

FACTORS RELATED TO NECK AND SHOULDER PAIN AMONG THE ROYAL THAI AIR  
FORCE PILOTS BANGKOK THAILAND



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จุฬาลงกรณ์มหาวิทยาลัย

CHULALONGKORN UNIVERSITY

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บทคัดย่อและแฟ้มข้อมูลฉบับเต็มของวิทยานิพนธ์ตั้งแต่ปีการศึกษา 2554 ที่ให้บริการในคลังปัญญาจุฬาฯ (CUIR)  
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ปัจจัยที่เกี่ยวข้องกับการปวดคอและปวดไหล่ในนักบินกองทัพอากาศไทย กรุงเทพมหานคร  
ประเทศไทย



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วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาวิทยาศาสตรมหาบัณฑิต

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By	Miss Jidapa Polruk
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จิตาภา พลรักษ์ : ปัจจัยที่เกี่ยวข้องกับการปวดคอและปวดไหล่ในนักบินกองทัพอากาศไทย กรุงเทพมหานคร ประเทศไทย. (FACTORS RELATED TO NECK AND SHOULDER PAIN AMONG THE ROYAL THAI AIR FORCE PILOTS BANGKOK THAILAND) อ.ที่ปรึกษา วิทยานิพนธ์หลัก: อ. ดร.ณัฐรา ฐานีพานิชสกุล, 107 หน้า.

เพื่อศึกษาปัจจัยที่เกี่ยวข้องกับการปวดคอและปวดไหล่ในนักบินกองทัพอากาศไทย, ความชุกของการปวดคอและปวดไหล่, อธิบายลักษณะส่วนบุคคลและลักษณะงานที่เกี่ยวข้องกับการปวดคอและปวดไหล่ รวมทั้งต้องการหาความสัมพันธ์ระหว่างลักษณะส่วนบุคคล ลักษณะงานและความผิดปกติของกล้ามเนื้อ(คอและไหล่)

การศึกษาครั้งนี้เป็นแบบภาคตัดขวาง, จำนวนนักบินทั้ง 126 คน ที่เข้าร่วมวิจัย. โดยใช้แบบสอบถามในการเก็บข้อมูล ซึ่งประกอบด้วยลักษณะส่วนบุคคล รวมทั้งแบบสอบถามความเครียด (DASS-21), ลักษณะงาน, ลักษณะท่าทาง และแบบสอบถามมาตรฐานเกี่ยวกับการประเมินความผิดปกติทางระบบกระดูกและกล้ามเนื้อ(NMQ) ใช้ข้อมูลทางสถิติในการวิเคราะห์ เพื่อหาความสัมพันธ์ระหว่างลักษณะส่วนบุคคล, ลักษณะงานและความผิดปกติของกล้ามเนื้อ(คอและไหล่)

ปวดคอพบมากที่สุดในการศึกษาครั้งนี้ ความชุกของ คอและไหล่ ใน 12 เดือนที่ผ่านมา คิดเป็น 62.7 % และ 56.3 % ตามลำดับ ความชุกของ อาการปวดคอ ใน 7 วันที่ผ่านมา คิดเป็น 10.3 % และ ความชุกของการ ปวดไหล่ ใน 7 วันที่ผ่านมา คิดเป็น 10.3 % ของการศึกษาครั้งนี้ ลักษณะส่วนบุคคลมีเพียง การดื่มแอลกอฮอล์ มากกว่าหนึ่งครั้ง ต่อสัปดาห์ ที่มีความเกี่ยวข้องกับการปวดคอและ ปวดไหล่ ใน นักบินกองทัพอากาศไทย กรุงเทพมหานคร ประเทศไทย

ลักษณะส่วนบุคคลมีเพียง การดื่มแอลกอฮอล์ มากกว่าหนึ่งครั้ง ต่อสัปดาห์ ที่มีความเกี่ยวข้องกับการปวดคอและ ปวดไหล่ ใน นักบินกองทัพอากาศไทย กรุงเทพมหานคร ประเทศไทย. ดังนั้นจึงควรมีการปรับเปลี่ยนพฤติกรรมกรรมการดื่มแอลกอฮอล์ และการออกกำลังกาย เพื่อเพิ่มประสิทธิภาพการทำงาน และสุขภาพของคุณ

คำหลัก ปวดคอ,ปวดไหล่ ,ลักษณะส่วนบุคคล , ลักษณะงาน,นักบิน

จุฬาลงกรณ์มหาวิทยาลัย  
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สาขาวิชา สาธารณสุขศาสตร์

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ลายมือชื่อนิสิต .....

ลายมือชื่อ อ.ที่ปรึกษาวิทยานิพนธ์หลัก .....

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KEYWORDS: NECK PAIN / SHOULDER PAIN / PERSONAL CHARACTERISTICS / JOB CHARACTERISTIC / PILOT

JIDAPA POLRUK: FACTORS RELATED TO NECK AND SHOULDER PAIN AMONG THE ROYAL THAI AIR FORCE PILOTS BANGKOK THAILAND. ADVISOR: NUTTA TANEAPANICHSKUL, Ph.D., 107 pp.

The purpose of this study was to finding factors related to neck and shoulder pain among The Royal Thai Air Force pilots Bangkok Thailand, prevalence of neck and shoulder pain, describe the personal characteristic, job characteristic and musculoskeletal disorder(neck and shoulder pain). To find the association personal characteristic, job characteristic with musculoskeletal disorder(neck and shoulder pain) .

The study design was cross-sectional, and 126 pilots were recruited. The study design including a structure questionnaire to assess personal characteristic and used Depression Anxiety Stress Scale-21(DASS-21)(only part of stress), job characteristic, Posture flexibility and the Nordic Musculoskeletal Questionnaire (only part of neck and shoulder). Using the Statistical Package for the Social Science, version 17.0 for analyzed were used to look for the relationship between personal characteristic, job characteristic with musculoskeletal disorder(neck and shoulder pain).

Neck pain is most common in this study. The prevalence of neck and shoulder in the past 12 months were 62.7% and 56.3% respectively. The prevalence of neck pain in the past 7 days was 10.3% and prevalence of shoulder pain in the past 7 days was 10.3% of this study.

Among the personal characteristic had only often drinking alcohol more than one time per week associated with neck and shoulder pain among the Royal Thai Air Force pilots Bangkok Thailand.

The personal characteristic had only often drinking alcohol more than one time per week associated to neck and shoulder pain among the Royal Thai Air Force pilots Bangkok Thailand. So it should be adjusted behavior, drinking alcohol and exercise to enhance performance your work and your health

Keywords neck pain, shoulder pain, personal characteristic, job characteristic, pilot

Field of Study: Public Health

Student's Signature .....

Academic Year: 2013

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## CHAPTER I

### INTRODUCTION

#### 1.1 Background and rationale

The growing field of occupational health worldwide is slowly peeling back the layers into many chronic health conditions amongst the working population, revealing that many formerly uncategorized chronic complaints are indeed due to our working conditions and type of work. Though seemingly trivial in some cases in terms of mortality, the morbidity created by these conditions are far greater than imaginable, costing both employers and employees millions of dollars each year in loss of productivity, medical leave and other costs as well as providing the individual sufferer with a condition that worsens over years, deteriorating slowly. In 2006 in the US alone the cost of occupational disease and injuries were comprehensively estimated to be between USD128 billion and \$155 billion per year (Schulte, 2005).

Musculoskeletal pain is a major problem in the general population. A report found that lower back pain is the first problem (%33.5), followed by knee (%19.5) and shoulder pain(%14)(Saetan, Khiewyoo, Jones, & Ayuwat, 2007). Neck and shoulder pain are common problem especially in worker today and necessary to receive health care (Guez, Hildingsson, Nilsson, & Toolanen, 2002). It affects physical, mental well-being and quality of life, including the cost of medical care (Ostergren et al., 2005).

From epidemiological studies have found that the prevalence of neck pain within one year in the Scandinavian countries is higher than most European countries and in Asian countries (Fejer, Kyvik, & Hartvigsen, 2006). A UK study found that the prevalence of neck pain among English population found that the reported neck pain

in the past 12 months were 11% and reported in the past 7 days 20% (KT Palmer et al., 2001). In Asian countries, a Hong Kong study found that neck pain in workers was 46.7%(Chiu et al., 2002). In Thailand, the prevalence of neck pain in the past 7 days was 23.6% and in the past 12 months was 20.9% of worker in sewing clothes at Banphai district, KhonKaen (Thotsathit, Puntumetakul, Eungpinichpong, & Peungsuwan, 2009). Neck and shoulder pain are the main problem associated with the work, especially working in a sitting position(Andersen et al., 2003)and doing repetitive work (Smedley et al., 2003).

Neck and shoulder pain is a problem among pilots flying high-performance aircraft. From previous studies found that the 1 year prevalence of neck pain in F-16 pilots in U.S. was 85.4% and increase of neck pain was 6.9% every 100 hours for this work(Albano & Stanford, 1998). The report, neck pain have a prevalence in F-16 pilots fluctuates among 50.6% (Vanderbeek, 1988). This number more than in general populations, is most likely attributable to the very dynamic environment which expose the pilot's cervical spine to high demands (Albano & Stanford, 1998). In 2008(De Loose et al., 2008) found that the prevalence the 1 year of neck pain was 18.9% in the Belgian Air Force and The Royal Netherlands Air Force. And 40 % from the reported that their pain significantly interfered with their ability to carry out the assigned mission(Albano & Stanford, 1998). The researcher intended to assess this issue of neck and shoulder pain in transport aircraft in Thailand because of found that prevalence of neck and shoulder pain is the second problem, next to a lower back pain from medical record in Aviation Medicine.

However, pilot in Air Force are involve in activites as part of flying such as briefing, mission planning, debriefing and administration. Most of these activities are important of fly assignment and requires sitting posture in long time periods.

There are a variety of causes for neck and shoulder pain. The most common cause of mechanical neck and shoulder pain is due to kinetic degeneration. Therefore each occupational has different ergonomic issues. It may be the cause of neck and shoulder pain.

In Thailand, few studies have been conducted on prevalence and factors associated between neck and shoulder pain among pilot. Pilots may be affected by neck and shoulder pain because of sitting position when controlling the airplane for a long time in the flight (Federal Aviation Administration(FAA), 2013). According to high cost involved in training a pilot in the Air Force (approximately 5 million per person) there is a need to look at ergonomic issue experienced by the Pilots. Every year 20 persons are trained as pilots for Royal Thai Air Force for transportation service. As an important area for study, the main objective of this study is to identify factors and prevalence associated between neck and shoulder pain among the Royal Thai Air Force pilots. The exploratory study will look at pain in the past 12 months and look at the past 7 days.

The expected outcome and the benefit from the study will be decide on ways prevent the causes of neck and shoulder pain among the Royal Thai Air Force pilots. It is also expected that pilots will have knowledge to take care of themselves. This will also reduce the cost of treating neck and shoulder pain.

## 1.2 Research Objective

### 1.2.1 General objective:

To identify the factors related to neck and shoulder pain among air force pilot in The Royal Thai Air Force Squadron 6.

### 1.2.2 Specific Objectives:

1). To find the prevalence of neck and shoulder pain among air force pilots in The Royal Thai Air Force Squadron 6.

2). To explain personal characteristics and job characteristics related to neck and shoulder pain in The Royal Thai Air Force Squadron 6.

3). To find the association between personal characteristic, job characteristic and musculoskeletal disorder (neck and shoulder) among air force pilot in The Royal Thai Air Force Squadron 6.

## 1.3 Research questions:

1.3.1 How prevalence is neck and shoulder pain among air force pilot in The Royal Thai Air Force Squadron 6?

1.3.2 Are the personal characteristic associated with neck and shoulder pain?

1.3.3 Are the job characteristics associated with the neck and shoulder pain?

#### **1.4 Hypothesis:**

1.4.1 The personal characteristic of air force pilot in The Royal Thai Air Force Squadron 6 associated with their neck and shoulder pain.

1.4.2 The air force pilot's job characteristic associated with neck and shoulder pain among air force pilot in The Royal Thai Air Force Squadron 6.

#### **1.5 Scope of study:**

This study will be conducted among male air force pilot in The Royal Thai Air Force Squadron 6 in Bangkok, Thailand. The period of data collection will be from March 2014 to April 2014.

#### **1.6 Conceptual Framework**

This study is a cross-sectional research design to determine the prevalence and factors related neck and shoulder pain among air force pilot. The conceptual framework of this study is shown in Figure 1.



## Conceptual Framework

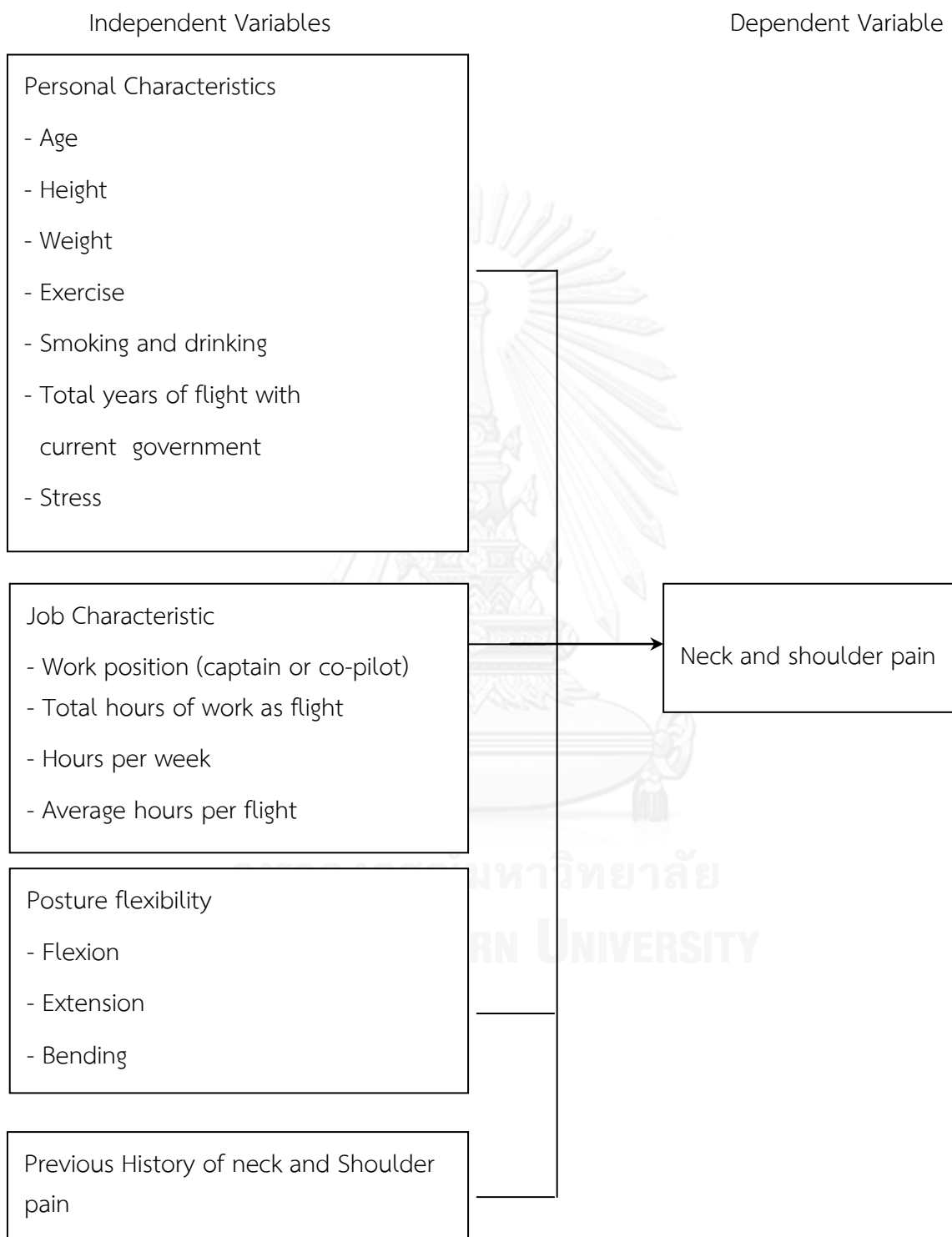


Figure 1the conceptual framework

## 1.7 Operational Definitions

**Personal Characteristics** refer to individual characteristics or the private aspect of a person's life including age, height and weight etc.

**Exercise** refer to activities outside the working hours like jogging for playing any kind of sport or gym.

**Smoking** refer to is the inhalation of the smoke of burning tobacco encase cigarette, cigar and pipe of Air Force pilot.

**Drinking** refer to swallow the liquid content of alcohol of Air Force pilot.

**Total years of flight** refer to the total year of flight since flight training school the currently.

**Stress** refer to a state of emotion strain or tension or mental resulting from adverse or from your work of Air Force pilot.

**Job Characteristic** refer to the job characteristic of the respondent has been working at-least one year for operates the flying controls of aircraft in The Royal Thai Air Force.

**Work position** refer to the work position of Air Force pilot, which has been working at-least one year.

**Pilot** refer to a person who operates the flying controls of an aircraft including captain and the co-pilot.

**Air Force** refer to (Military) a branch of a nation's army service mainly responsible of air fighting.

**Captain** refer to the main pilot who responsible for the flight safety and operate an aircraft during the flight.

**Co-pilot** refer to a second pilot whose job is to share the responsibility for operation and safety an aircraft with the main pilot.

**Total hours of work as flight** refer to the total flight hours since flight training school the currently.

**Hours per week** refer to the total flight hours per week of working an aircraft start from take off an aircraft until landing an aircraft.

**Average hours per flight** refer to the average number of flying hours per flight of Air Force pilot.

**Posture flexibility** refer to a position of Air Force pilot body when flexion and extension of neck and shoulder.

**Flexion** refer to flexion of neck and shoulder in nature of life in every day.

**Extension** refer to extension of neck and shoulder in nature of life in every day.

**Bending** refer to bending of neck in nature of life in every day.

**Previous History of neck and Shoulder pain** refer to the reviewed article of the old studies have involved to neck and shoulder pain.

**Neck pain** refer to the sensory a uneasiness in muscle area of neck, neck pain show result disorders a some structures in the neck.

**Shoulder pain** refer to shoulder pain is included some pain that increase or around shoulder.

## CHAPTER II

### LITERATURE REVIEW

This literature review section aims to explore and find relevant details from previously published peer-reviewed studies to address the workings of this proposed study. Among subjects that will be explored are the working definitions and diagnosis of occupational neck and shoulder pain as well as the relationship between various independent factors and occupational neck and shoulder pain amongst the study population. Exploration also will be done on the best determined methods to best capture these variables and various research tools that can be utilized as well as comparative sampling methodology and expected results.

#### 2.1 Prevalence of work related to neck and shoulder pain

##### 2.1.1 Prevalence of neck and shoulder pain in pilot

From literature (Albano & Stanford, 1998) found that a relative high neck pain rate was also observed among fighter pilot and showed prevalence of neck pain was 57% and shoulder pain was 35%. It was compared with 1/3 of general population on the average report of neck pain in course of 1 year (Fejer et al., 2006) have prevalence was 36% and unexpected in Scandinavian countries reported have neck pain more than other countries in European and Asian.

The repetition posture of aircraft mean pilot hold control wheel for flying flight a long time and same position every time and every flight. From previous study found the positive significant between neck pain and sitting position more than 95% of working time from prospective cohort study (Ariens et al., 2001). This is characterized as more dynamic and vary and include only occasional caretaking

work, sitting tasks, assembling of heavy and bigger equipment or surveillance of machinery.

## 2.2 Pain

The International Association for the Study of Pain (IASP) was definition of pain is as follow: “An unpleasant sensory and emotion experience associated with actual or potential tissue damage, or described in terms of such damage”.(Pain, 2012) Moreover, pain is unable to be transferred vocally, It depend on individual person’s previous experience and suitable to relief treatment. Pain is a subjective phenomenon(Pain, 2012).

## 2.3 Anatomy of Neck and Shoulder

### 2.3.1 Neck

Neck is part of the body, separate the head from a torso. The neck consist of cervical vertebrae 7 pieces( cervical vertebrae C1 to C7) starting from upper torso until base of skull (Panchbhavi, 2013).

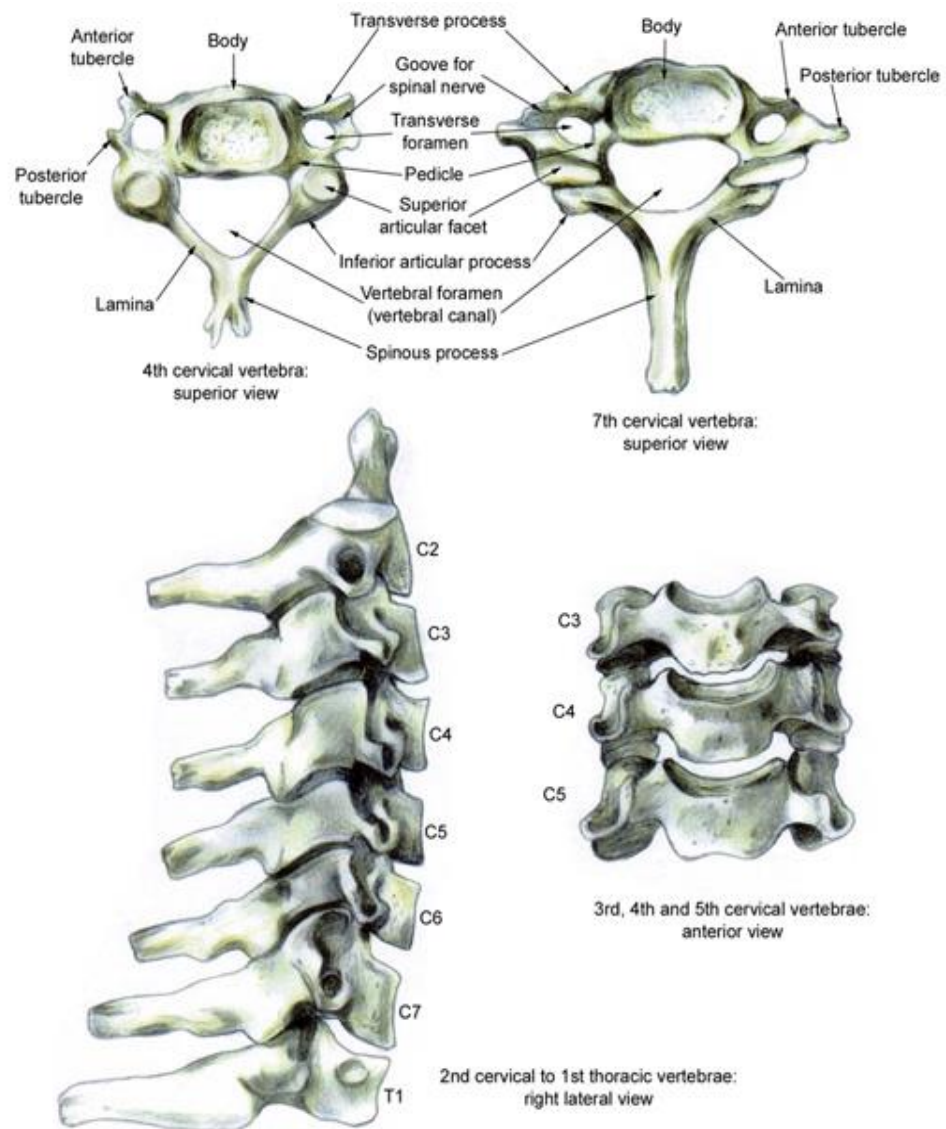


Figure 2: Anatomy of cervical (Windsor, 2013)

The muscle of around the neck can call be grouped depend on location such as anterior cervical muscles and lateral vertebrae muscles. The muscle of the neck there are three type (Panchbhavi, 2013).

1) Superficial muscle consist of sternocleidomastoid and trapezius (Panchbhavi, 2013).

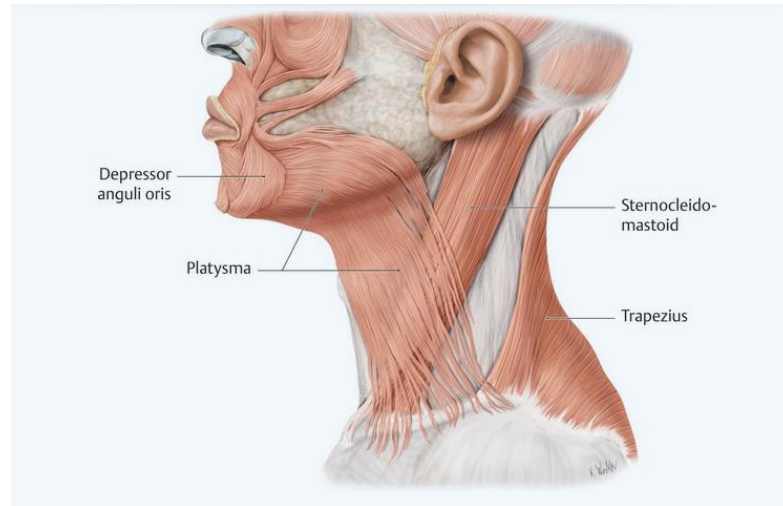


Figure 3 Left lateral view (Gilroy, Macpherson, & Ross, 2012)

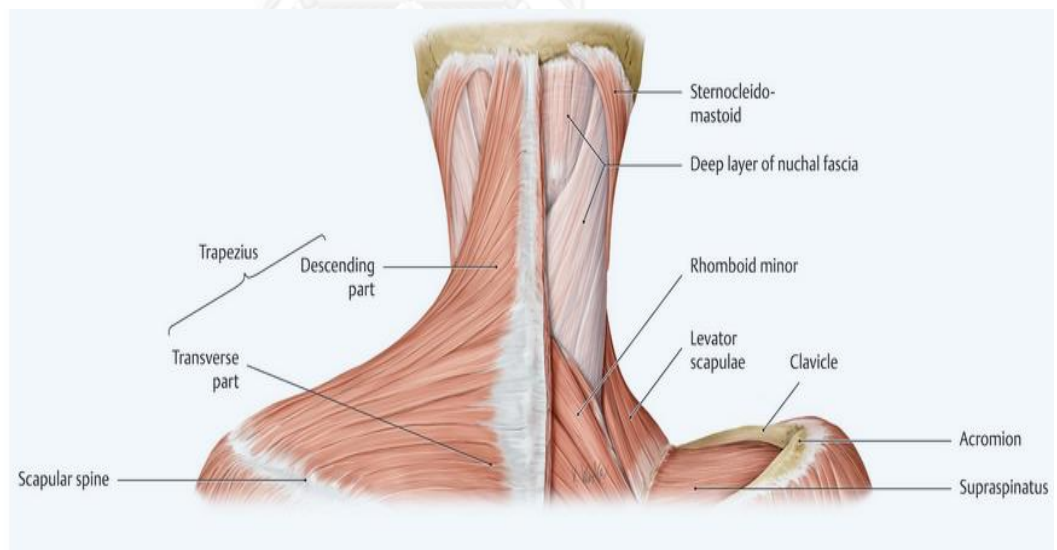


Figure 4 Posterior view (Gilroy et al., 2012)

2) Anterior cervical muscles consist of infrahyoid and suprahyoid muscles and anterior vertebral muscles stay in the front of neck (Panchbhavi, 2013).

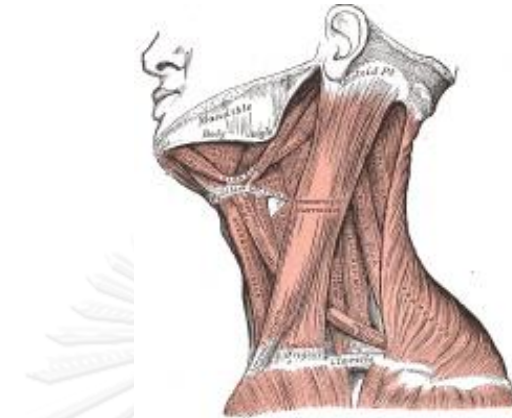


Figure 5: Anterior cervical muscles (Panchbhavi, 2013)

3) Suprahyoid muscle is important actions for swallowing when the food pass from the mouth through pharynx (Panchbhavi, 2013).

### 2.3.2 Shoulder

The shoulder consist of three bones: humerus(the upper arm bone), scapula(the shoulder blade) and clavicle(the collar bone)(Surgery, 2010).

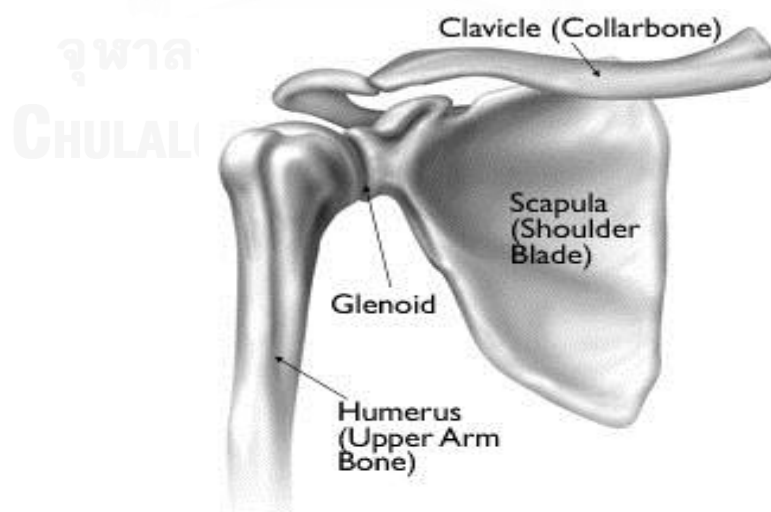


Figure 6 Anatomy of Shoulder (J, 2003)



The muscle of the shoulder can be separated into 3 important groups

1) Superficial muscles (Extrinsic) consist of front (anterior), back (posterior) and side (lateral) muscles of the shoulder (Funk, 2014).

Front anterior muscle of shoulder consist of pectoralis major

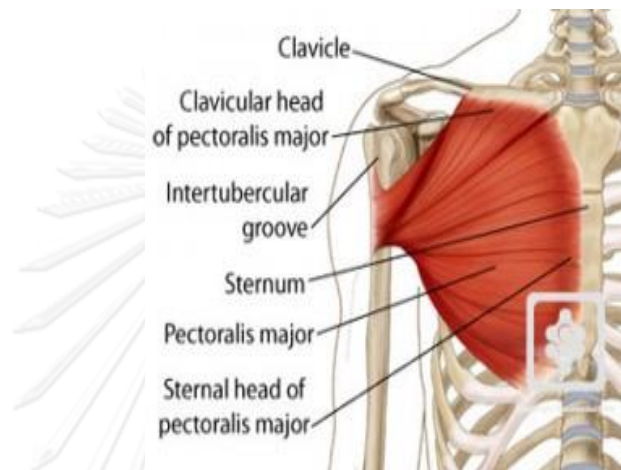


Figure 7: Front (anterior) in superficial muscle of shoulder (Funk, 2014).

Back or posterior muscle of shoulder consist of trapezius and latissimus dorsi muscle.

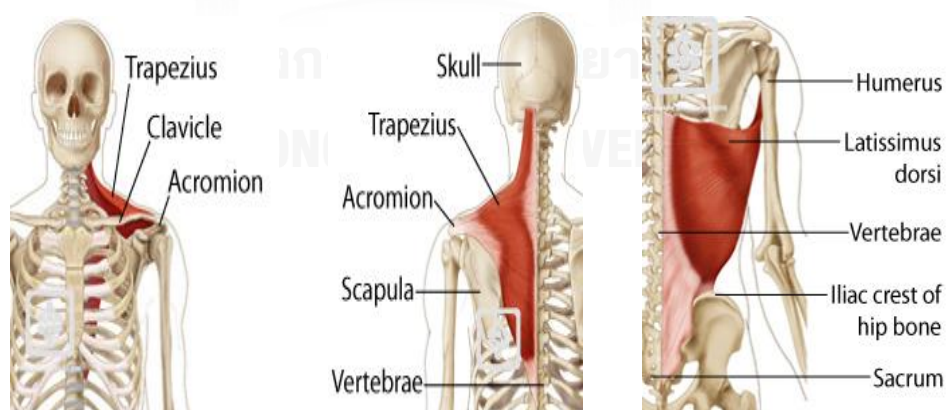


Figure 8: Back (posterior) in superficial muscle of shoulder (Funk, 2014).

Side or lateral muscle of shoulder consist of deltoid muscle. There is strong muscle and large of the shoulder.

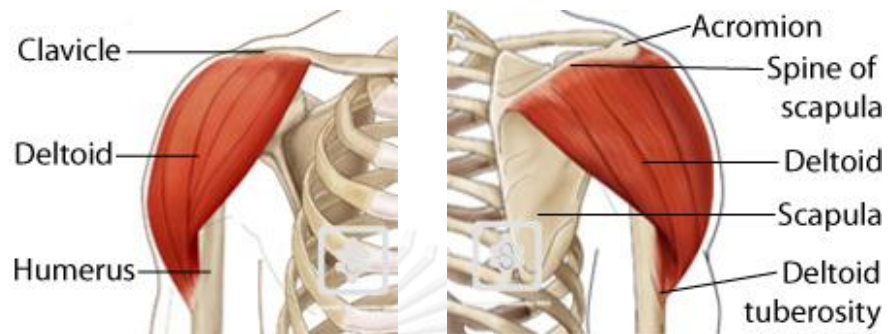


Figure 9: Side (lateral) in superficial muscle of shoulder

(Funk, 2014).

2) Deep muscles (Intrinsic) consist of front (anterior), back (posterior) and side (lateral) muscles of the should (Funk, 2014).

Front or anterior muscle of shoulder consist of 3 types such as pectoralis minor muscles and subclavius muscles.



Figure 10 : Front or anterior in deep muscle of shoulder

(Funk, 2014).

Back or posterior muscle of shoulder consist of 4 types such as the levator scapulae, teres major, rhomboid major and minor muscles.

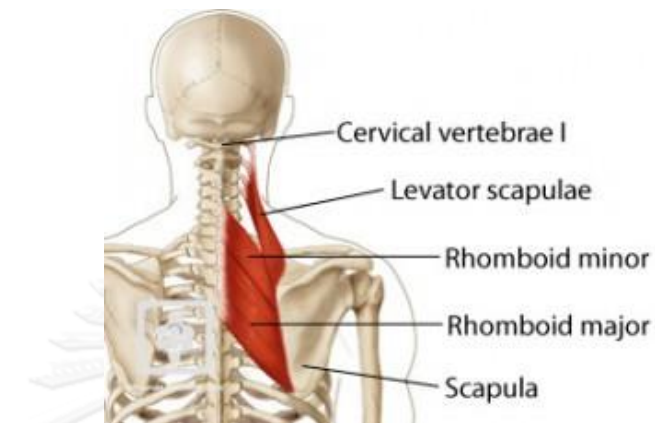


Figure 11 : Back or posterior in deep muscle of shoulder  
(Funk, 2014).

Side or lateral muscle of shoulder consist of serratus anterior muscle. These muscle pull the scapula forward to the thoracic wall and control for flexion and abduction of the arm.

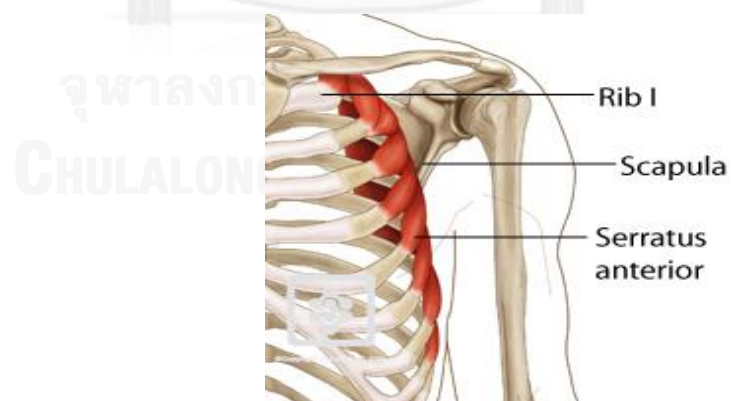


Figure 12 : Side or lateral in deep muscle of shoulder (Funk, 2014).

3) Muscles of the shoulder and arm consist of 3 types, biceps brachii muscle, coracobrachialis muscle and triceps brachii muscle. These muscles are important for the humerus bone because of the primary flexor and extensor of the forearm (Funk, 2014).

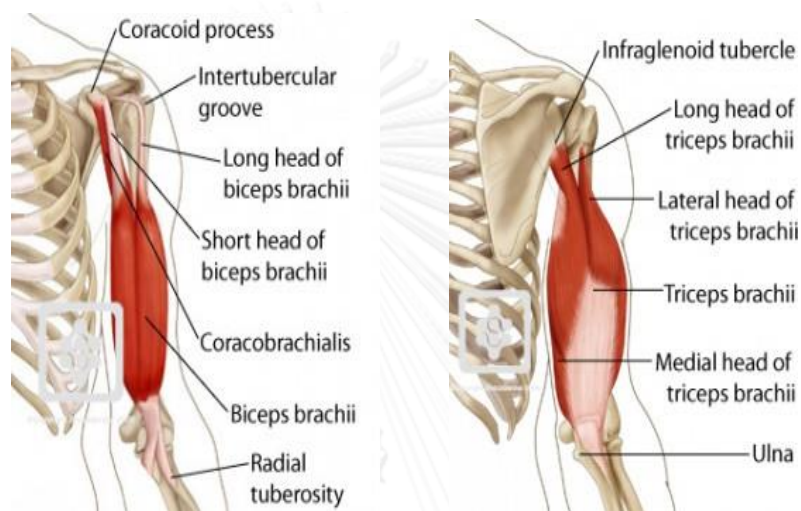


Figure 13 : Muscles of the shoulder and arm (Funk, 2014).

## 2.4 Neck and Shoulder pain : cause and effect

### 2.4.1 Neck Pain

Neck is composed of vertebrae starting from upper torso until base of skull. The bony vertebrae along with the muscle and the ligaments provide a stability to spine. Around the neck, the spine has muscle to support for movement. Moreover, the neck has supports weight of the head and also to protect a head movement. Because of its less support from the spine, neck is easy to disorder and get an injury((AAOS), 2010).

When you have neck pain, muscle around the neck are often painful when you touch. It is irritable connective tissue in your neck that may cause pain can spread large area are call “ trigger points”(AAOS), 2010).

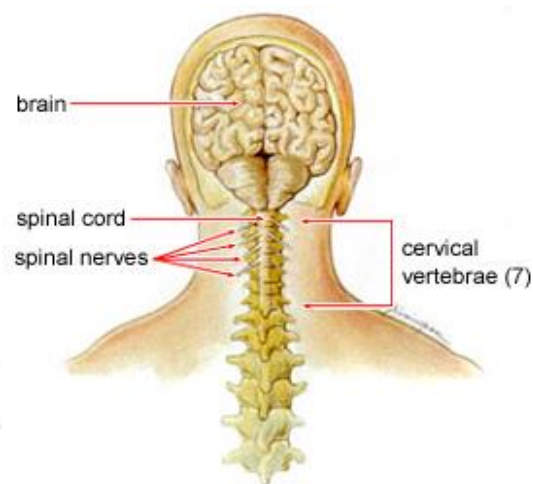


Figure 14 : Anatomy in the neck ((AAOS) (2010))

#### Cause

The most common causes of neck pain is due to effects on soft tissue because of prolonged wear and tear. Rare case have tumors and infection and those may be cause of neck pain. Some people have neck pain from shoulder, arm or upper back((AAOS), 2010).

#### Inflammatory Disease

Rheumatoid arthritis is destruction of the joint at neck and causes a stiffness and pain. Normally rheumatoid occurs at upper neck area ((AAOS), 2010).

#### Cervical Disk Degeneration (Spondylosis)

Disk acts as a shock absorber between bone in neck. The disc degeneration is seen in people average 40 years old. The most of cervical spondylosis is found

between C3-C7 vertebrae as seen in X-ray (Wajanawisit, Laohachareonsombat, Kawinwongkowitz, & Moonpruk, 1994).

### **Injury**

Neck is flexible and supports the head. When meeting with accidents there is hyperextension or hyperflexion and neck is bent backward more than its usual limit and is the most common cause for neck injury. When the neck is fractured, usually the effect to spinal cord is cause paralysis((AAOS), 2010).

### **Other Causes**

Other causes are infection, tumor or congenital abnormalities at vertebrae ((AAOS), 2010).

### **Symptoms**

Pain from the neck may cause a headache or shoot down an arm. The neck may be stiff, tendon or both are painful and may be worsened a movement.

### **Effect of neck pain**

If severe your neck pain occurs from a diving accident, motor vehicle accident and or fall should see doctor immediately. However should be awareness and avoid the risk of further injury it possible paralysis ((AAOS), 2010).

## **2.4.2 Shoulder Pain**

Shoulder consists of tendons, joints and muscle which provides a rang of movements of the arm. The cause of shoulder pain may be from scratching the back to throwing a perfect pitch which will increase a problem with impingement and instability of soft tissue in your shoulder (Surgery, 2010)

## *Cause*

The shoulder problem have 4 main groups:

### **1) Arthritis**

There are many causes of arthritis and common type of arthritis in shoulder is osteoarthritis. The symptom such as stiffness, swelling and pain can be found in middle age. This sometime lead to limit motion because of pain (J, 2003).

### **2) Instability**

Shoulder instability happen when head of upper arm bone force out of shoulder. It occurs due sudden injury and overuse( (Phukranchanamorakot, Wajanawisit, Laohachareonsombat, Kawinwongkowitz, & Moonpruk, 1994).

### **3) fracture**

The shoulder fracture (broken bone) involve the humerus, clavicle and scapula. The fracture shoulder are found in older patients higher than young patients, shoulder fractures are common in contact sport injury or motor vehicle accidents (Surgery, 2010).

### **4) Tear tendon**

Tearing and splitting of tendon may effect degenerative or injury. Tear may completely or partially split tendons. In worst case a complete tear will pull a tendon from the bone (Surgery, 2010).

The shoulder impingement happen at top of shoulder blade when pressure is applied to soft tissue while arm is lifted away from body. This can cause to tendinitis and bursitis causing limited motion and pain (Surgery, 2010).

The less shoulder problem found from tumors and infection.

### Symptom

The most common symptom of shoulder pain is a shoulder injury. There are symptom stiffness and limit of movement. Sometimes a shoulder injury lead to tingling down arm and numbness.

#### 2.4.3 Diagnosis neck and shoulder pain

**X-rays** : Plain X-ray can reveal narrowing of the spinal canal, tumors, fractures, narrowing of the space between two spinal bones and instability of the spinal column (Ratini, 2013).

**Bone scan** indicate the multiple lesion that form in bone such as metastasis, occult trauma and infection (Tungkaserane, Tadtanon, Chodtanaphod, & Kukiattinan, 2003).

**Magnetic resonance imaging( MRI )** is the popular investigation used to diagnose spine problems because of give more detail of spine (Tungkaserane et al., 2003).

**CT scanning** : indicates more detail of tissue damage in the bone of neck such as fracture of neck and suspected herniated disc (Tungkaserane et al., 2003).

**Electrodiagnostic studies** : Electromyography (EMG), nerve conduction velocity (NCV) are sometime used to diagnosis arm pain, neck/shoulder pain, tingling and numbness (Ratini, 2013).



## 2.5 Therapies to reduce neck and shoulder pain

### 2.5.1 Treatments for neck pain

Treatment for neck pain include physical therapy, stretch and spray therapy, trigger point injection and compression (Phillips, 2012)

**1) Physical therapy** is primary goal to restore balance among muscles working at a functional unit. The physical therapist such as massage may progress toward that goal can reduced and relief pain of the neck (Phillips, 2012).

(Sherman, Cherkin, Hawkes, Miglioretti, & Deyo, 2009)the result showed that massage may provide a short-term relief and reduce for chronic pain. (Ma et al., 2011)the authors concluded that patient who underwent biofeedback a training trapezius muscles showed reduced pain of the neck greater and better than patient who underwent passive treatment modalities or exercise therapy.

**2) Trigger Point Injection** used for severe pain. The most accepted of treatment more than exercise and physical therapy. Medicine used for trigger point injection is local anesthetic (S. H. Lee, Chen, Lee, Lin, & Chan, 2008).

**3) Medication** classify of 4 types for treatment of neck pain (Douglas et al., 2012).

3.1) Nonsteroidal Anti- Inflammatory Drugs (NSAIDs) are the drugs of choice for an initial treatment of neck pain such as ibuprofen, naproxen, diclofenac and ketoprofen (Phillips, 2012).

3.2) Tricyclic Antidepressants are common used for chronic pain and can help to reduce pain of dysesthesia and treat insomnia such as amitriptyline (Phillips, 2012).

3.3) Skeletal Muscle Relaxants are common used to treat a muscle pain, but carefully to used because of potential of some of the addictive medication and sedation such as cyclobenzaprine, carisoprodol and tizanidine (Phillips, 2012).

3.4) Tramadol is medication for analgesic. Its effect is shared with a tricyclic antidepressants (Phillips, 2012).

### 2.5.2 Treatments for shoulder pain

Type of treatment of the shoulder pain will depend on cause, underlying and symptoms. The main treatment for a shoulder pain including avoid the activity that make your symptom worse, using ice and hot packs, physiotherapy, steroid injection and surgery (Service(NHS), 2012).

*Avoid the activity that make your symptom worse* depend on causing of shoulder pain. Should be change activities such as rest and avoid overdoing activities and overexertion. However should be physiotherapy to help and improve the shoulder flexibility and strength (J, 2003).

*Using ice and hot packs* when you have injury shoulder from sport because of ice pack can reduce pain and inflammation but can apply on 10 -30 minutes after injury. Hot pack used after the initial acute phase passed (Service(NHS), 2012).

*Physiotherapy* can help improve shoulder flexibility and strength to relieve pain related most shoulder problem. Physiotherapy have many therapies such as ultrasound therapy, massage, transcutaneous electrical nerve stimulation and laser therapy (Murphy & Carr, 2013).

**Steroid injection** depend on cause of shoulder problem, the most medication steroid injection most common used corticosteroid. The corticosteroid may be give relieve pain the short term and reduce inflammation, you can movement your shoulder more comfortable therapy(Murphy & Carr, 2013).

**Surgery** may be the last of treatment of shoulder pain such as some rotator cuff tear and shoulder dislocations. However 90 percent of patients will respond to common treatment of shoulder pain such as rest, physiotherapy and medication (J, 2003).

## 2.6 Risk factors

Many factors may contribute to disorders of the neck and shoulder. Work can be the important risk factor to pilots at work. It is generally is easier to find evidence of physical work environment factors associated with neck/shoulder pain.

### 2.6.1 Individual factors

#### Age

Age is expected to be an associate with flying hours and significant may be related neck and shoulder pain. A report found pilots of average 30 to 39 years old more likely to have symptom of neck/shoulder pain of 56.2% (De Loose et al., 2008). A small number reported found pilot age 55 years and older have neck pain during flying (Walters, Cox, Clayborne, & Hathaway, 2012).

#### Weight

It is a measure that is related to neck pain; it was obesity and overweight were associated with an increased the risk of chronic pain in neck and shoulder. From

(Nilsen, Holtermann, & Mork, 2011) found that obesity in women and men had approximately 20% increased risk of chronic pain in neck and shoulder.

### **Exercise**

The exercise such as strength training muscle of neck and shoulder can decrease pain and have a positive prevention effect from neck and shoulder pain. A supervised neck and shoulder exercise was effective in reducing neck pain as observed in a case study of “neck and shoulder exercise for neck pain in Air Force Helicopter Pilots” in Sweden (B. O. Ang, Monnier, & Harms-Ringdahl, 2009). Another study for exercise 8 weeks found that the exercise was effective to significantly reducing neck and shoulder pain because of decrease discomfort neck and shoulder (M. H. Lee, Park, & Kim, 2013).

### **Smoking**

Smoking is a factor with increasing risk of developing osteoporosis. Cigarettes have nicotine which affects the production of bone forming cells (osteoblasts). Smoking decreases the absorption which is important for bone mineralization from the diet. Moreover, smoking looks like to breaks down estrogen in the body more rapidly. Estrogen is essential to construct a strong skeleton in both men and women. Smoking can put greater risk fractures and decrease the weight(Surgery, 2010).

### **Posture**

An association between static posture or extreme and neck/shoulder pain was founded (Ohlsson et al., 1995). From a study it was found that time spent in forward neck flexion (angle of 15 degree) was significantly associated with neck

disorder and abduction or flexion shoulder angle greater than 60 degree. About extension and bending of the neck not found from the previous study.

(Health(NIOH), 1997) concluded that evidence for a relationship between sustained or repeated shoulder posture with greater than 60 degree of abduction or flexion and shoulder musculoskeletal disorder was found for both non-specific shoulder pain and shoulder tendinitis. Another report found an exposure associate between persistent neck pain and years of being a sewing machine operator (Andersen & Gaardboe, 1993a, 1993b).

#### **Total flight hours**

A report found that pilot have flying more than 3000 hours significantly to contributed to neck pain in aircrew of USA(Walters et al., 2012).

#### **Stress**

Work stress was also associated with risk of chronic neck and shoulder pain in both men and women (Fanavoll, 2011). Stress also increase a muscle tension which lead to neck and shoulder including headache (Lliades, 2014). Air force pilot have many job tasks leading to stress and fatigue. So stress can be a factor associated with neck and shoulder pain occurring from their job stress.

### **2.6.2 Flight related(physical) factor**

#### **Vibration**

Whole body exposed vibration arise, where the body is support on a vibration surface. In the most of case this occurs, when one is sitting on a vibrating seat, standing on the vibrating floor or lying on the vibrating bed. Whole body vibration is experienced in transport and some type of machine, it usually involve vibration

frequency ranged from 0.5 to 80 Hz (Griffin, 1990). Whole body vibration not have one specific target organ and has been association with a variety of health problems (Kjellberg, 1990).

When human expose to whole vibration has been association with a variety changes in health, occupational function and comfort. (Hopcroft & Skinner, 2005) found that the C -130 vibration no significant impact on physical, mental function.

## 2.7 Type of air craft

There are five types of aircrafts in The Royal Thai Air Force (R. T. A. Force, 2013)

1. **Training aircraft** such as PC-9, CT-4A/E and Cessna etc.



Figure 15 : PAC CT-4E (R. T. A. Force, 2013)

2. Fighter and attack aircraft such as Grippen, F-16 and Alpha Jet etc.



Figure 16 : Alpha Jet (R. T. A. Force, 2013)



Figure 17 : F-16 (R. T. A. Force, 2013)

3. Surveillance aircraft such as Normad N.228, Saab(S-100B Argus), BT-67 and Aerostar etc.



Figure 18 : BT-67 (R. T. A. Force, 2013)

4. Transport aircraft such as Saab(340B), C-130, ATR-72-500, Boeing (B737-4Z6) and Airbus (A340-500, A-319-115X CJ) etc.



Figure 19 : Airbus 319 (R. T. A. Force, 2013)





Figure 20 : C-130 (R. T. A. Force, 2013)

5. **Helicopter** such as Bell helicopter(UH-1H) and 412 EP/SP (use only The Royal Thai Family) etc.



Figure 21 : Bell 412EP(R. T. A. Force, 2013)

This study, study in a transport aircraft C-130 which primary performs the tactical portion of the airlift mission. The aircraft was capable of operate from rough, dirt strips and was prime transport for air dropping troops and the equipment into hostile area(U. S. A. FORCE, 2009). Feature C-130 using its aft loading ramp and door. C-130 can accommodate a wide variety of oversize cargo including car, armored

vehicles, contain delivery system bundles and personnel or aeromedical evacuation (Federal Aviation Administration(FAA), 2013).



Figure 22: C-130


## 2.8 The Nordic Questionnaire

The Nordic Musculoskeletal Questionnaires (NMQ) has long been one of the gold-standard diagnostic questionnaires for musculoskeletal involvement in occupational health. Developed under the age and the support of the Nordic Council of Ministers, the researchers developed and tested standardized questionnaires in overall neck and shoulder complaint by workers. It was widely used since its inception in 1987 and validated for use in many languages including in English (Kuorinka et al., 1987).

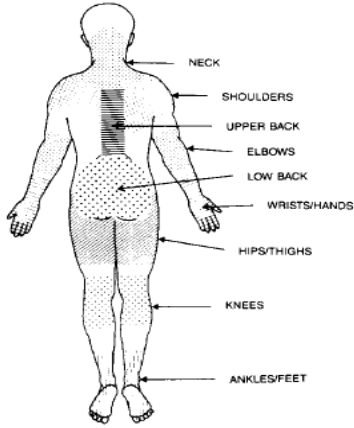
The structure of the Nordic Musculoskeletal Questionnaires (NMQ) have 2 type consists of general questionnaire and specific ones focusing on the neck, shoulder and low back. The main purpose of the questionnaire compost of 2 parts: first part for screening of musculoskeletal disorder showed picture of body such as neck, shoulders, upper back, low back, elbows, wrists/hands, hips/thighs, knees and ankles/feet and answer by putting (X) in the box. Second part for the occupational

health concentrate on anatomical area such as neck, shoulder and low back which the musculoskeletal symptoms are common. These questions contain duration of the symptoms over past time (Kuorinka et al., 1987).

The researcher used only specific parts of neck and shoulder. The questionnaires probe deeply into the analysis for respective a symptoms and ask duration of symptoms over past time such as past 7 days and past 12 months.



**How to answer the questionnaire:**  
Please answer by putting a cross in the appropriate box — one cross for each question. You may be in doubt as to how to answer, but please do your best anyway. Please answer every question, even if you have never had trouble in any part of your body.



In this picture you can see the approximate position of the parts of the body referred to in the questionnaire. Limits are not sharply defined, and certain parts overlap. You should decide for yourself in which part you have or have had your trouble (if any).

Have you at any time during the last 12 months had trouble (ache, pain, discomfort) in:		To be answered only by those who have had trouble								
		Have you at any time during the last 12 months been prevented from doing your normal work (at home or away from home) because of the trouble?		Have you had trouble at any time during the last 7 days?						
1	2	Yes	No	2	Yes	1	No	2	Yes	
<b>Neck</b>										
<b>Shoulders</b>										
1 No 2 Yes										
3 Yes, in the right shoulder										
4 Yes, in the left shoulder										
5 Yes, in both shoulders										
<b>Elbows</b>										
1 No 2 Yes										
3 Yes, in the right elbow										
4 Yes, in the left elbow										
5 Yes, in both elbows										
<b>Wrists/hands</b>										
1 No 2 Yes										
3 Yes, in the right wrist/hand										
4 Yes, in the left wrist/hand										
5 Yes, in both wrists/hands										
<b>Upper back</b>										
1 No 2 Yes										
<b>Low back (small of the back)</b>										
1 No 2 Yes										
<b>One or both hips/thighs</b>										
1 No 2 Yes										
<b>One or both knees</b>										
1 No 2 Yes										
<b>One or both ankles/feet</b>										
1 No 2 Yes										

Figure 23 : The Nordic Musculoskeletal Questionnaires part screening of musculoskeletal disorder (Kuorinka et al., 1987)

## 2.9 Review related study of neck and shoulder pain

### Study of neck and shoulder pain among pilots

(De Loose et al., 2008) studies F-16 pilots of the Royal Netherlands and the Belgian Air Force. The studies found that 1 year prevalence of self-reported neck pain

among F-16 pilots was 18.9% in 90 male F-16 pilots of the Royal Netherlands Air Force and the Belgian Air Force .

(Walters et al., 2012) demonstrated that high force airplane required for sitting a long time in flight, frequently holding the neck in a forward posture and bent position which was significant with the neck pain. Among helicopter aircrew in the US, they were complaining of neck and shoulder pain during their flight. The result from the most common neck pain was found between 30-39 years group, there were no responses between 19-24 years group and a small number reported found pilot age 55 years and older have neck pain during flying. But the individual less than 25 years old and total flying hours less than 500 hours were less likely of report flying to related neck pain.

(B. Ang, 2007) reported that the prevalence of neck pain in the past 12 months among helicopter pilots in Sweden was 57%. Half of neck pain cases reported that neck pain interfered their leisure time and flying duties. Study of screening neck and shoulder neck and shoulder pain by Nordic musculoskeletal questionnaire

In Thailand found the prevalence of neck and shoulder pain among sewing occupational at Banphai district Khonkaen showed the prevalence of neck and shoulder pain are relative high in sewing worker. (Thotsathit et al., 2009) the result found that prevalence of neck pain during the past 12 months was 20.9% and during past 7 days was 23.6%, the prevalence of shoulder during the past12 months was 25.1% and during the past7 days was 27.4%.

(Saetan et al., 2007) the result that the prevalence shoulder pain among Northeastern Construction Workers with Temporary Migration found the prevalence during past 12 months was 14% and during the past 7 days was 10.9



## CHAPTER III

### METHODOLOGY

#### 3.1 Research Design

The study was a cross-sectional study conducted during a month period of 2014.

#### 3.2 Study Area

Area of this research was conducted at Don Mueang District, the North of Bangkok Thailand. Don Mueang has base of a The Royal Thai Air Force Squadron 6.

#### 3.3 Study Population

The target population of this study is Thai male air force pilots in The Royal Thai Air Force Squadron 6 is 174(Unpublished data, 2013) at Don Mueang Bangkok Thailand.

#### 3.4 Inclusion & Exclusion criteria

##### 3.4.1 Inclusion Criteria:

The selection criteria will be as follows:

- Voluntary participants ( willing participate)
- Thai Male Air Force Pilot ,Bangkok Thailand
- Working as a pilot captain or co-pilot in Squadron the Royal Thai Air Force at least 1 year.

##### 3.4.2 Exclusion Criteria:

Participants with any of the following conditions will be ineligible:

- Have been diagnosed or treated for neck and shoulder pain with underlying fracture clavicle, fracture c-spine by physician or other medical in currently.
- Stop working temporary because of neck and shoulder pain before by physician diagnosis.

### 3.5 Sample and Sample size:

The sample size is calculated by Yamane formula (1967:886)

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

Where  $n$  is the sample size

$N$  is the population size

Total number of Air Force Pilots in *The Royal Thai Air Force Squadron 6* is **174** (Unpublished data, 2013).

$e$  is the level of precision (0.05)

The error is assumed at 5%.

The sample size  $121.25 (\sim 121) \pm 10\% \sim \mathbf{131 \text{ Pilots}}$

Thus, 131 Air Force Pilots will be selected randomly as the participants in this study.

### 3.6 Sample Technique:

Respondents were selected from air force pilot working at Squadron 6 Don Mueang Bangkok Thailand. The Squadron commander will be approached to ask for their permission to conduct the study including inform their air force pilot of the existence of this study.

### 3.7 Research instrument

#### 3.7.1 Questionnaire

Questionnaire was separated into 4 parts including participant personal characteristic, job characteristic, posture flexibility and previous history of neck and shoulder pain.

**Part 1:** Personal Characteristics including age, height, weight, education, money income, smoking and drinking, total years of flight with current government and stress questionnaire use DASS-21 questionnaire (only part of stress).

DASS-21 questionnaire(Blackdoginstitute, 2014) classification five levels based on score as follow:

Normal	(0-7)
Mild	(8-9)
Moderate	( 10-12)
Severe	(13-16)
Extremelysevere	(+17)

**Part 2:** Job Characteristic including work position (captain or co-pilot), total years of flight with current government, total hours of work as flight and hours per week.

**Part 3:** Posture flexibility including flexion, extension and bending of neck and shoulder.



#### **Part 4:** Previous history of neck and shoulder pain

The questionnaire will modify from previous studies (Walters et al., 2012). The questions for Section 1 was modified from previous studies (Songkham, 2011; Walters et al., 2012) and use DASS-21 questionnaire only part of stress. Section 2 was modified from previous studies (Songkham, 2011; Walters et al., 2012). Section 3 was modified from neck and shoulder musculoskeletal disorder evidence (Ohlsson et al., 1995). Section 4 comprised of the Nordic Musculoskeletal Questionnaire's (NMQ) specific neck and shoulder pain which had specific questions giving details about the neck and shoulder pain (Kuorinka et al., 1987). Respondents are asked if they have had any pain in the neck and shoulder trouble in the last 12 months and last 7 days which has prevented normal activity.

#### **3.8 Data Collection Processing**

Questionnaire was collected after receive permission from Squadron 6 commander by self-report. The Squadron 6 commander each squadron will be approached to ask for their permission to conduct the study including inform their air force pilot of the existence of this study. Respondents were recruited by using inclusion and exclusion criteria.

1) Questionnaire was distributed to pilot at the Squadron 6 Don Mueang Bangkok, Thailand who visited the Squadron 6. Questionnaire will be collected from them and picked up after filling in.

2) Investigators were checked the questionnaire from pilot at Squadron 6 Don Mueang Bangkok, Thailand.

### 3.9 Data Analysis Processing

In this study, the data were analysis by using the Statistical Package for the Social Science, version 17.0 (SPSS Inc.,Chicago,IL,USA).

Normal distribution was tested by using the Kolmogorov-Smirnov Test. If the significant value of the Kolmogorov-Smirnov Test greater than 0.05, the data is considered as the normality distribution.

To describe personal characteristics and job characteristics, descriptive statistic (mean, standard deviation(SD) and percentage) was used.

Chi-square test was used to find an association between:

Personal characteristic - neck and shoulder pain

Job characteristic – neck and shoulder pain

The level of significant value was considered at 0.05 and 0.01, respectively.

### 3.10 Reliability and Validation study of the instrument

The developed instrument will be tested for validity and reliability. After construction of the instrument, it will be translated into Thai and then back-translated into English.

Validity was reviewed by 3 experts as following.

1. Wg.Cdr.Benja Wilai from the occupational health

Office: Bhumibol Adulyadej Hospital at Bangkok.

2. Flt.Lt. Saranuwat Nopparittanon from the flight training school

Office: Flight Training School at Kampangsan Nakornpathom

3. Flt.Lt. Thanee Nissayan from the flight training school

Office: Flight Training School at Kamphansan Nakornpathom

An Index of Item Objective Congruence (IOC) of the questionnaire was 0.95

The reliability of the new instrument will then be tested via a pilot test conducted in a group of 30 pilots working in the Royal Thai Air Force of another squadron at Surattani in to assess reliability. After try out the questionnaire and use The Cronbach's Alpha coefficient value is 0.701.

### 3.11 Ethical Consideration

Ethical consideration The thesis was approved by the Ethics Review Committee for Research Involving Human Research Subjects, Health Sciences Group, Chulalongkorn University with the certified code no.050/2014

## CHAPTER IV

### RESULTS

#### 4.1 Results

This chapter is based on one cross-sectional design which aim to finding factor related to neck and shoulder pain among the Royal Thai Air Force pilots Bangkok Thailand. Discuss on factor related to neck and shoulder pain among the Royal Thai Air Force pilots Bangkok Thailand is presented in this chapter. The results in this study are presented in three sections as follow:

Part I Personal characteristics and Job characteristics among the Royal Thai Air Force pilots

Part II Prevalence of neck and shoulder pain among the Royal Thai Air Force pilots

Part III The association between risk factors and musculoskeletal disorder( neck and shoulder).

##### 4.1.1 Personal characteristics and Job characteristics among the Royal Thai Air Force pilots

A total of 126 air force pilots participants in this study, giving a response rate of 96.18%. Five of air force pilots were excluded because of not participants of this study. Therefore, 126 air force pilots were used in the data analysis of this study. The Personal characteristics and Job characteristics among the Royal Thai Air Force pilots In the study are presented in Table 4.1 and Table 4.2.

Table 4.1 Personal Characteristics among the Royal Thai Force pilots. The age of participants were less than or equal to 30 years (73.8%), with a mean of 29.2 years

(SD= 3.47) and ranged 21-30 years. Weight of participants had more than or equal to 70 kilograms(69%), with a mean of 73.3 (SD= 9.42) and ranged 70-79 kilograms. Height of participants ranged 170-179 centimeters (61.1%), with a mean of 173 (SD=4.90). About 80.2% of pilots were not married and the most of participants had completed bachelor degree was 89.7%. The majority of participants had income ranged 40,000 - 50,000 baht per month was 61.1%. It was found that most of participants had good health 84.9%, exercise less than three time per week was 58.7% and almost of participants like jogging (67.5%). The majority of participants drinking alcohol was 93.7% and drinking more than one time per week was 62.7%. However all of them non -smoke (81.7%) and drive to work every day(100%). It was found that distance from home more than five kilometers (50.8%). The another cause of neck and shoulder come from sleeping pillow fall(56.3%) and lift heavy(24.6) respectively. The most of participants had normal stress score range 0-9 was 84.9%.

**Table 4.1** Personal Characteristics among the Royal Thai Force pilots (n=126)

Characteristics	n (%)
<b>Age, y</b>	
≤ 30	93 (73.8)
> 30	33 (26.2)
Mean (±SD)	29.2(±3.47)
Range 21-30 years	
<b>Weight</b>	
< 70 kgs	39 (31.0)
≥ 70 kgs	87 (69.0)
Mean (±SD)	73.3(±9.42)
Range 70-79 kgs	
<b>Height</b>	
160-169 cms	28 (22.2)
170-179 cms	77 (61.1)
180-189 cms	21 (16.7)
Mean (±SD)	173(±4.90)
<b>Status</b>	
Single	101 (80.2)
Married	25 (19.8)
<b>Graduated</b>	
Bachelor degree	113 (89.7)
≥ Master's degree	13 (10.3)

**Table 4.1** Personal Characteristics among the Royal Thai Force pilots (n=126) (cont.)

Characteristics	n (%)
<b>Income</b>	
30,000 – 40,000 baht	29 (23.0)
40,000 – 50,000 baht	77 (61.1)
50,000 – 60,000 baht	12 (9.5)
> 60,000 baht	8 (6.3)
<b>Health status</b>	
Good	107 (84.9)
Not too bad	19 (15.1)
<b>Exercise (n =125)</b>	
< 3 times/week	74 (58.7)
≥ 3 times/week	51 (40.5)
<b>Type exercise (n =125)</b>	
Swimming	14 (11.1)
Badminton	13 (10.3)
Basketball	13 (10.3)
Others	85 (67.5)
<b>Alcohol drinking</b>	
Yes	118 (93.7)
No	8 (6.3)
<b>Often drinking alcohol</b>	
< Weekly	39 (31.0)
≥ Weekly	79 (62.7)

**Table 4.1** Personal Characteristics among the Royal Thai Force pilots (n=126) (cont.)

Characteristics	n (%)
<b>Smoked cigarette</b>	
Yes	23 (18.3)
No	103 (81.7)
<b>Drive to work every day</b>	
Yes	126 (100)
No	0 (0)
<b>Often drive to work per week</b>	
< 3times/week	0 (0)
≥ 3times/week	126 (100)
<b>Distance from home</b>	
≤ 5 kms	62 (49.2)
> 5kms	4 (50.8)
<b>Neck and shoulder pain come from another cause</b>	
Sleeping pillow fall	71 (56.3)
Lift heavy	31 (24.6)
Other	24 (19.0)
<b>Level Stress ( DASS-21)</b>	
Normal (0-9)	107 (84.9)
Severe (10-21)	19 (15.1)

Table 4.2 Job characteristics most of participants of job position co-pilot was 68.3% and captain was 31.7%. And 91.3% of participants had total years of work range 1-9 years, with a mean of 5 years (SD= 3.08). About 36% of total hours ranged 401 to 800 hours. And found that average total hours of work per week ranged from



1 to 10 hours (94.4%), with a mean of 6 hours (SD= 3.38). Average most of them had total day of work per week ranged from 1 to 3 days(63.7%), with a mean of 2.87(SD= 0.94). A total hours in each flight ranged 1 to 2 hours per flight was 69.8%, with a mean of 2.09(SD= 0.87)

**Table 4.2** Job Characteristics among the Royal Thai Force pilots (n=126)

Characteristics	n (%)
<b>Job position</b>	
Captain	40 (31.7)
Co-pilot	86 (68.3)
<b>Total of your work</b>	
1- 9 years	115 (91.3)
10- 19 years	11 (8.7)
Mean ( $\pm$ SD)	5( $\pm$ 3.08)
Range 1-9 years	
<b>Total hours</b>	
< 400 hours	31 (24.6)
401 – 800 hours	36 (28.6)
801 – 1200 hours	31 (24.6)
> 1201 hours	28 (22.2)
<b>Total hours per week (average)</b>	
1-10 hours	119 (94.4)
11-20 hours	7 (5.6)
Mean ( $\pm$ SD)	6( $\pm$ 3.38)
Range 1-10 hours	

**Table 4.2** Job Characteristics among the Royal Thai Force pilots (n=126) (cont.)

Characteristics	n (%)
<b>Total days per week (average)</b>	
1-3 days	102 (81.0)
4-6 days	24 (19.0)
Mean ( $\pm$ SD)	2.87( $\pm$ .94)
Range 1-3 days	
<b>Total hours in each flight</b>	
$\leq$ 2hours	88 (69.8)
>2 hours	38 (30.2)
Mean ( $\pm$ SD)	2.09( $\pm$ .87)
Range 1-2 hours	

#### 4.1.2 Prevalence of neck and shoulder pain among the Royal Thai Air Force pilots

The participants of this study were the Royal Thai Air Force pilots Bangkok Thailand squadron 6 including captain or co-pilot and working as a pilot at least one year. Of 126 air force pilots participants and completed the questionnaire. Therefore, 126 air force pilots were used in the data analysis of this study. Prevalence of neck and shoulder pain of all participants are presented in Table 4.3 and Table 4.4.

Table 4.3 Prevalence of neck pain among the Royal Thai Air Force pilots pain in the past 12 months was 62.7% and in the past 7 days was 10.3%.

**Table 4.3** Prevalence neck pain in the Royal Thai Air Force Pilots (n=126)

Neck Pain	Total(n)	(%)
In the last 12 months		
Yes	79	62.7%
No	47	37.3%
In the last 7 days		
Yes	13	10.3%
No	113	89.7%

Table 4.4 Prevalence of shoulder pain among the Royal Thai Air Force pilots pain in the past 12 months was 56.3% and in the past 7 days was 10.3%.

**Table 4.4** Prevalence shoulder pain in the Royal Thai Air Force Pilots (n=126)

Neck Pain	Total(n)	(%)
In the last 12 months		
Yes	71	56.3%
No	55	43.7%
In the last 7 days		
Yes	13	10.3%
No	113	89.7%

### 4.1.3 The association between risk factors and musculoskeletal disorder ( neck and shoulder).

When performing Chi-Square Test analysis factors showing p-value < .05 is mean significantly in this study.

From Table 4.5 Personal characteristic of participants had no statistical difference in most of personal characteristic except often drinking alcohol was significant with neck pain (p-value= .012). And often drinking alcohol was significant with shoulder pain (p-value= .011) about drinking alcohol more than one time per week.

**Table 4.5** Personal Characteristics associated with neck and shoulder pain among the Royal Thai Air Force pilots.

Factors	n (%)	Neck Pain(%)			Shoulder Pain(%)		
		Pain	No Pain	p-value <sup>a</sup>	Pain	No Pain	p-value <sup>a</sup>
<b>Age, y</b>							
≤ 30	94(74.6)	58(61.7)	36(38.3)	.692	51(54.3)	43(45.7)	.417
> 30	32(25.4)	21(65.6)	11(34.4)		20(62.5)	12(37.5)	
<b>Weight</b>							
< 70 kgs	39(31)	23(59.0)	16(41.0)	.563	19(48.7)	20(51.3)	.248
≥ 70 kgs	87(69)	56(64.4)	31(35.6)		52(59.8)	35(40.2)	
<b>Height</b>							
160-169cms	28(22.2)	18(64.3)	10(35.7)	.289	18(64.3)	12(35.7)	.681
170-179cms	77(61.1)	51(66.2)	26(33.8)		42(54.5)	35(45.5)	
180-189cms	21(16.7)	10(47.6)	11(52.4)		13(61.9)	8(38.1)	

<sup>a</sup> Chi-Square Test, <sup>b</sup> Fisher's Exact Test, <sup>c</sup> p-value < .05

**Table 4.5** Personal Characteristics associated with neck and shoulder pain among the Royal Thai Air Force pilots. (cont.)

Factors	n (%)	Neck Pain(%)			Shoulder Pain(%)		
		Pain	No Pain	<i>p</i> -value <sup>a</sup>	Pain	No Pain	<i>p</i> -value <sup>a</sup>
<b>Status</b>							
Single	101(80.2)	67(66.3)	34(33.7)	.090	56(55.4)	45(44.5)	.681
Married	25(19.8)	12(48.0)	13(52.0)		15(60.0)	10(40.0)	
<b>Graduated</b>							
Bachelor degree	113(89.7)	73(64.6)	40(35.4)	.193	65(57.8)	48(42.5)	.434
≥ Master's degree	13(10.3)	6(46.2)	7(53.8)		6(46.2)	7(53.8)	
<b>Income</b>							
≤ 50,000 baht	106(84.1)	66(62.3)	40(37.7)	.816	59(57.5)	47(44.3)	.720
> 50,000 baht	20(15.9)	13(65.0)	7(35.0)		12(60.0)	8(40.0)	
<b>Health status</b>							
Good	107(84.9)	65(60.7)	42(39.3)	.283	57(53.3)	50(46.7)	.098
Not too bad	19(15.1)	14(73.7)	5(26.3)		14(73.7)	5(26.3)	
<b>Exercise</b>							
< 3 times/week	74(58.7)	51(68.9)	23(31.1)	.070	43(58.1)	31(41.9)	.722
≥ 3 times/week	51(40.5)	27(52.9)	24(47.1)		28(54.9)	23(45.1)	
<b>Alcohol drinking</b>							
Yes	118(93.7)	76(64.4)	42(35.6)	.148 <sup>b</sup>	65(55.0)	53(45.0)	.464 <sup>b</sup>
No	8(6.3)	3(37.5)	5(62.5)		6(75.0)	2(25.0)	
<b>Often drinking alcohol</b>							
< Weekly	39(31.0)	19(48.7)	20(51.3)	.012 <sup>c</sup>	15(38.5)	24(61.5)	.011 <sup>c</sup>
≥ Weekly	79(62.7)	57(72.2)	22(27.8)		50(63.3)	29(36.7)	
<b>Smoked cigarette</b>							
Yes	23(18.3)	17(73.9)	6(26.1)	.219	13(56.5)	10(43.5)	.985
No	103(81.7)	62(60.2)	41(39.8)		58(73.4)	45(26.6)	

<sup>a</sup> Chi-Square Test, <sup>b</sup> Fisher's Exact Test, <sup>c</sup> *p*-value < .05

**Table 4.5** Personal Characteristics associated with neck and shoulder pain among the Royal Thai Air Force pilots.(cont.)

Factors	n (%)	Neck Pain(%)			Shoulder Pain(%)		
		Pain	No Pain	<i>p</i> -value <sup>a</sup>	Pain	No Pain	<i>p</i> -value <sup>a</sup>
<b>Drive to work every day</b>							
Yes	126(100)	79(62.7)	47(37.8)	-	71(56.3)	55(43.7)	-
No	0(0)	0(0)	0(0)		0(0)	0(0)	
<b>Often drive to work per week</b>							
< 3times/week	0(0)	0(0)	0(0)	-	0(0)	0(0)	
≥ 3times/week	126(100)	79(62.7)	47(37.8)		55(43.7)	71(56.3)	
<b>Distance from home</b>							
≤ 5 kms	62(49.2)	39(62.9)	23(37.1)	.963	33(53.2)	29(46.8)	.487
> 5kms	64(50.8)	40(62.5)	24(37.5)		38(59.4)	26(40.6)	
<b>Neck and shoulder pain come from another cause</b>							
Sleeping pillow fall							
	71(56.3)	42(59.2)	29(40.8)	.312	39(54.9)	32(45.1)	.524
Lift heavy	31(24.6)	23(74.2)	8(25.8)		20(64.5)	11(35.5)	
Other	24(19.0)	14(58.3)	10(41.7)		12(50.0)	12(50.0)	
<b>Level Stress ( DASS-21)</b>							
Normal(0-9)	107(84.9)	68(63.6)	39(36.4)	.638	61(57.0)	46(43.0)	.723
Severe(10-21)	19(15.1)	11(57.9)	8(42.1)		10(52.6)	9(47.4)	

<sup>a</sup> Chi-Square Test, <sup>b</sup> Fisher's Exact Test, <sup>c</sup> *p*-value < .05

The job characteristic of participants among the Royal Thai Air Force pilots with neck and shoulder pain was no significant in this study. From this study found that job characteristic no associated with neck and shoulder pain among the Royal Thai Air Force pilots Squadron 6. And presented in the Table 4.6.

**Table 4.6** Job Characteristics associated with neck and shoulder pain among the Royal Thai Air Force pilots.

Factors	n (%)	Neck Pain(%)			Shoulder Pain(%)		
		Pain	No Pain	<i>p-value</i> <sup>a</sup>	Pain	No Pain	<i>p-value</i> <sup>a</sup>
<b>Job position</b>							
Captain	40(31.7)	26(65.0)	14(35.0)	.716	22(55.0)	18(45.0)	.835
Co-pilot	86(68.3)	53(61.6)	33(38.4)		49(57.0)	37(43.0)	
<b>Total of your work</b>							
1- 9 years	115(91.3)	71(61.7)	44(38.3)	.536 <sup>b</sup>	63(57.8)	52(45.2)	.346 <sup>b</sup>
10- 19years	11(8.7)	8(72.7)	3(27.3)		3(27.3)	8(72.7)	
<b>Total hours</b>							
≤ 800 hours	67(53.2)	39(58.2)	28(41.8)	.267	38(56.7)	29(43.3)	.929
> 800 hours	59(46.8)	40(67.8)	19(32.2)		33(55.9)	26(44.1)	
<b>Total hours per week (average)</b>							
1-10 hours	119(94.4)	75(63.0)	44(37.0)	1.0 <sup>b</sup>	68(57.1)	51(42.9)	.698 <sup>b</sup>
11-20 hours	7(5.6)	4(57.1)	3(42.9)		3(42.9)	4(57.1)	
<b>Total days per week (average)</b>							
1-3 days	102(81.0)	65(63.7)	37(36.3)	.623	58(56.9)	44(43.1)	.811
4-6 days	24(19.0)	14(58.3)	10(41.7)		13(54.2)	11(45.8)	
<b>Total hours in each flight</b>							
≤ 2hours	88(69.8)	58(65.9)	30(34.1)	.257	51(58.0)	37(42.0)	.580
>2 hours	38(30.2)	21(55.3)	17(44.7)		20(52.6)	18(47.4)	

<sup>a</sup> Chi-Square Test, <sup>b</sup> Fisher's Exact Test, <sup>c</sup> *p-value* < .05

The Posture flexibility in this study was significant with neck and shoulder pain among the Royal Thai Air Force pilots about treatment and neck and shoulder pain come from another cause (except your job) shown in the Table 4.7.

Treatment was significant with neck pain (p-value = .000) and treatment was significant with shoulder pain (p-value = .001). Neck and shoulder pain come from another cause (except your job) was significant with neck pain (p-value = .000) and Neck and shoulder pain come from another cause (except your job) was significant with shoulder pain (p-value = .004).

**Table 4.7** Posture flexibility associated with neck and shoulder pain among the Royal Thai Air Force pilots.(n =126)

Factors	n (%)	Neck Pain(%)			Shoulder Pain(%)		
		Pain	No Pain	p-value <sup>a</sup>	Pain	No Pain	p-value <sup>a</sup>
<b>Neck flexion per day</b>							
≤ 2 times per day	63(50)	39(62.0)	24(38.0)	.854	34(54.0)	29(46.0)	.590
> 2 times per day	63(50)	40(63.5)	23(36.5)		37(58.7)	26(41.3)	
<b>Neck extension per day</b>							
≤ 2 times per day	84(66.7)	51(60.7)	33(39.3)	.515	47(56.0)	37(44.0)	.899
> 2 times per day	42(33.3)	28(66.7)	14(33.3)		24(57.1)	18(42.7)	
<b>Neck bending per day</b>							
≤ 2 times per day	70(55.6)	41(58.6)	29(41.4)	.284	39(55.7)	31(44.3)	.872
> 2 times per day	56(44.4)	38(67.9)	18(32.1)		32(76.2)	24(23.8)	
<b>Shoulder flexion per day</b>							
≤ 2 times per day	88(69.2)	57(64.8)	31(35.2)	.464	49(55.7)	39(44.3)	.818
> 2 times per day	38(30.2)	22(57.9)	16(42.1)		22(57.9)	16(42.1)	

<sup>a</sup> Chi-Square Test, <sup>b</sup> Fisher's Exact Test, <sup>c</sup> p-value < .05



**Table 4.7** Posture flexibility associated with neck and shoulder pain among the Royal Thai Air Force pilots. (n = 126) (cont.)

Factors	n (%)	Neck Pain(%)			Shoulder Pain(%)		
		Pain	No Pain	<i>p-value</i> <sup>a</sup>	Pain	No Pain	<i>p-value</i> <sup>a</sup>
<b>Shoulder extension per day</b>							
≤ 2 times per day	98(77.8)	60(61.2)	38(38.8)	.522	54(55.1)	44(44.9)	.597
> 2 times per day	28(22.2)	19(67.9)	9(32.1)		17(60.7)	11(39.3)	
<b>Treatment</b>							
Yes	55(43.7)	50(90.9)	5(9.1)	.000 <sup>c</sup>	40(72.7)	15(27.3)	.001 <sup>c</sup>
No	71(56.3)	29(40.8)	42(59.2)		31(43.7)	40(56.3)	
<b>Neck and shoulder pain come from another cause (except your job)</b>							
Yes	64(50.8)	58(90.6)	6(9.4)	.000 <sup>c</sup>	44(69.75)	20(31.25)	.004 <sup>c</sup>
No	62(48.2)	21(33.9)	41(66.1)		27(43.5)	35(56.5)	

<sup>a</sup> Chi-Square Test, <sup>b</sup> Fisher's Exact Test, <sup>c</sup> *p-value* < .05

Previous history of neck pain in the Royal Thai Air Force pilots was significant with neck pain, about the total length of time that you have had neck pain during the last 12 months (*p-value* = .013), neck pain reduce your work (*p-value* = .000), neck pain reduce your spare time (*p-value* = .000) and last 7 days had neck pain (*p-value* = .002) presented in the Table 4.8.

**Table 4.8** Previous history of neck pain in the Royal Thai Air Force pilots.(n =126)

Factors	Total(n)	Neck Pain(%)		<i>p-value</i> <sup>a</sup>
		Pain	No Pain	
<b>Hurt neck in accident</b>				
No	126(100)	79(62.7)	47(37.3)	-
Yes	0(0)	0(0)	0(0)	
<b>Change job because neck pain</b>				
No	126(100)	79(62.7)	47(37.3)	-
Yes	0(0)	0(0)	0(0)	
<b>The total length of time that you have had neck pain during the last 12 months</b>				
≤ 7 days	116(92.1)	69(59.5)	47(40.5)	.013 <sup>b, c</sup>
> 7 days	10(7.9)	10(100)	0(0)	
<b>Neck pain reduce your work</b>				
No	95(75.4)	49(51.6)	46(48.4)	.000 <sup>b, c</sup>
Yes	31(24.5)	30(96.8)	1(3.2)	
<b>Neck pain reduce your spare time</b>				
No	84(66.7)	38(45.2)	46(57.8)	.000 <sup>b, c</sup>
Yes	42(33.3)	41(97.6)	1(2.4)	
<b>The total length of time that you have had neck pain effect your work</b>				
≤ 7 days	124(98.4)	77(62.1)	47(37.9)	.529 <sup>b</sup>
> 7 days	2(1.6)	2(100)	0(0)	
<b>Seen doctor because of neck pain last 12 months</b>				
No	126(100)	79(62.7)	47(37.3)	
Yes	0(0)	0(0)	0(0)	
<b>Last 7 days had neck pain</b>				
No	113(89.7)	66(58.4)	47(41.6)	.002 <sup>b, c</sup>
Yes	13(10.3)	13(100)	0(0)	

<sup>a</sup> Chi-Square Test, <sup>b</sup> Fisher's Exact Test, <sup>c</sup> *p-value* < .05

Previous history of shoulder pain in the Royal Thai Air Force pilots was significant with shoulder pain about In last 12 months had shoulder pain (p-value = .000), The total length of time that you have had shoulder pain during the last 12 months (p-value = .000), Shoulder pain reduce your work (p-value = .000), Shoulder pain reduce your spare time (p-value = .000) and Last 7 days had shoulder pain (p-value = .001) presented in the Table 4.9.

**Table 4.9** Previous history of shoulder pain in the Royal Thai Air Force pilots

Factors	Total(n)	Shoulder Pain(%)		<i>p-value</i> <sup>a</sup>
		Pain	No Pain	
<b>Hurt shoulder in accident</b>				
No	126(100)	71(56.3)	55(43.7)	-
Yes	0(0)	0(0)	0(0)	
<b>Change job because shoulder pain</b>				
No	126(100)	71(56.3)	55(43.7)	-
Yes	0(0)	0(0)	0(0)	
<b>In last 12 months had shoulder pain</b>				
No	59(46.8)	4(6.8)	55(93.2)	.000 <sup>b,c</sup>
Yes	67(53.2)	67(100)	0(0)	
<b>The total length of time that you have had shoulder pain during the last 12 months</b>				
≤ 7 days	112(88.9)	57(50.9)	55(49.1)	.000 <sup>b,c</sup>
> 7 days	14(11.1)	14(100)	0(0)	
<b>Shoulder pain reduce your work</b>				
No	104(82.5)	49(47.1)	55(52.9)	.000 <sup>b,c</sup>
Yes	22(17.5)	22(100)	0(0)	

<sup>a</sup> Chi-Square Test, <sup>b</sup> Fisher's Exact Test, <sup>c</sup> p-value < .05

**Table 4.9** Previous history of shoulder pain in the Royal Thai Air Force pilots (cont.)

Factors	Total(n)	Shoulder Pain(%)		<i>p-value</i> <sup>a</sup>
		Pain	No Pain	
<b>Shoulder pain reduce your spare time</b>				
No	93(73.8)	38(40.9)	55(59.1)	.000 <sup>b,c</sup>
Yes	33(26.2)	0(0)	33(100)	
<b>The total length of time that you have had shoulder pain effect your work</b>				
≤ 7 days	121(96.0)	66(54.5)	55(45.5)	.068 <sup>b</sup>
> 7 days	5(4.0)	5(100)	0(0)	
<b>Seen doctor because of shoulder pain last 12 months</b>				
No	123(97.6)	68(55.3)	55(44.7)	.256 <sup>b</sup>
Yes	3(2.4)	3(100)	0(0)	
<b>Last 7 days had shoulder pain</b>				
No	113(89.7)	58(51.3)	55(48.7)	.001 <sup>b,c</sup>
Yes	13(10.3)	13(100)	0(0)	

<sup>a</sup> Chi-Square Test, <sup>b</sup> Fisher's Exact Test, <sup>c</sup> *p-value* < .05

The Table 4.10 shown that neck pain was associated with shoulder pain. The statistical was significantly (*p-value* = .000).

**Table 4.10** Neck pain associated to shoulder pain

	Total(n)	Shoulder Pain (%)		<i>p-value</i> <sup>a</sup>
		Pain	No Pain	
<b>Neck Pain</b>				
Pain	47	16(34.0)	31(66.0)	.000 <sup>c</sup>
No Pain	79	55(69.6)	24(30.4)	
Total	126	71(56.3)	55(43.7)	

<sup>a</sup> Chi-Square Test, <sup>b</sup> Fisher's Exact Test, <sup>c</sup> *p-value* < .05

## CHAPTER V

### DISCUSSION

To our knowledge, this study was the study find the prevalence of neck and shoulder pain in the past 12 months and in the past 7 days, often drinking alcohol associated with neck and shoulder pain. In this section, the findings regarding the annual prevalence of neck and shoulder pain as well as often drinking alcohol associated with neck and shoulder pain in the Royal Thai Air Force pilots Squadron 6 are discussed.

#### **5.1 Prevalence of neck and shoulder pain in the Royal Thai Air Force pilots**

The prevalence of neck and shoulder pain in this sample of the Royal Thai Air Force pilots Squadron 6 in the past 12 months were 62.7% and 56.3% respectively. The prevalence of neck pain in the past 7 days was 10.3% and prevalence of shoulder pain in the past 7 days was 10.3% of this study.

The findings are consistent with previous studies. (Albano & Stanford, 1998) found the prevalence of neck pain in the past 12 months was 57% and shoulder pain in the past 12 months was 35% in the fighter pilots in U.S. Similarly, (B. Ang, 2007) found that the prevalence of neck pain in the past 12 months was 57% among helicopter pilots in Sweden. In the previous study a position of pilots similar with (Walters et al., 2012) found that high force airplane required for sitting a long time in flight, frequently holding the neck in a forward posture and bent position which was significant with the neck pain. Among helicopter aircrew in U.S., they were complaining of neck and shoulder pain during their flight.

## 5.2 The association between risk factors and musculoskeletal disorder (neck and shoulder).

The study found that often drinking alcohol, treatment, neck and shoulder pain come from another cause(except your job), the total length of time that you have had neck pain during the last 12 months, neck pain reduce your work, neck pain reduce your spare time, last 7 days had neck pain, the total length of time that you have had shoulder pain during the last 12 months, Shoulder pain reduce your work, Shoulder pain reduce your spare time and Last 7 days had shoulder pain were significant with neck and shoulder pain.

This study found significant between neck and shoulder pain among the Royal Thai Air Force pilots (p-value = .000). According to neck and shoulder are near area, sometime felt shoulder pain be coming from your neck. This is because the muscles and nerves that arise from your neck pass through shoulder on their way down the arm. Nerve from your neck “nerve roots” also travel down your arm (via a brachial plexus). Its neck pain may extend down the arm (Lennard, 2012). Because of neck and shoulder are intimately connection by multiple nerve pathways(Eric, 2013).

### 5.2.1 Individual factors

#### Age

Although this study found that age of participants ranged 21 to 30 years was 73.8%, with a mean of 29.2 years, not significant with neck and shoulder pain among the Royal Thai Air Force pilots. Difference with previous studies found that the pilots of the age ranged 30-39 year old were more likely to have symptoms of neck and shoulder pain was 18.9% (De Loose et al., 2008). And difference with a small number reported found that pilot age 55 years old and older have a neck pain when during

flying a flight(Walters et al., 2012). However, this study can't found association between age and neck/shoulder pain among the Royal Thai Air Force pilots because of age difference from another study.

### **Alcohol**

This study found that often drinking alcohol was significant with neck pain (p-value = .012) and significant with shoulder pain (p-value = .011). The most of participants are drinking alcohol more than one time per week had higher neck and shoulder pain more than drinking alcohol less than one time per week. Drinking alcohol is really a general risk factors that increase pain in the neck and shoulders (Jirattanapothichai, 2011). Similar previous study found that the adolescence between 16 and 18 years old with alcohol consumption associated higher pain of musculoskeletal pain (Jussila et al., 2014).

### **Exercise**

This study found that exercise not significant with neck and shoulder pain among the Royal Thai Air Force pilots. In my opinion is correct because of when you exercise such as swimming, basketball and strength training muscle of neck and shoulder can decrease pain and have a positive prevention effect from neck and shoulder pain. Similar from case study "neck and shoulder exercise for neck pain in Air Force Helicopter Pilots" in Sweden was effective in reducing neck pain(B. O. Ang et al., 2009).

## **Stress**

From this study although results stress not significant with neck and shoulder pain among the Royal Thai Air Force pilots. I think is correct because of pilots should be good attitude(good mental) and healthy can fly and safety the flight. And pilots are get rid of stress is good such as doing a plan for flight and briefing before flying according to the squadron have a supported them for release stress and relax for these job such as have a big living room including mini bar, games and varieties magazines. Similar with previous study found that work stress was also associated with risk of chronic neck and shoulder pain in both men and women (Fanavoll, 2011). And stress also increase a muscle tension which lead to neck and shoulder including headache (Lliades, 2014).

## **Total hours of flight**

This study can't found the significant with neck and shoulder pain among the Royal Thai Air Force pilots, half of them had total of flight range 400-800 hours (28.6%). Difference previous study found that pilots have flying more than 3,000 hour was significantly to contributed to neck and shoulder pain in aircrew of USA (Walters et al., 2012).



## CHAPTER VI

### CONCLUSION AND RECOMMENDATIONS

#### 6.1 Conclusion

This study was conducted in the Royal Thai Air Force Bangkok, Thailand. The data collection was conducted on March, 2014. The sample size of the study was 126 pilots. The study population was male the Royal Thai Air Force pilots in Squadron 6 Don Mueang Bangkok Thailand. This study based on cross-sectional study and main purpose of a study was to identify the factor related to neck and shoulder pain among the Royal Thai Air Force pilots, prevalence of neck and shoulder pain in pilots, explain and find the association between personal characteristic, job characteristic with neck and shoulder pain among the Royal Thai Air Force. The analysis part used statistical package of social science (SPSS): Normal distribution, descriptive statistic and Chi-square test. Chi-square test were used for find association between personal characteristic, job characteristic with neck and shoulder pain among the Royal Thai Air Force.

Findings of this study are summarized as follow:

##### **6.1.1 Personal characteristics and Job characteristics among the Royal Thai Air Force pilots**

Personal Characteristics among the Royal Thai Force pilots. The age of participants were less than or equal to 30 years (73.8%), with a mean of 29.2 years (SD= 3.47) and ranged 21-30 years. Weight of participants had more than or equal to 70 kilograms(69%), with a mean of 73.3 (SD= 9.42) and ranged 70-79 kilograms. Height of participants ranged 170-179 centimeters (61.1%), with a mean of 173

(SD=4.90). About 80.2% of pilots were not married and the most of participants had completed bachelor degree was 89.7%. The majority of participants had income ranged 40,000 - 50,000 baht per month was 61.1%. It was found that most of participants had good health 84.9%, exercise less than three time per week was 58.7% and almost of participants like jogging (67.5%). The majority of participants drinking alcohol was 93.7% and drinking more than one time per week was 62.7%. However all of them non -smoke (81.7%) and drive to work every day(100%). It was found that distance from home more than five kilometers (50.8%). The another cause of neck and shoulder come from sleeping pillow fall(56.3%) and lift heavy(24.6) respectively. The most of participants had normal stress score range 0-9 was 84.9%.

Job characteristics most of participants of job position co-pilot was 68.3% and captain was 31.7%. And 91.3% of participants had total years of work range 1-9 years, with a mean of 5 years (SD= 3.08). About 36% of total hours ranged 401 to 800 hours. And found that average total hours of work per week ranged from 1 to 10 hours (94.4%), with a mean of 6 hours (SD= 3.38). Average most of them had total day of work per week ranged from 1 to 3 days(63.7%), with a mean of 2.87(SD= 0.94). A total hours in each flight ranged 1 to 2 hours per flight was 69.8%, with a mean of 2.09(SD= 0.87).

### **6.1.2 Prevalence of neck and shoulder pain among the Royal Thai Air**

#### **Force pilots**

The prevalence of neck and shoulder pain in this sample of the Royal Thai Air Force pilots Squadron 6 in the past 12 months were 62.7% and 56.3% respectively.

The prevalence of neck pain in the past 7 days was 10.3% and prevalence of shoulder pain in the past 7 days was 10.3% of this study.

### **6.1.3 The association between risk factors and musculoskeletal disorder (neck and shoulder).**

The study found that often drinking alcohol, treatment, neck and shoulder pain come from another cause(except your job), the total length of time that you have had neck pain during the last 12 months, neck pain reduce your work, neck pain reduce your spare time, last 7 days had neck pain, the total length of time that you have had shoulder pain during the last 12 months, Shoulder pain reduce your work, Shoulder pain reduce your spare time and Last 7 days had shoulder pain were significantly with neck and shoulder pain

## **6.2 Recommendation**

### **From this study to further research**

Neck and shoulder pain is the continuous symptom from stress or ergonomic incorrect such as sitting flight or driving along time of periods, sleeping pillow fall and lift heavy.

Physical therapy, massage can relieve neck pain but should be change the sitting position is better. If possible, choose a chair that fits the shape of the individual and a backrest to relax for neck pain.

Further research should focus on the factors in the order to develop effective strategies to reduce the occurrence of neck and shoulder pain in the Royal Thai Air Force pilots Squadron 6.

### **To pilots**

Form this study found that most of pilots in the Royal Thai Air Force drinking alcohol more than once a week, It was significant with neck and shoulder pain. Researcher recommended to Air Force pilots should be awareness your health because of drinking alcohol was damage your health and lead to liver disease and may be effect your job in the future. So it should be adjusted behavior and exercise to enhance performance your work and your health.

### **Air Force Squadron 6**

This study was interested neck and shoulder pain in Air force pilots, in fact there should be have intervention to reduce health effect and provide knowledge to the Air Force pilots.

### **6.3 Limitation:**

This study has some limitation due to using only self-report questionnaire as the measurable tool it may be affected to the results in the term of recall bias participants.

This study exclusion about of participants had been diagnosed or treated for neck and shoulder pain with underlying fracture clavicle, fracture c-spine by physician or other medical in currently. However, all of participants not found that have stop working temporary because of neck and shoulder pain before by physician diagnosis in this study.

## REFERENCES

- (AAOS), A. A. o. O. S. (2010). Neck Pain. Retrieved 3 December, from <http://orthoinfo.aaos.org/topic.cfm?topic=a00231>
- Albano, J. J., & Stanford, J. B. (1998). Prevention of minor neck injuries in F-16 pilots. *Aviation, space, and environmental medicine, 69*(12), 1193-1199.
- Andersen, J. H., & Gaardboe, O. (1993a). Musculoskeletal disorders of the neck and upper limb among sewing machine operators: a clinical investigation. *Am J Ind Med, 24*(6), 689-700.
- Andersen, J. H., & Gaardboe, O. (1993b). Prevalence of persistent neck and upper limb pain in a historical cohort of sewing machine operators. *Am J Ind Med, 24*(6), 677-687.
- Andersen, J. H., Kaergaard, A., Mikkelsen, S., Jensen, U. F., Frost, P., Bonde, J. P., . . . Thomsen, J. F. (2003). Risk factors in the onset of neck/shoulder pain in a prospective study of workers in industrial and service companies. *Occup Environ Med, 60*(9), 649-654.
- Ang, B. (2007). *Neck Pain in Air Force Pilots*. Karolinska Institutet, Stockholm, Sweden, Neurobiology, Care Sciences and Society.
- Ang, B. O., Monnier, A., & Harms-Ringdahl, K. (2009). Neck/shoulder exercise for neck pain in air force helicopter pilots: a randomized controlled trial. *Spine (Phila Pa 1976), 34*(16), E544-551. doi: 10.1097/BRS.0b013e3181aa6870
- Ariens, G. A., Bongers, P. M., Douwes, M., Miedema, M. C., Hoogendoorn, W. E., van der Wal, G., . . . van Mechelen, W. (2001). Are neck flexion, neck rotation, and sitting at work risk factors for neck pain? Results of a prospective cohort study. *Occup Environ Med, 58*(3), 200-207.
- Blackdoginstitute. (2014). DASS-21. from <http://www.blackdoginstitute.org.au/docs/3.dass21withscoringinfo.pdf>
- Chiu, T. T., Ku, W. Y., Lee, M. H., Sum, W. K., Wan, M. P., Wong, C. Y., & Yuen, C. K. (2002). A study on the prevalence of and risk factors for neck pain among university academic staff in Hong Kong. *Journal of Occupational Rehabilitation, 12*(2), 77-91.
- De Loose, V., Van den Oord, M., Burnotte, F., Van Tiggelen, D., Stevens, V., Cagnie, B., . . . Danneels, L. (2008). Individual, work-, and flight-related issues in F-16 pilots reporting neck pain. *Aviat Space Environ Med, 79*(8), 779-783.

- Eric, R. (2013). Shoulder Problems: A Pain in the Neck? , from <http://health.yahoo.net/articles/arthritis/shoulder-problems-pain-neck>
- Fanavoll, R. (2011). *Association between work stress, physical exercise, and chronic shoulder/neck pain: the HUNT Study*. (Master Thesis), Norwegian University of Science and Technology Trondheim.
- Federal Aviation Administration(FAA). (2013). Medical Facts for Pilots. from [http://www.faa.gov/air\\_traffic/publications/atpubs/aim/aim0801.html](http://www.faa.gov/air_traffic/publications/atpubs/aim/aim0801.html)
- Fejer, R., Kyvik, K. O., & Hartvigsen, J. (2006). The prevalence of neck pain in the world population: a systematic critical review of the literature. *Eur Spine J*, 15(6), 834-848. doi: 10.1007/s00586-004-0864-4
- Force, R. T. A. (2013). The Royal Thai Air Force Museum. from <http://www.rtaf.mi.th/museum/RTAF%202541-Present%20Th.pdf>
- FORCE, U. S. A. (2009). C-130J Hercules. from <http://www.403wg.afrc.af.mil/library/factsheets/factsheet.asp?id=3444>
- Funk, L. (2014). Shoulder Anatomy. from <http://www.frozenshoulderclinic.com/shoulder-anatomy/>
- Gilroy, Macpherson, & Ross. (2012). Superficial musculature of the neck. from <https://www.inkling.com/read/atlas-of-anatomy-gilroy-thieme-2nd/chapter-39/ch39-section-1>
- Griffin, M. J. (1990). *Handbook of Human Vibration*. . Academic Press,London.
- Guez, M., Hildingsson, C., Nilsson, M., & Toolanen, G. (2002). The prevalence of neck pain: a population-based study from northern Sweden. *Acta Orthop Scand*, 73(4), 455-459. doi: 10.1080/00016470216329
- Health(NIOH), N. I. f. O. S. a. (1997). *Musculoskeletal Disorders and Workplace Factors* (B. P. Bernard Ed.). กรุงเทพมหานคร
- Hopcroft, R., & Skinner, M. (2005). *C-130J Human Vibration* Air Operations Division. Defence Science and Technology Organisation. DSTO-TR-1756.
- J, B. (2003). Anatomy of Shoulder. from <http://orthoinfo.aaos.org/topic.cfm?topic=A00222>
- Jirattanapothichai, K. (2011). Neck pain. from <http://haamor.com/th/%E0%B8%9B%E0%B8%A7%E0%B8%94%E0%B8%84%E0%B8%AD/>
- Jussila, L., Paananen, M., Nayha, S., Taimela, S., Tammelin, T., Auvinen, J., & Karppinen, J. (2014). Psychosocial and lifestyle correlates of musculoskeletal pain patterns in adolescence: a 2-year follow-up study. *Eur J Pain*, 18(1), 139-146. doi: 10.1002/j.1532-2149.2013.00353.x

- Kjellberg, A. (1990). Psychological aspects of occupational vibration. *Scandinavian Journal of Work and Environmental Health*, 16, 39-43.
- Kuorinka, I., Jonsson, B., Kilbom, A., Vinterberg, H., Biering-Sorensen, F., Andersson, G., & Jorgensen, K. (1987). Standardised Nordic questionnaires for the analysis of musculoskeletal symptoms. *Appl Ergon*, 18(3), 233-237.
- Lee, M. H., Park, S. J., & Kim, J. S. (2013). Effects of neck exercise on high-school students' neck-shoulder posture. *J Phys Ther Sci*, 25(5), 571-574. doi: 10.1589/jpts.25.571
- Lee, S. H., Chen, C. C., Lee, C. S., Lin, T. C., & Chan, R. C. (2008). Effects of needle electrical intramuscular stimulation on shoulder and cervical myofascial pain syndrome and microcirculation. *J Chin Med Assoc*, 71(4), 200-206. doi: 10.1016/s1726-4901(08)70104-7
- Lennard, F. (2012). Neck Pain referred to the Shoulder. from <http://www.shoulderdoc.co.uk/article.asp?article=1529>
- Lliades, C. (2014). Stress Management and Neck Pain. from <http://www.everydayhealth.com/neck-pain/neck-pain-reduce-stress.aspx>
- Ma, C., Szeto, G. P., Yan, T., Wu, S., Lin, C., & Li, L. (2011). Comparing biofeedback with active exercise and passive treatment for the management of work-related neck and shoulder pain: a randomized controlled trial. *Arch Phys Med Rehabil*, 92(6), 849-858. doi: 10.1016/j.apmr.2010.12.037
- Murphy, R., & Carr, A. (2013). Shoulder Pain. from <http://www.mydr.com.au/sports-fitness/shoulder-pain>
- Nilsen, T. I., Holtermann, A., & Mork, P. J. (2011). Physical exercise, body mass index, and risk of chronic pain in the low back and neck/shoulders: longitudinal data from the Nord-Trondelag Health Study. *Am J Epidemiol*, 174(3), 267-273. doi: 10.1093/aje/kwr087
- Ohlsson, K., Attewell, R. G., Palsson, B., Karlsson, B., Balogh, I., Johnsson, B., . . . Skerfving, S. (1995). Repetitive industrial work and neck and upper limb disorders in females. *Am J Ind Med*, 27(5), 731-747.
- Ostergren, P. O., Hanson, B. S., Balogh, I., Ektor-Andersen, J., Isacsson, A., Orbaek, P., . . . Malmö Shoulder Neck Study, G. (2005). Incidence of shoulder and neck pain in a working population: effect modification between mechanical and psychosocial exposures at work? Results from a one year follow up of the Malmö shoulder and neck study cohort. *J Epidemiol Community Health*, 59(9), 721-728. doi: 10.1136/jech.2005.034801

- Pain, I. A. f. t. S. o. (2012). Pain Term. from <https://www.iasp-pain.org/Education/Content.aspx?ItemNumber=1698>
- Palmer, K., Walker-Bone, K., Griffin, M. J., Syddall, H., Pannett, B., Coggon, D., & Cooper, C. (2001). Prevalence and occupational associations of neck pain in the British population. *Scandinavian Journal of Work, Environment & Health*, 27(1), 49-56. doi: 10.5271/sjweh.586
- Panchbhavi, V. K. (2013). Neck Pain. from <http://reference.medscape.com/article/1968303-overview#showall>
- Phillips, C. D. (2012). Cervical Myofascial Pain from <http://emedicine.medscape.com/article/305937-overview#aw2aab6b2b5C>
- Phukranchanamorakot, C., Wajanawisit, W., Laohachareonsombat, W., Kawinwongkowitz, W., & Moonpruk, P. (1994). *Shoulder pain*. Orthopaedic Faculty of Medicine Ramathibodi Hospital.
- Ratini, M. (2013). Pain Management: Neck and Shoulder Pain. from <http://www.webmd.com/pain-management/guide/neck-shoulder>
- Saetan, O., Khiewyoo, J., Jones, C., & Ayuwat, D. (2007). Musculoskeletal Disorders Among Northeastern Construction Workers with Temporary Migration. *Srinagarind Med J*, 22(2), 165-173.
- Schulte, P. A. (2005). Characterizing the burden of occupational injury and disease. *Journal of Occupational and Environmental Medicine*, 47(6), 607-622.
- Service(NHS), N. H. (2012). Shoulder pain - Treatment from <http://www.nhs.uk/Conditions/shoulderpain/Pages/Treatment.aspx>
- Sherman, K. J., Cherkin, D. C., Hawkes, R. J., Miglioretti, D. L., & Deyo, R. A. (2009). Randomized trial of therapeutic massage for chronic neck pain. *Clin J Pain*, 25(3), 233-238. doi: 10.1097/AJP.0b013e31818b7912
- Smedley, J., Inskip, H., Trevelyan, F., Buckle, P., Cooper, C., & Coggon, D. (2003). Risk factors for incident neck and shoulder pain in hospital nurses. *Occup Environ Med*, 60(11), 864-869.
- Songkham, W. (2011). *Effects of a healthy unit guidance (HUG) programme on work environments and health outcomes among nursing personnel*. (Degree of Doctor of Philosophy Program in Public Health), Chulalongkorn University.
- Surgery, A. A. o. O. (2010). Shoulder Pain and Common Shoulder Problems. from <http://orthoinfo.aaos.org/topic.cfm?topic=a00065>
- Thotsathit, N., Puntumetakul, R., Eungpinichpong, W., & Peungsuwan, P. (2009). Prevalence and factors associated with neck and shoulder pain in sewing occupation:



- a study at Banphai district Khon Kaen. *Journal of Physical*, 32(3), 162-172.
- Tungkaserane, J., Tadtanon, D., Chodtanaphod, T., & Kukiattinan, S. (2003). *Neck Pain*. Phrmongkutklao College of Medicine: Orthopaedics For Medical Students.
- Vanderbeek, R. D. (1988). Period prevalence of acute neck injury in US Air Force pilots exposed to high G forces. *Aviation, space, and environmental medicine*, 59(12), 1176-1180.
- Wajanawisit, W., Laohachareonsombat, W., Kawinwongkowitz, W., & Moonpruk, P. (1994). *Neck Pain*. Orthopaedic Faculty of Medicine Ramathibodi Hospital: Orthopaedic.
- Walters, P. L., Cox, J. M., Clayborne, K., & Hathaway, A. J. (2012). Prevalence of Neck and Back Pain amongst Aircrew at the Extremes of Anthropometric Measurements (U. S. A. A. R. L. W. P. Division, Trans.).
- Windsor, R. E. (2013). Cervical Spine Anatomy. from <http://emedicine.medscape.com/article/1948797-overview#a30>



APPENDICES

จุฬาลงกรณ์มหาวิทยาลัย  
**CHULALONGKORN UNIVERSITY**

## APPENDIX A

## Questionnaire

Interviewer Code \_\_\_\_\_ Date and times \_\_\_\_\_

Factors related to neck and shoulder pain among The Royal Thai Air Force pilots Bangkok Thailand

## Description

In order to participate in this study, you are required to complete the questionnaire. Questionnaire is separated into 4 part; first and second part consisted of opened and closed questions, third parts consisted of only closed questions and the last part use the Nordic Musculoskeletal Questionnaire only part of neck and shoulder. The details are showed as following:

Part 1: Personal Characteristics in this part have 23 questions

Part 2: Job Characteristic in this part have 5 questions

Part 3: Posture flexibility in this part have 8 questions

Part 4: Previous history of neck and shoulder pain in this part have 17 questions.

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By Miss Jidapa Polruk College of Public Health Science Chulalongkorn University

**Part 1: Personal Characteristics**

*Instruction:* Please answer by putting a check (✓) in the appropriate box and fill in the answer.

1. Age \_\_\_\_\_ years.

2. Weight \_\_\_\_\_ kilograms.

3. Height \_\_\_\_\_ centimeters.

4. What is your marital status?

Single

Separated/ Divorced

Married

Widow

5. What are you graduated?

Bachelor degree

Master's degree

Degree of Doctor of Philosophy (PhD)

6. How much salary you get it per month?

30,000 – 40,000 baht

40,001 – 50,000 baht

50,001 – 60,000 baht

>60,000 baht

7. How long have you been doing your present type of work?

.....year

8. How is your health status in general?

- Good
- Reasonably good
- Not too bad
- Poor

9. How often do you exercise? (If you say Never, do not answer question No.10)

- Never   $\geq 3$  times/week
- $< 3$  times/week

10. What type of exercise?

- Swimming  Basketball
- Badminton  Others (specific).....

11. Have you ever been drink alcohol before?

- Yes, I'm drinking nowadays.

How often do you drink alcohol;

- Everyday
- 2-3 times/week
- Weekly
- 2-3 times/month
- Once a month
- Less than once a month

How much do you drink alcohol.....glass/time.

- Yes, I did drink in the past .And how long you drunk.....year.
- No, I never drunk

12. Have you ever been smoked cigarette before?

- Yes, I'm smoking nowadays. ....pack/day
- Yes, I did smoke in the past. And how long you smoked.....year.
- No, I never smoked

13. Do you drive to work every day? (If you say No, do not answer question No.14)

- Yes
- No

14. How often you drive to work per week?

- < 3 times/week
- ≥ 3times/week

15. How far from home to work place?

..... kilometers.

16. In your opinion when you have a neck or shoulder pain usually come from another cause?(except flying)

- Sleeping pillow fall
- Lift heavy
- Other (specific).....

## Stress

Instruction: Please read each statement and circle a number 0, 1, 2 or 3 which indicates how much the statement applied to you over the past week. There are no right or wrong answers. Do not spend too much time on any statement.

The rating scale is as follows:

- 0 Did not apply to me at all - NEVER
- 1 Applied to me to some degree, or some of the time - SOMETIMES
- 2 Applied to me to a considerable degree, or a good part of time - OFTEN
- 3 Applied to me very much, or most of the time - ALMOST ALWAYS

17. I found it hard to wind down?	0	1	2	3
18. I tended to over-react to situations?	0	1	2	3
19. I felt that I was using a lot of nervous energy?	0	1	2	3
20. I found myself getting agitated?	0	1	2	3
21. I found it difficult to relax?	0	1	2	3
22. I was intolerant of anything that kept me from getting on with what I was Doing?	0	1	2	3
23. I felt that I was rather touchy?	0	1	2	3
<b>Total</b>				

**Part 2: Job Characteristic**

Instruction: Please answer by putting a check (✓) in the appropriate box and fill in the answer.

24. What is your current pilot position?

Captain                       Co-pilot

25. How many hours total you have doing for flight?

< 400 hours               400 – 800 hours  
 801 – 1200 hours               >1201 hours

26. How many hours average you work per week? (average)

.....hours.

27. How many days you have flight per week? (average)

.....days

28. How long do you spend in each flight?

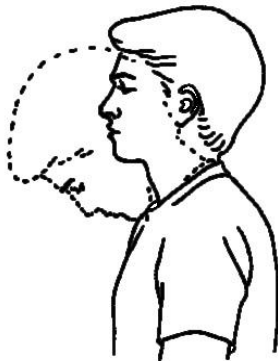
.....hours



**Part 3: Posture flexibility**

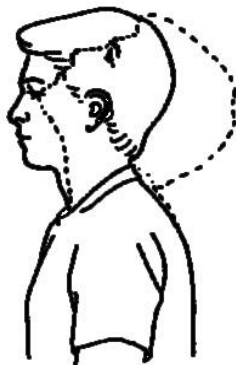
Instruction: Please estimate, how often do you have to do the neck and shoulder posture like these pictures below Please answer by putting a check (✓) in the appropriate box.

29. How often flexion (> 15 degree) of neck per day?



- Never
- 1-2 times per day
- 3-10 times per day
- >10 times per day

30. How often extension of neck per day?



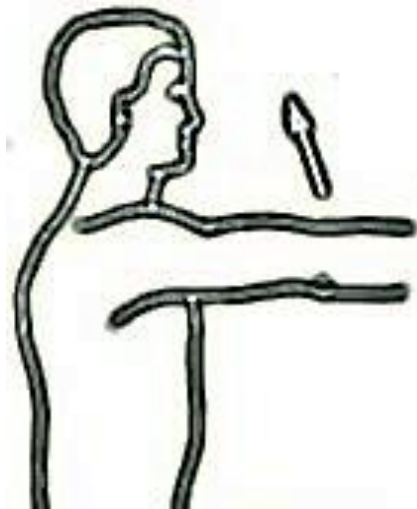
- Never
- 1-2 times per day
- 3-10 times per day
- >10 times per day

31. How often bending per day?



- Never
- 1-2 times per day
- 3-10 times per day
- >10 times per day

32. How often flexion (> 60 degree) of shoulder per day?



- Never
- 1-2 times per day
- 3-10 times per day
- >10 times per day

33. How often extension of shoulder per day?



- Never
- 1-2 times per day
- 3-10 times per day
- >10 times per day

34. Have you ever been illness due to neck and shoulder discomfort?

( If you say No, do not answer question No.35-36 )

- Yes  No

35. Where do you get the treatment for neck and shoulder pain?

- Doctors clinic or hospital
- Drugstore for oral medicine
- Drugstore for massage medicine
- Go to massage store
- No treatment
- Other (specific).....

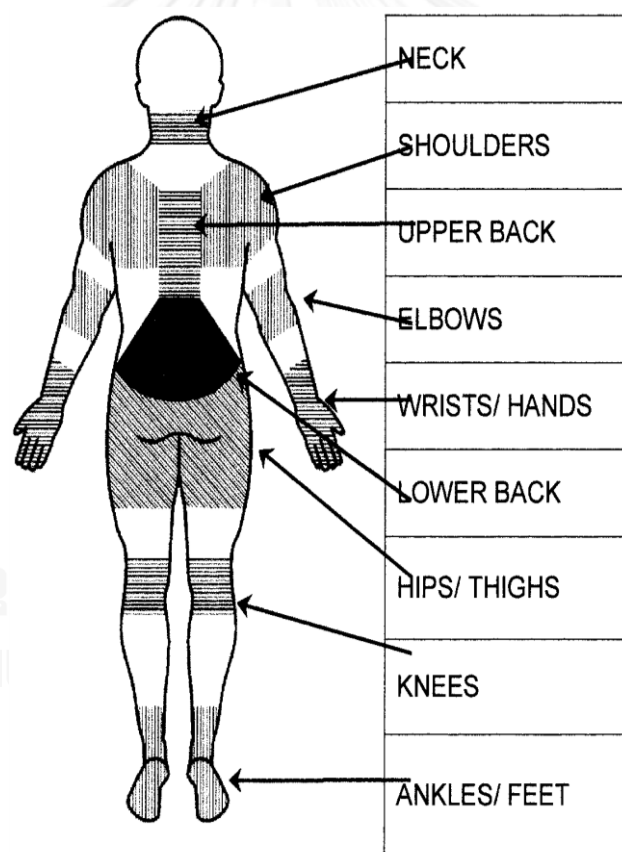
36. In your opinion, the signs of neck and shoulder pain )or discomfort( were form this job.

- Yes
- No

#### Part 4: Previous history of neck and shoulder pain

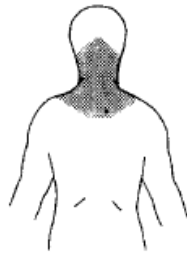
##### The Nordic Musculoskeletal Disorder

The NMQ were used as a questionnaire a structured interview. However, studying the problems regarding neck and shoulder pain by this questionnaire as follow; Show this picture to indicate two symptom sites being neck and shoulders. The question need to research only neck and shoulder. Respondents are asked if they have had any pain in the neck and shoulder trouble in the last 12months and last 7 days which has prevented normal activity.



## Neck

How to answer the questionnaire. By neck trouble is meant ache pain or discomfort in the shaded area. Please concentrate on this area ignoring any trouble you may have in adjacent parts of the body. There is a separate questionnaire for shoulder trouble. Please answer by putting check(✓) in the appropriate box for each question. You may be in doubt as to how to answer but please do your best anyway.



37. Have you ever had neck trouble (ache, pain or discomfort )?

No

Yes

**If you answer No to question 1.do not answer the question 38 – 44.**

38. Have you ever hurt you neck in an accident?

No

Yes

39. Have you ever had to change jobs or duties because neck is trouble?

No

Yes

40.What is the total length of time that you have had neck trouble during the last 12 months?

0 day

1 – 7 days

8 – 30 days

more than 30 days, but not every day

every day

41. Has neck trouble cause you to reduces your activity during the last 12 months?

a) work activity at home or away from home?

No

Yes

b) leisure activity?

No

Yes

42. What is the total length of time that neck trouble has prevented you from doing your normal work (at home or away from home) during the last 12 months?

0 day

1 – 7 days

8 – 30 days

more than 30 days, but not every day

43. Have you been seen by a doctor physiotherapist chiropractor or other such person because of neck trouble during the last 12 months?

No

Yes

44. Have you had trouble at any time during the last 7 days?

No

Yes



49. What is the total length of time that you have had shoulder trouble during the last 12 months?

- 0 day
- 1 – 7 days
- 8 – 30 days
- more than 30 days, but not every day
- every day

50. Has shoulder trouble cause you to reduces your activity during the last 12 months?

a) work activity at home or away from home?

- No  Yes

b) leisure activity?

- No  Yes

51. What is the total length of time that shoulder trouble has prevented you from doing your normal work (at home or away from home) during the last

12 months?

- 0 day
- 1 – 7 days
- 8 – 30 days
- more than 30 days, but not every day

52. Have you been seen by a doctor, physiotherapist, chiropractor or other such person because of shoulder trouble during the last 12 months?

- No  Yes

53. Have you had shoulder trouble at any time during the last 7 days?

- No  Yes



## APPENDIX B

## แบบสอบถาม

1

**แบบสอบถาม**

รหัสผู้สัมภาษณ์ \_\_\_\_\_ วันที่ / เวลา \_\_\_\_\_

**ปัจจัยที่เกี่ยวข้องกับการปวดคอและปวดไหล่ในนักบินกองทัพอากาศไทย กรุงเทพฯ  
ประเทศไทย**

**คำอธิบาย**

กรุณาตอบแบบสอบถามต่อไปนี้ เพื่อใช้เป็นแนวทางประกอบการศึกษา โดยแบบสอบถามจะแบ่งออกเป็น 4 ส่วน ซึ่งส่วนที่ 1 และ 2 จะประกอบด้วยคำถามทั้งปลายเปิดและปลายปิด ส่วนที่ 3 จะคำถามปลายปิดเท่านั้น ส่วนสุดท้าย จะเป็นคำถามเฉพาะเกี่ยวกับอาการปวดกล้ามเนื้อในส่วนของคอและไหล่ ซึ่งมีรายละเอียดดังต่อไปนี้

ส่วนที่ 1 : คุณลักษณะเฉพาะของบุคคล ซึ่งมีทั้งหมด 23 ข้อ

ส่วนที่ 2 : คุณลักษณะของงาน ซึ่งมีทั้งหมด 5 ข้อ

ส่วนที่ 3 : ความยืดหยุ่นของท่าทาง ซึ่งมีทั้งหมด 8 ข้อ

ส่วนที่ 4 : คำถามเฉพาะเกี่ยวกับประวัติในการปวด คอและไหล่ ซึ่งมีทั้งหมด 17 ข้อ

---

โดย น.ส. จิตภา พลรักษ์ วิทยาลัยวิทยาศาสตร์สาธารณสุข จุฬาลงกรณ์มหาวิทยาลัย

ส่วนที่ 1 : คุณลักษณะเฉพาะของบุคคล

คำแนะนำ : กรุณากรอกข้อมูลลงในช่องว่าง หรือทำเครื่องหมายถูก (/) ลงในช่องที่เหลี่ยมให้เหมาะสม



1. อายุ ..... ปี
2. น้ำหนัก ..... กิโลกรัม
3. ความสูง ..... เซนติเมตร
4. สถานภาพ

โสด

แยกกันอยู่/หย่าร้าง

แต่งงาน

หม้าย

เลขที่โครงการวิจัย..... 023-1157

วันที่รับรอง..... 28 ส.ค. 2557

วันหมดอายุ..... 27 ส.ค. 2558

5. ระดับการศึกษา

ป.ตรี

ป.โท

ป.เอก

6. รายได้เฉลี่ยต่อเดือน

30,000 - 40,000 บาท

40,001 - 50,000 บาท

50,001 - 60,000 บาท

มากกว่า 60,000 บาท

7. คุณทำงานเป็นนักบินมานานเท่าไร

.....ปี


8. โดยทั่วไปสุขภาพของคุณเป็นอย่างไร

ดี

พอใช้

ดีพอควร

ไม่ดี

  
 เลขที่โครงการวิจัย ..... 023.1/57  
 วันที่รับรอง ..... 28 ส.ค. 2557  
 วันหมดอายุ ..... 27 ส.ค. 2558

9. คุณออกกำลังกายบ่อยแค่ไหน (ถ้าตอบ ไม่เคย ไม่ต้องตอบคำถามข้อ 10)

ไม่เคย  
 น้อยกว่า 3 ครั้ง/สัปดาห์  
 มากกว่า 3 ครั้ง/สัปดาห์

10. คุณออกกำลังกายประเภทไหน

ว่ายน้ำ  
 บาสเกตบอล  
 แบดมินตัน  
 อื่นๆ (ระบุ) .....

11. คุณเคยดื่มเครื่องดื่มแอลกอฮอล์หรือไม่

เคย และยังคงดื่มอยู่ในปัจจุบัน  
 คุณดื่มเครื่องดื่มแอลกอฮอล์บ่อยแค่ไหน


ทุกวัน  
 2-3 ครั้ง/สัปดาห์  
 สัปดาห์ละครั้ง  
 เดือนละครั้ง  
 น้อยกว่า 1 ครั้ง/เดือน

ปริมาณในการดื่มแอลกอฮอล์โดยเฉลี่ย ..... แก้ว/ครั้ง

เคย แต่ปัจจุบันเลิกแล้ว เคยดื่มเป็นระยะเวลา ..... ปี  
 ไม่เคย

12. คุณเคยสูบบุหรี่หรือไม่

เคย และยังคงสูบบุหรี่ในปัจจุบัน .....ซอง/วัน  
 เคย แต่ปัจจุบันเลิกแล้ว เคยสูบบุหรี่เป็นระยะเวลา ..... ปี  
 ไม่เคย



13. คุณขับรถยนต์มาทำงานทุกวันหรือไม่ ( ถ้าตอบไม่ใช่ ไม่ต้องตอบคำถามข้อที่14 )

ใช่

ไม่ใช่

เลขที่โครงการวิจัย..... 023-1/57

วันที่รับรอง..... 28 ส.ค. 2557

วันหมดอายุ..... 27 ส.ค. 2558

14. คุณขับรถยนต์มาทำงานบ่อยครั้งเท่าไรต่อสัปดาห์

น้อยกว่า 3 ครั้งต่อสัปดาห์

มากกว่า 3 ครั้งต่อสัปดาห์

15. ระยะทางจากบ้านกับที่ทำงานของคุณ เป็นระยะทางประมาณเท่าไร

..... กิโลเมตร

16. ในความคิดของคุณ เมื่อคุณมีอาการปวดคอ หรือ ปวดไหล่มักจะมาจากสาเหตุอื่นได้หรือไม่

( ยกเว้นจากการบิน )

นอนตกหมอน

ยกของหนัก

อื่นๆ (โปรดระบุ).....

**ความเครียด**

คำแนะนำ : โปรดอ่านข้อความแต่ละข้อและวงกลมหมายเลข 0, 1, 2 หรือ 3 ที่ระบุข้อความได้ตรงกับท่านมากสุดในช่วงสัปดาห์ที่ผ่านมา ทั้งนี้

ไม่มีคำตอบที่ถูกหรือคำตอบที่ผิด ท่านไม่ควรใช้เวลามากนักในแต่ละข้อความ  
เกณฑ์การประเมินมีดังนี้:

- 0 ไม่ตรงกับข้าพเจ้าเลย
- 1 ตรงกับข้าพเจ้าบ้าง หรือเกิดขึ้นเป็นบางครั้ง
- 2 ตรงกับข้าพเจ้า หรือเกิดขึ้นบ่อย
- 3 ตรงกับข้าพเจ้ามาก หรือเกิดขึ้นบ่อยมากที่สุด

เลขที่โครงการวิจัย..... 023.1/57  
วันที่รับรอง..... 28 ส.ค. 2557  
วันหมดอายุ..... 27 ส.ค. 2558

17. ข้าพเจ้ารู้สึกว่ายากที่จะผ่อนคลายอารมณ์	0	1	2	3
18. ข้าพเจ้าเริ่มมีปฏิกิริยาตอบสนองต่อสิ่งต่าง ๆ มากเกินไป	0	1	2	3
19. ข้าพเจ้ารู้สึกว่าข้าพเจ้าวิตกกังวลมาก	0	1	2	3
20. ข้าพเจ้าเริ่มรู้สึกว่าข้าพเจ้ามีอาการกระวนกระวายใจ	0	1	2	3
21. ข้าพเจ้ารู้สึกไม่ผ่อนคลาย	0	1	2	3
22. ข้าพเจ้าทนไม่ได้กับภาวะใดก็ตามที่ทำให้ข้าพเจ้าไม่สามารถทำอะไรต่อจากที่ข้าพเจ้ากำลังกระทำอยู่	0	1	2	3
23. ข้าพเจ้ารู้สึกว่าข้าพเจ้าค่อนข้างมีอาการเหนื่อยง่าย	0	1	2	3
คะแนนรวมทั้งหมด				

ส่วนที่ 2 : คุณลักษณะของงาน

กำหนดให้ : กรุณากรอกข้อมูลลงในช่องว่าง หรือทำเครื่องหมายถูก (/) ลงในช่องที่เหลี่ยม

ให้เหมาะสม



เลขที่โครงการวิจัย..... 023.1.137  
 อนุมัติรับรอง..... 28 ส.ค. 2557  
 วันหมดอายุ..... 27 ส.ค. 2558

24. ตำแหน่งนักบินในปัจจุบันของคุณ

- นักบินที่ 1  
 นักบินที่ 2

25. ชั่วโมงบินรวมของคุณคือเท่าไร

- < 400 ชั่วโมง  
 401 – 800 ชั่วโมง  
 801 – 1200 ชั่วโมง  
 > 1201 ชั่วโมง

26. ชั่วโมงบินเฉลี่ยต่อสัปดาห์ จำนวน ..... ชั่วโมง

27. จำนวนวันที่ทำการบินเฉลี่ยต่อสัปดาห์ จำนวน ..... วัน

28. ชั่วโมงบินโดยเฉลี่ยในแต่ละเที่ยวบิน จำนวน ..... ชั่วโมง

### ส่วนที่ 3 : ลักษณะท่าทาง

คำแนะนำ : ให้ประเมินจำนวนครั้งของการปฏิบัติท่าทางต่างๆ ของ คอและไหล่ ตามภาพ โดยประมาณต่อวัน และทำเครื่องหมายถูก (/) ลงในช่องสี่เหลี่ยมให้เหมาะสม



เลขที่โครงการวิจัย..... 023.1/57  
วันที่รับรอง..... 28 ส.ค. 2557  
วันหมดอายุ..... 27 ส.ค. 2558

29. การก้มคอ (> 15 องศา) ประมาณกี่ครั้งต่อวัน



- ไม่เคย
- 1 - 2 ครั้ง/วัน
- 3 - 10 ครั้ง/วัน
- มากกว่า 10 ครั้ง/วัน

30. การเงยคอ ประมาณกี่ครั้งต่อวัน



- ไม่เคย
- 1 - 2 ครั้ง/วัน
- 3 - 10 ครั้ง/วัน
- มากกว่า 10 ครั้ง/วัน



31. การเอียงคอ ประมาณกี่ครั้งต่อวัน



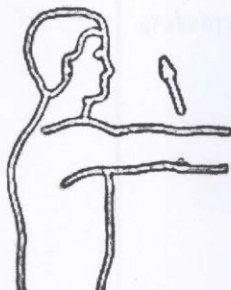
- ไม่เคย  
 1 - 2 ครั้ง/วัน  
 3 - 10 ครั้ง/วัน  
 > 10 ครั้ง/วัน

เลขที่โครงการวิจัย 023.1/57

วันที่รับรอง 28 ส.ค. 2557

วันหมดอายุ 27 ส.ค. 2558

32. การกางแขนไปข้างหน้า ประมาณกี่ครั้งต่อวัน



- ไม่เคย  
 1 - 2 ครั้ง/วัน  
 3 - 10 ครั้ง/วัน  
 > 10 ครั้ง/วัน

33. การกางแขนไปด้านหลัง ประมาณกี่ครั้งต่อวัน



- ไม่เคย  
 1 - 2 ครั้ง/วัน  
 3 - 10 ครั้ง/วัน  
 > 10 ครั้ง/วัน



34. คุณเคยมีอาการเจ็บป่วย ไม่สุขสบาย เนื่องจากอาการปวดคอและปวดไหล่หรือไม่

ใช่

ไม่

ถ้า "ไม่" ไม่ต้องตอบคำถามข้อที่ 35-36



เลขที่โครงการวิจัย..... 023.1/57

วันที่รับรอง..... 28 ส.ค. 2557

วันหมดอายุ..... 27 ส.ค. 2558

35. เมื่อคุณมีอาการปวดคอหรือไหล่ คุณเข้ารับการรักษาที่ไหน

พบแพทย์ที่คลินิก หรือ โรงพยาบาล

ซื้อยารับประทานเอง

ซื้อยามานวดเอง

ไปนวด หรือ ให้คนอื่นนวดให้

ไม่ได้รับการรักษา

อื่นๆ(โปรดระบุ).....

36. คุณคิดว่าอาการปวดคอและไหล่ เป็นผลมาจากการที่คุณทำหรือไม่

ใช่

ไม่

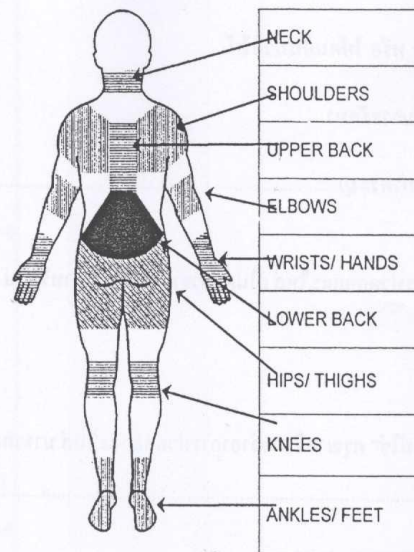
ถ้าตอบ "ไม่ใช่" กรุณาอธิบายว่าอาการปวดคอและไหล่ มาจากสาเหตุใด

.....

#### ส่วนที่ 4 : ประวัติอาการเจ็บปวดบริเวณคอและไหล่

แบบสอบถามมาตรฐานเกี่ยวกับการประเมินความผิดปกติทางระบบกระดูกและกล้ามเนื้อ

แบบสอบถามมาตรฐานเกี่ยวกับการประเมินความผิดปกติทางระบบกระดูกและกล้ามเนื้อ ถูกใช้ เป็นแบบอย่างในการทำแบบสอบถาม ซึ่งในแบบสอบถามนี้จะใช้สำหรับการศึกษา อาการเจ็บปวดของ คอและไหล่ เท่านั้น จากรูปภาพจะแสดงบริเวณส่วนต่างๆ ของร่างกาย ที่สามารถทำให้เกิดอาการเจ็บปวด ขึ้นได้ โดยให้ผู้ตอบแบบสอบถาม ตอบเกี่ยวกับอาการเจ็บปวดของคอและไหล่ ซึ่งมีผลต่อการทำงาน ชีวิตประจำวันในช่วงระยะเวลา 12 เดือนที่ผ่านมา และช่วงระยะเวลา 7 วันที่ผ่านมา



เลขที่โครงการวิจัย..... 023..1/57

วันที่รับรอง..... 28 ส.ค. 2557

วันที่หมดอายุ..... 27 ส.ค. 2558

### ค.อ

คำแนะนำ ในการตอบแบบสอบถาม ในส่วนของอาการเจ็บปวดบริเวณคอ คือพื้นที่สีทึบในภาพ และไม่  
 ต้องคำนึงถึงอาการเจ็บปวดในส่วนอื่นๆ ของร่างกายนอกเหนือจากนี้ ส่วนของแบบสอบถามเกี่ยวกับ  
 อาการเจ็บปวดบริเวณไหล่จะแยกไว้อีกส่วนหนึ่ง กรุณาตอบแบบสอบถาม โดยการทำเครื่องหมายถูก ( / )  
 ลงในช่องสี่เหลี่ยมให้เหมาะสม



ชื่อโครงการวิจัย..... 023.1/57  
 วันที่รับรอง..... 28 มี.ค. 2557  
 วันหมดอายุ..... 27 มี.ค. 2558

37. คุณเคยมีอาการเจ็บปวดบริเวณคอหรือไม่

ไม่เคย  เคย

ถ้า ไม่เคย ไม่ต้องตอบคำถามข้อ 38 – 44

38. คุณเคยมีอาการเจ็บปวดบริเวณคอเนื่องจากอุบัติเหตุหรือไม่

ไม่เคย  เคย

39. คุณเคยต้องเปลี่ยนหน้าที่หรืองาน เนื่องจากอาการเจ็บปวดบริเวณคอหรือไม่

ไม่เคย  เคย

40. ในช่วงระยะเวลา 12 เดือนที่ผ่านมา คุณมีอาการเจ็บปวดบริเวณคอ รวมแล้วเป็นระยะเวลา  
 เท่าไหร่

- 0 วัน  
 1 – 7 วัน  
 8 – 30 วัน  
 มากกว่า 30 วัน แต่ไม่ทุกวัน  
 ทุกวัน

41. ในช่วงระยะเวลา 12 เดือนที่ผ่านมา อาการเจ็บปวดบริเวณคอ ส่งผลต่อการทำกิจกรรมต่าง  
ของคุณให้ลดลงหรือไม่

ก) การทำงานปกติในบ้าน หรือ ที่ทำงาน

ไม่ใช่

ใช่

ข) การทำกิจกรรม ในยามว่าง

ไม่ใช่

ใช่



เลขที่โครงการวิจัย..... 023.1157

วันที่รับรอง..... 28 ส.ค. 2557

วันหมดอายุ..... 27 ส.ค. 2558

42. ในช่วงระยะเวลา 12 เดือนที่ผ่านมา อาการเจ็บปวดบริเวณคอ ส่งผลให้คุณไม่สามารถ  
ทำงานได้เป็นปกติ รวมแล้วเป็นระยะเวลาเท่าไร

0 วัน

1 – 7 วัน

8 – 30 วัน

มากกว่า 30 วัน แต่ไม่ใช่ทุกวัน

43. ในช่วงระยะเวลา 12 เดือนที่ผ่านมา คุณเคยไปพบแพทย์ เนื่องจากอาการเจ็บปวด  
บริเวณคอหรือไม่

ไม่เคย

เคย

44. ในช่วงระยะเวลา 7 วันที่ผ่านมา คุณมีอาการเจ็บปวดบริเวณคอหรือไม่

ไม่ใช่

ใช่

## ไพล่

คำแนะนำ ในการตอบแบบสอบถาม ในส่วนของอาการเจ็บปวดบริเวณ ไหล่ คือพื้นที่สีทึบในภาพ และไม่ต้องคำนึงถึงอาการเจ็บปวดในส่วนอื่นๆ ของร่างกายนอกเหนือจากนี้ ส่วนของแบบสอบถามเกี่ยวกับอาการเจ็บปวดบริเวณคอจะแยกไว้ อีกส่วนหนึ่ง กรุณาตอบแบบสอบถาม โดยการทำเครื่องหมายถูก (/) ลงในช่องสี่เหลี่ยมที่เหมาะสม



ที่โครงการวิจัย 023.1/57  
วันที่รับรอง 28 ส.ค. 2557  
วันหมดอายุ 27 ส.ค. 2558

45. คุณเคยมีอาการเจ็บปวดบริเวณไหล่หรือไม่

- ไม่เคย  เคย

ถ้า ไม่เคย ไม่ต้องตอบคำถามข้อ 46 – 53

46. คุณเคยมีอาการเจ็บปวดบริเวณไหล่เนื่องจากอุบัติเหตุหรือไม่

- ไม่เคย  เคย

47. คุณเคยต้องเปลี่ยนหน้าที่หรือเปลี่ยนงาน เนื่องจากอาการเจ็บปวดบริเวณไหล่หรือไม่

- ไม่เคย  เคย

48. ในช่วงระยะเวลา 12 เดือนที่ผ่านมา คุณมีอาการเจ็บปวดบริเวณ ไหล่หรือไม่

- ไม่ใช่  
 ใช่ ปวดไหล่ขวา  
 ใช่ ปวดไหล่ซ้าย  
 ใช่ ปวดทั้งสองไหล่

ถ้า ไม่ใช่ ไม่ต้องตอบคำถามข้อ 49 -53



49. ในช่วงระยะเวลา 12 เดือนที่ผ่านมา คุณมีอาการเจ็บปวดบริเวณไหล่ รวมแล้วเป็น

ระยะเวลาเท่าไร

- 0 วัน  
 1 – 7 วัน  
 8 – 30 วัน  
 มากกว่า 30 วัน แต่ไม่ทุกวัน  
 ทุกวัน

เลขที่โครงการวิจัย..... 023-1/57

วันที่รับรอง..... 28 ส.ค. 2557

วันหมดอายุ..... 27 ส.ค. 2558

50. ในช่วงระยะเวลา 12 เดือนที่ผ่านมา อาการเจ็บปวดบริเวณไหล่ ส่งผลต่อการทำกิจกรรม

ต่างๆของคุณให้ลดลงหรือไม่

ก) การทำงานปกติในบ้าน หรือ ที่ทำงาน

ไม่ใช่  ใช่

ข) การทำกิจกรรม ในยามว่าง

ไม่ใช่  ใช่

51. ในช่วงระยะเวลา 12 เดือนที่ผ่านมา อาการเจ็บปวดบริเวณไหล่ ส่งผลให้คุณไม่สามารถทำงานได้เป็นปกติ รวมแล้วเป็นระยะเวลาเท่าไร

- 0 วัน  
 1 – 7 วัน  
 8 – 30 วัน  
 มากกว่า 30 วัน แต่ไม่ทุกวัน

52. ในช่วงระยะเวลา 12 เดือนที่ผ่านมา คุณเคยไปพบแพทย์ เนื่องจากอาการเจ็บปวดบริเวณไหล่หรือไม่

ไม่เคย  เคย

53. ในช่วงระยะเวลา 7 วันที่ผ่านมา คุณมีอาการเจ็บปวดบริเวณไหล่หรือไม่

ไม่ใช่  ใช่

APPENDIX C  
INFORM CONSENT FORM

AF 05-07

**หนังสือแสดงความยินยอมเข้าร่วมการวิจัย**

ทำที่.....  
วันที่.....เดือน.....พ.ศ. ....

เลขที่ของผู้มีส่วนร่วมในการวิจัย.....

ข้าพเจ้า ซึ่งได้ลงนามท้ายหนังสือนี้ ขอแสดงความยินยอมเข้าร่วมโครงการวิจัย

ชื่อโครงการวิจัย บัณฑิตที่เกี้ยวข้องกับการปวดคอและปวดไหล่ในนักบินกองทัพอากาศไทย กรุงเทพฯ ประเทศไทย

ชื่อผู้วิจัย นางสาวจิตภา พลรักษ์

ที่อยู่ติดต่อ วิทยาลัยวิทยาศาสตร์สารสนเทศ จุฬาลงกรณ์มหาวิทยาลัย (อาคารสถาบัน 3 ชั้น 11)

โทรศัพท์ 084 377 4554

ข้าพเจ้า ได้รับทราบรายละเอียดเกี่ยวกับที่มาและวัตถุประสงค์ในการทำวิจัย รายละเอียดขั้นตอนต่างๆ ที่จะต้องปฏิบัติหรือได้รับการปฏิบัติ ความเสี่ยงอันตราย และประโยชน์ซึ่งเกิดขึ้นจากการวิจัยเรื่องนี้ โดยได้อ่านรายละเอียดในเอกสารชี้แจงผู้เข้าร่วมการวิจัยโดยตลอด และได้รับคำอธิบายจากผู้วิจัย จนเข้าใจเป็นอย่างดีแล้ว

ข้าพเจ้าจึงสมัครใจเข้าร่วมในโครงการวิจัยนี้ ตามที่ระบุไว้ในเอกสารชี้แจงผู้เข้าร่วมการวิจัย โดยข้าพเจ้ายินยอม ตอบแบบสอบถามงานวิจัยครั้งนี้ ซึ่งมีคำถามทั้งหมดจำนวน 53 ข้อ โดยเก็บแบบสอบถามจำนวน 1 ครั้ง และใช้ระยะเวลาในการตอบแบบสอบถามประมาณ 10-15 นาที เมื่อเสร็จสิ้นการวิจัยแล้ว แบบสอบถามของข้าพเจ้าจะถูกทำลายด้วยวิธีที่เหมาะสม

ข้าพเจ้ามีสิทธิถอนตัวออกจากกรวิจัยเมื่อใดก็ได้ตามความประสงค์ โดยไม่ต้องแจ้งเหตุผล ซึ่งการถอนตัวออกจากกรวิจัยนั้น จะไม่มีผลกระทบต่อในทางใดๆ ต่อตำแหน่งงานของข้าพเจ้าทั้งสิ้น

ข้าพเจ้าได้รับคำรับรองว่า ผู้วิจัยจะปฏิบัติตามข้อข้อมูลที่ระบุไว้ในเอกสารชี้แจงผู้เข้าร่วมการวิจัย และข้อมูลใดๆ ที่เกี่ยวข้องกับข้าพเจ้า ผู้วิจัยจะเก็บรักษาเป็นความลับ โดยจะนำเสนอข้อมูลการวิจัยเป็นภาพรวมเท่านั้น ไม่มีข้อมูลใดในการรายงานที่จะนำไปสู่การระบุตัวข้าพเจ้า

หากข้าพเจ้าไม่ได้รับการปฏิบัติตามที่ได้ระบุไว้ในเอกสารชี้แจงผู้เข้าร่วมการวิจัย 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..... ลงชื่อ.....  
(.....) (.....)

ผู้วิจัยหลัก ผู้มีส่วนร่วมในการวิจัย

เลขที่โครงการวิจัย 023.1/FA

วันที่รับรอง 28 มี.ค. 2557

วันหมดอายุ 27 มี.ค. 2558

.....  
พยาน

ณีนภฯ งานบริหารฯสก๓

## APPENDIX D

## ETHICAL APPROVAL FOR THE STUDY

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](mailto:eccu@chula.ac.th)

COA No. 050/2014



## Certificate of Approval

**Study Title** No.023.1/57 : **FACTORS RELATED TO NECK AND SHOULDER PAIN AMONG THE ROYAL THAI AIR FORCE PILOTS BANGKOK THAILAND**

**Principal Investigator** : MS. JIDAPA POLRUK

**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:  Signature:   
(Associate Professor Prida Tasanapradit, M.D.) (Assistant Professor Dr. Nuntaree Chaichanawongsoj)  
Chairman Secretary

Date of Approval : 28 March 2014

Approval Expire date : 27 March 2015

## The approval documents including

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



Protocol No. 023.1/57  
Date of Approval 28 MAR 2014  
Approval Expire Date 27 MAR 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.



AF 01-12



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

COA No. 050/2557

## ใบรับรองโครงการวิจัย

โครงการวิจัยที่ 023.1/57 : ปัจจัยที่เกี่ยวข้องกับการปวดคอและปวดไหล่ในนักบินกองทัพอากาศไทย  
ประเทศไทย

ผู้วิจัยหลัก : นางสาวจิตภา พลรัถษ์

หน่วยงาน : วิทยาลัยวิทยาศาสตร์สาธารณสุข จุฬาลงกรณ์มหาวิทยาลัย

คณะกรรมการพิจารณาจริยธรรมการวิจัยในคน กลุ่มสหสถาบัน ชุดที่ 1 จุฬาลงกรณ์มหาวิทยาลัย  
ได้พิจารณา โดยใช้หลัก ของ The International Conference on Harmonization – Good Clinical Practice  
(ICH-GCP) อนุมัติให้ดำเนินการศึกษาวิจัยเรื่องดังกล่าวได้

ลงนาม..... ประทีป ประดิษฐ์

(รองศาสตราจารย์ นายแพทย์ปริดา ทักตนประดิษฐ์)

ประธาน

ลงนาม..... นันทรี ชัยชนะวงศาโรจน์

(ผู้ช่วยศาสตราจารย์ ดร.นันทรี ชัยชนะวงศาโรจน์)

กรรมการและเลขานุการ

วันที่รับรอง : 28 มีนาคม 2557

วันหมดอายุ : 27 มีนาคม 2558

## เอกสารที่คณะกรรมการรับรอง

- 1) โครงการวิจัย
- 2) ข้อมูลสำหรับกลุ่มประชากรหรือผู้มีส่วนร่วมในการวิจัยและใบยินยอมของกลุ่มประชากรหรือผู้มีส่วนร่วมในการวิจัย
- 3) ผู้วิจัย
- 4) แบบสอบถาม



เลขที่โครงการวิจัย..... 023.1/57

วันที่รับรอง..... 28 มี.ค. 2557

วันหมดอายุ..... 27 มี.ค. 2558

## เงื่อนไข

1. ข้าพเจ้ารับทราบว่าเป็นการคิดจริยธรรม หากดำเนินการเก็บข้อมูลการวิจัยก่อนได้รับการอนุมัติจากคณะกรรมการพิจารณาจริยธรรมการวิจัยฯ
2. หากใบรับรองโครงการวิจัยหมดอายุ การดำเนินการวิจัยต้องยุติ เมื่อต้องการต่ออายุต้องขออนุมัติใหม่ล่วงหน้าไม่ต่ำกว่า 1 เดือน พร้อมส่งรายงานความก้าวหน้าการวิจัย
3. ต้องดำเนินการวิจัยตามที่ระบุไว้ในโครงการวิจัยอย่างเคร่งครัด
4. ใช้เอกสารข้อมูลสำหรับกลุ่มประชากรหรือผู้มีส่วนร่วมในการวิจัย ใบยินยอมของกลุ่มประชากรหรือผู้มีส่วนร่วมในการวิจัย และเอกสารเชิญเข้าร่วมวิจัย (ถ้ามี) เฉพาะที่ประทับตราคณะกรรมการเท่านั้น
5. หากเกิดเหตุการณ์ไม่พึงประสงค์ร้ายแรงในสถานที่เก็บข้อมูลที่ขออนุมัติจากคณะกรรมการ ต้องรายงานคณะกรรมการภายใน 5 วันทำการ
6. หากมีการเปลี่ยนแปลงการดำเนินการวิจัย ให้ส่งคณะกรรมการพิจารณารับรองก่อนดำเนินการ
7. โครงการวิจัยไม่เกิน 1 ปี ส่งแบบรายงานสิ้นสุดโครงการวิจัย (AF 03-12) และบทคัดย่อผลการวิจัยภายใน 30 วัน เมื่อโครงการวิจัยเสร็จสิ้น สำหรับโครงการวิจัยที่เป็นวิทยานิพนธ์ให้ส่งบทคัดย่อผลการวิจัย ภายใน 30 วัน เมื่อโครงการวิจัยเสร็จสิ้น

## APPENDIX E

## BUDGETS

Category	Item Totals (THB)	Sub-Totals (THB)
<b>Direct Expenses</b> <ul style="list-style-type: none"> <li>● Survey Supplies Expense 5,000</li> <li>● Materials and Supplies 2,000</li> <li>● Questionnaire Printing 3,000</li> <li>● Incentive 10,000</li> </ul>		
<b>Sub Totals</b>		20,000
<b>Travel Expense</b> <ul style="list-style-type: none"> <li>● Transportation 4,000</li> <li>● Meals 6,000</li> </ul>		
<b>Total Travel Expenses</b>		10,000
<b>TOTAL PROJECT EXPENSES</b>	<b>30,000</b>	

APPENDIX F

WORK PLACE AND COLLECTED DATA







**VITA**

Name : Miss Jidapa Polruk

Date of Birth : 15 June 1985

Place of Birth : Yala, Thailand

Education : Bachelor of Science in Nursing (2004-2008)  
The Royal Thai Air Force Nursing College  
Bangkok, Thailand

Work Experiences : Registered Nurse at Orthopaedic Center and  
Intensive unit  
Bhumibol Adulyadej Hospital, Bangkok Thailand  
April 2008- October 2009

Registered Nurse at Digestive Disease Center  
Bumrungrad International Hospital, Bangkok  
September 2010 - May 2013



จุฬาลงกรณ์มหาวิทยาลัย  
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