมา

1.4 เพศ ☐ ชาย ☐ หญิง (ตั้งครรภ์มาแล้ว.....ครั้ง)

1.5 น้ำหนัก ..... ส่วนสูง. .....

1.6 การสูบบุหรี่ ☐ สูบ ..... ปี ☐ ไม่สูบ

1.7 สถานภาพ ☐ โสด ☐ สมรส ☐ หม้าย ☐ แยกกันอยู่/หย่าร้าง

1.8 ระดับการศึกษา ☐ ไม่ได้รับการศึกษา ☐ ประถมศึกษา ☐ มัธยมศึกษาตอนต้น/ปวช.

☐ มัธยมศึกษาตอนปลาย/ปวส. ☐ ปริญญาตรี ☐ อื่นๆ .....

1.9 รายได้เฉลี่ยต่อเดือน ☐ น้อยกว่า 5,000 บาท ☐ 5,000-10,000

☐ 10,000-15,000 บาท ☐ มากกว่า 15,000 บาท

1.10 ทำนามาแล้ว ..... ปี

1.11ทำนาปีละกี่ครั้ง ..... ครั้ง จำนวน:..... ไร่

1.12 พื้นที่นาเป็นของ ☐ ตนเอง ☐ เช่าผู้อื่น ☐ อื่นๆ .....

1.13 โดยปกติท่านทำนากี่วันในแต่ละสัปดาห์ ..... วัน

1.14 โดยปกติระยะเวลาการทำนาใน 1 วัน ..... ชั่วโมง..... นาที

1.15 โดยปกติทำงานติดต่อกันในแต่ละครั้งนานที่สุด ..... ชั่วโมง ..... นาที

1.16 โดยปกติท่านมีการหยุดพักในแต่ละวันจำนวน.....ครั้ง

1.17 โดยปกติระยะเวลาหยุดพักแต่ละครั้งนานเท่าใด.....

1.18 อาชีพเสริม .....

1.19 ขณะทำนา ท่านใช้อุปกรณ์ป้องกันกล้ามเนื้อหลังที่*สามารถช่วยพยุงกระดูกสันหลังไม่ให้มีการใช้ผิดรูปร่าง ดังรูปด้านนี้หรือไม่*

☐ ใช้

☐ ไม่ใช้

ตอนที่ 2 ข้อมูลเกี่ยวกับกิจกรรมการทำนา

2.1. ขั้นตอนการเตรียมดิน ในช่วงเดือน.....

2.1.1ขั้นตอนการไถ *(เลือกตอบได้เพียงข้อเดียว)*

☐ ไถด้วยตนเอง ☐ ไถโดยใช้เครื่องจักรเดินตาม ☐ ไถด้วยเครื่องจักรแบบนั่ง

2.1.2 ระยะเวลาในการไถนาทั้งหมด .....

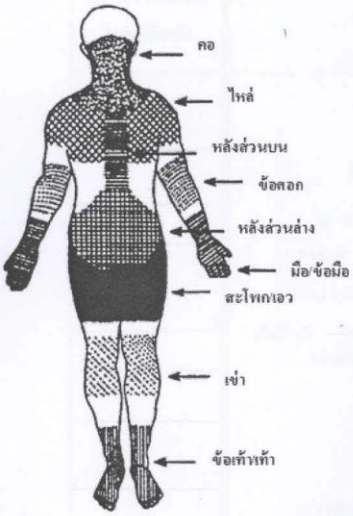
2.1.3 ขณะที่ท่านทำงาน ท่านมีการทำงานอย่างไรบ้าง *(สามารถตอบได้มากกว่า 1 ข้อ)*

☐ ยืนทำงาน ☐ เดินไป มา ☐ บิดเอี้ยวตัว

☐ ยกแขนท่อนล่างขึ้น-ลง ☐ บิดข้อมือ ☐ ยกมือ ชูมือหรือแขนสูงกว่าระดับไหล่นาน

☐ อื่นๆ .....

2.1.4 อาการเจ็บปวดของร่างกายที่เกี่ยวข้องกับขั้นตอนการเตรียมดิน ให้ ✓ ลงในช่องว่าง บริเวณที่รู้สึกเจ็บปวด

ส่วนของร่างกายที่เจ็บปวด	ในช่วงระยะเวลา 12 เดือนที่ผ่านมา
	

2.2. ขั้นตอนการ*ปลูกข้าว* ทำในช่วงเดือน.....

2.2.1 ขั้นตอนการ*หว่านข้าว (เลือกตอบได้เพียงข้อเดียว)*

☐ หว่านด้วยตนเอง ☐ หว่านโดยใช้เครื่องจักร

2.2.2 *ขั้นตอนการดำนา (ซ่อมข้าว/แซมข้าว)*

☐ *ทำด้วยตนเอง* ☐ *จ้างทำ* ☐ *ไม่ได้ทำ*

2.2.3 ระยะเวลาที่ใช้ในการ*หว่านข้าว*.....

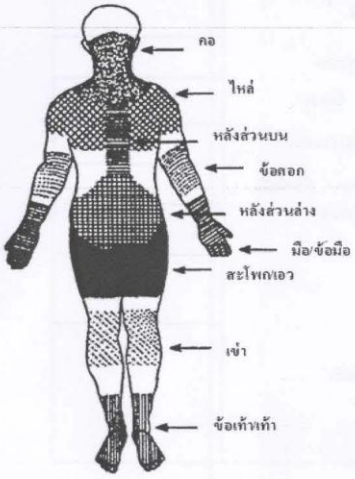
2.2.4 ระยะเวลาที่ใช้ในการ*ดำนา (ซ่อมข้าว/แซมข้าว)*แซมข้าว/ซ่อมข้าว.....

2.2.5 ขณะที่ท่านทำงาน ท่านมีท่าทางการทำงานอย่างไรบ้าง *(สามารถตอบได้มากกว่า 1 ข้อ)*

☐ ยืนทำงาน ☐ บิดเอี้ยวตัว ☐ ก้มหลัง ☐ ยกแขนท่อนล่างขึ้น ลง

☐ ใช้ท่าทางซ้ำๆ ☐ บิดข้อมือ ☐ อื่นๆ ระบุ .....

2.2.6 อาการเจ็บปวดของร่างกายที่เกี่ยวข้องกับขั้นตอนการดำนา ให้ ✓ ลงในช่องว่าง บริเวณที่รู้สึกเจ็บปวด

ส่วนของร่างกายที่เจ็บปวด	ในช่วงระยะเวลา *12 เดือน*ที่ผ่านมา
	

2.3. ขั้นตอนการเก็บเกี่ยว ทำในช่วงเดือน.....

2.3.1 ขั้นตอนการเกี่ยวข้าว *(เลือกตอบได้เพียงข้อเดียว)*

☐ ใช้รถเกี่ยวข้าว*อย่างเดียว* (ข้ามไปตอนที่ 3)

☐ ใช้เคียวเกี่ยวข้าวเองด้วยตนเอง*อย่างเดียว*

☐ *ใช้รถเกี่ยวและเกี่ยวด้วยตนเอง (เก็บข้าวตก)*

2.3.2 ระยะเวลาในการเกี่ยวข้าว.....

2.3.3 น้ำหนักแรกเริ่มของมัดต้นข้าวที่ยกขนย้าย ..... กิโลกรัม

2.3.3 การขนย้ายกระสอบข้าวเปลือก *(เลือกตอบได้เพียงข้อเดียว)*

☐ ขนย้ายเอง ☐ จ้างมาขน

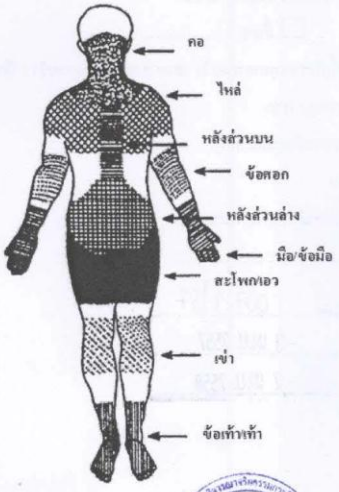
2.3.4 น้ำหนักของกระสอบข้าวที่ยกโดยเฉลี่ย เมื่อทำการขนย้ายเพื่อรอขาย ..... กิโลกรัมต่อกระสอบ

2.3.5 ขณะที่ท่านทำงาน ท่านมีท่าทางการทำงานอย่างไรบ้าง *(สามารถตอบได้มากกว่า 1 ข้อ)*

☐ ยืนทำงาน ☐ บิดเอี้ยวตัว ☐ ก้มหลัง ☐ ยกแขนท่อนล่างขึ้น ลง

☐ ใช้ท่าทางซ้ำๆ ☐ บิดข้อมือ ☐ อื่นๆ ระบุ .....

2.3.6 อาการเจ็บปวดของร่างกายที่เกี่ยวข้องกับขั้นตอนการเก็บเกี่ยว ให้ ✓ ลงในช่องว่าง บริเวณที่รู้สึกเจ็บปวด

ส่วนของร่างกายที่เจ็บปวด	ในช่วงระยะเวลา 12 เดือนที่ผ่านมา
	

ตอนที่ 3 ข้อมูลเกี่ยวกับสุขภาพและความเจ็บปวด

3.1. ท่านมีโรคประจำตัวหรือไม่

☐ ไม่มี ☐ มี(ระบุ)..... ☐ ไม่ทราบ

3.2. ตลอดเวลา 3 เดือนที่ผ่านมาท่านเคยเจ็บป่วยจากการทำนานี้หรือไม่

☐ ไม่เคย ☐ เคย (ระบุ).....

3.3. ความถี่ในการออกกำลังกาย

☐ นานๆครั้ง ☐ 1-3 ครั้งต่อเดือน ☐ 1-2 ครั้งต่อสัปดาห์
☐ 3-6 ครั้งต่อสัปดาห์ ☐ ทุกวัน ☐ อื่นๆ .....

3.4. ประเภทการออกกำลังกาย.....

3.5. ท่านมีความรู้สึกอย่างไรกับอาชีพการทำนา *(เลือกตอบได้เพียงข้อเดียว)*

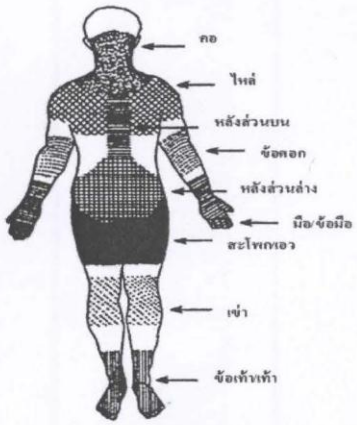
☐ ชอบทำงานนี้ ☐ ซ้ำซากจำเจ น่าเบื่อ
☐ ทำงานนี้ดีกว่าอาชีพอื่น ☐ ทำเพราะไม่มีอาชีพอื่นทำ
☐ หากมีงานอื่นที่ดีกว่าก็จะเปลี่ยนงาน ☐ อื่นๆ .....

3.6. ทราบหรือไม่ว่าอาการปวดหรือเมื่อยกล้ามเนื้อมีสาเหตุมาจากอะไร *(สามารถตอบได้มากกว่า 1 ข้อ)*

☐ ไม่ทราบ ☐ ทราบมีสาเหตุมาจาก
☐ งานที่ทำ ☐ ขนย้ายสิ่งของน้ำหนักมาก
☐ การทำงานบ้าน ☐ งานอดิเรก
☐ การเล่นกีฬา ☐ พื้นที่ / อุปกรณ์ทำนาไม่เหมาะสม
☐ โรคประจำตัว ☐ อื่นๆ .....

เลขที่โครงการวิจัย 007.1/57
วันที่รับรอง - 3 เม.ย. 2557
วันหมดอายุ - 2 เม.ย. 2558

3.7. ส่วนใดของร่างกายที่ท่านมีปวดหรือเมื่อยล้าเป็นประจำ ในช่วงการทำนา (โปรดทำเครื่องหมาย ✓ ในช่องที่ตรงกับระดับที่ท่านรู้สึก)



ส่วนของร่างกาย	ระดับความเจ็บปวด			
	ไม่รู้สึก	รู้สึกเล็กน้อย	รู้สึกปานกลาง	รู้สึกมาก
คอ	0	1	2	3
ไหล่ด้านซ้าย	0	1	2	3
ไหล่ด้านขวา	0	1	2	3
หลังส่วนบน	0	1	2	3
ข้อศอกด้านซ้าย	0	1	2	3
ข้อศอกด้านขวา	0	1	2	3
หลังส่วนล่าง	0	1	2	3
มือ/ข้อมือ ด้านขวา	0	1	2	3
มือ/ข้อมือ ด้านซ้าย	0	1	2	3
สะโพก/เอว	0	1	2	3
เข่า ด้านขวา	0	1	2	3
ข้อเท้า/เท้า ด้านขวา	0	1	2	3

APPENDIX B

AF 02-12

The Ethics Review Committee for Research Involving Human Research Subjects, Health Science Group, Chulalongkorn University
Institute Building 2, 4 Floor, Soi Chulalongkorn 62, Phyat hai Rd., Bangkok 10330, Thailand,
Tel: 0-2218-8147 Fax: 0-2218-8147 E-mail: eccu@chula.ac.th

COA No. 054/2014

Certificate of Approval

Study Title No.007.1/57 : **FACTORS ASSOCIATED WITH SYMPTOM OF MUSCULOSKELETAL DISORDERS AMONG RICE FARMERS: CROSS SECTIONAL STUDY IN TARNLALORD SUB-DISTRICT, PHIMAI DISTRICT, NAKHORN RATCHASIMA PROVINCE, THAILAND**

Principal Investigator : MS. TITAPORN LUANGWILAI

Place of Proposed Study/Institution : College of Public Health Sciences, Chulalongkorn University

The Ethics Review Committee for Research Involving Human Research Subjects, Health Science Group, Chulalongkorn University, Thailand, has approved constituted in accordance with the International Conference on Harmonization – Good Clinical Practice (ICH-GCP) and/or Code of Conduct in Animal Use of NRCT version 2000.

Signature: Prida Tasanapradit Signature: Nuntaree Chaichanawongsaroj

(Associate Professor Prida Tasanapradit, M.D.) Chairman

(Assistant Professor Dr. Nuntaree Chaichanawongsaroj) Secretary

Date of Approval : 3 April 2014 Approval Expire date : 2 April 2015

The approval documents including

1) Research proposal
2) Patient/Participant Information Sheet and Informed Consent Form
3) Researcher
4) Questionnaire

Protocol No. 007.1/57
Date of Approval -3 APR 2014
Approval Expire Date -2 APR 2015

The approved investigator must comply with the following conditions:

1. *The research/project activities must end on the approval expired date of the Ethics Review Committee for Research Involving Human Research Subjects, Health Science Group, Chulalongkorn University (ECCU). In case the research/project is unable to complete within that date, the project extension can be applied one month prior to the ECCU approval expired date.*
2. *Strictly conduct the research/project activities as written in the proposal.*
3. *Using only the documents that bearing the ECCU's seal of approval with the subjects/volunteers (including subject information sheet, consent form, invitation letter for project/research participation (if available).*
4. *Report to the ECCU for any serious adverse events within 5 working days*
5. *Report to the ECCU for any change of the research/project activities prior to conduct the activities.*
6. *Final report (AF 03-12) and abstract is required for a one year (or less) research/project and report within 30 days after the completion of the research/project. For thesis, abstract is required and report within 30 days after the completion of the research/project.*
7. *Annual progress report is needed for a two- year (or more) research/project and submit the progress report before the expire date of certificate. After the completion of the research/project processes as No. 6.*

APPENDIX C

AF 05-07

หนังสือแสดงความยินยอมเข้าร่วมการวิจัย

ทำที่.....

วันที่.....เดือน.....พ.ศ. .....

เลขที่ ประชากรตัวอย่างหรือผู้มีส่วนร่วมในการวิจัย.....

ข้าพเจ้า ซึ่งได้ลงนามท้ายหนังสือนี้ ขอแสดงความยินยอมเข้าร่วมโครงการวิจัย

ชื่อโครงการวิจัย ปัจจัยที่มีความสัมพันธ์กับอาการผิดปกติทางระบบกระดูกและกล้ามเนื้อของกลุ่มชาวนา ในตำบลธารละหลอด อำเภอพิมาย จังหวัดนครราชสีมา, ประเทศไทย

ชื่อผู้วิจัย นางสาวฐิตาภรณ์ เหลืองวิลัย

ที่อยู่ที่ติดต่อ 79 หมู่ 1 ตำบล ท่าวุ้ง อำเภอ ท่าวุ้ง จังหวัด ลพบุรี

โทรศัพท์ 080-5958575

ข้าพเจ้า ได้รับทราบรายละเอียดเกี่ยวกับที่มาและวัตถุประสงค์ในการทำวิจัย รายละเอียดขั้นตอนต่างๆ ที่จะต้องปฏิบัติหรือได้รับการปฏิบัติ ความเสี่ยง/อันตราย และประโยชน์ซึ่งจะเกิดขึ้นจากการวิจัยเรื่องนี้ โดยได้อ่านรายละเอียดในเอกสารชี้แจงผู้เข้าร่วมการวิจัยโดยตลอด และได้รับคำอธิบายจากผู้วิจัย จนเข้าใจเป็นอย่างดีแล้ว

ข้าพเจ้าจึงสมัครใจเข้าร่วมในโครงการวิจัยนี้ ตามที่ระบุไว้ในเอกสารชี้แจงผู้เข้าร่วมการวิจัย โดยข้าพเจ้ายินยอม *ให้สัมภาษณ์แบบสอบถาม 1 ครั้ง จำนวน 1 ฉบับ 30 ข้อ เป็นเวลา 20 นาทีกับผู้วิจัยและสามารถให้ผู้วิจัยเข้ามาสังเกตการณ์ขณะทำนาได้*

ข้าพเจ้ามีสิทธิถอนตัวออกจากการวิจัยเมื่อใดก็ได้ตามความประสงค์ โดยไม่ต้องแจ้งเหตุผล ซึ่งการถอนตัวออกจากการวิจัยนั้น จะไม่มีผลกระทบในทางใดๆ ต่อข้าพเจ้าทั้งสิ้น

ข้าพเจ้าได้รับคำรับรองว่า ผู้วิจัยจะปฏิบัติต่อข้าพเจ้าตามข้อมูลที่ระบุไว้ในเอกสารชี้แจงผู้เข้าร่วมการวิจัย และข้อมูลใดๆ ที่เกี่ยวข้องกับข้าพเจ้า ผู้วิจัยจะเก็บรักษาเป็นความลับและ*แบบสัมภาษณ์ถูกทำลายเมื่อเสร็จสิ้นการวิจัย* โดยจะนำเสนอข้อมูลการวิจัยเป็นภาพรวมเท่านั้น ไม่มีข้อมูลใดในการรายงานที่จะนำไปสู่การระบุตัวข้าพเจ้า

หากข้าพเจ้าไม่ได้รับการปฏิบัติตรงตามที่ได้ระบุไว้ในเอกสารชี้แจงผู้เข้าร่วมการวิจัย ข้าพเจ้าสามารถร้องเรียนได้ที่คณะกรรมการพิจารณาจริยธรรมการวิจัยในคน กลุ่มสหสถาบัน ชุดที่ 1 จุฬาลงกรณ์มหาวิทยาลัย ชั้น 4 อาคารสถาบัน 2 ซอยจุฬาลงกรณ์ 62 ถนนพญาไท เขตปทุมวัน กรุงเทพฯ 10330 โทรศัพท์ 0-2218-8147, 0-2218-8141 โทรสาร 0-2218-8147 **E-mail: eccu@chula.ac.th**

ข้าพเจ้าได้ลงลายมือชื่อไว้เป็นสำคัญต่อหน้าพยาน ทั้งนี้ข้าพเจ้าได้รับสำเนาเอกสารชี้แจงผู้เข้าร่วมการวิจัย และสำเนาหนังสือแสดงความยินยอมไว้แล้ว

ลงชื่อ.....

(.....)

ผู้วิจัยหลัก

ลงชื่อ.....

(.....)

ผู้มีส่วนร่วมในการวิจัย

เลขที่โครงการวิจัย 007.1/57

วันที่รับรอง - 3 มิ.ย. 2557

วันหมดอายุ - 2 มิ.ย. 2558

ลงชื่อ.....

(.....)

พยาน

1/1

VITA

Name: Miss Titaporn Luangwilai

Date of Birth: 4th August 1989

Place of Birth: Lopburi, Thailand

Educations:

June,2013 - Present M.P.H, College of Public Health Sciences, Chulalongkorn University

June,2008 - April 2012 B.S., Faculty of Public Health, Burapha University

Contact information: 79 m.1 T.Thawung A.Thawung Lopburi 20140

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E-mail: beerluangwilai@gmail.com