THE PREVALENCE AND WORK-RELATED FACTOR NECK AND SHOULDER PAIN AMONG CRITICAL CARE NURSING PERSONNEL IN RAMATHIBODI HOSPITAL, BANGKOK

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THE PREVALENCE AND WORK-RELATED FACTOR NECK AND SHOULDER PAIN AMONG CRITICAL CARE NURSING PERSONNEL IN RAMATHIBODI HOSPITAL, BANGKOK

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ABSTRACT

This study was a cross-sectional study using self-administered questionnaires to investigate the prevalence rate of work-related neck and shoulder pain and to determine factors affecting neck and shoulder pain in critical care nursing personnel at Ramathibodi hospital in Thailand. It was conducted among 205 full-time nursing personnel during 15 May to December 2009. The RULA (Rapid Upper Limb Assessment) was introduced to describe the working posture. Chi-square test is used to determine difference between the study groups of variables. Descriptive statistics was used to analyze the data such as percentage, mean, standard deviation (SD). Odds ratio and 95% confidence interval were used to determine the relationship between independent variables and neck and shoulder pain.

The results indicated that the prevalence of work related neck and shoulder pain among critical care nursing personnel was 69.4%, followed by low back pain (57.50%) and upper back pain (57%). The significantly associated factors with neck and shoulder pain were working hours per day greater than 8 ($p=0.014$) and high RULA score at right and left side ($p=0.049$). The results showed the relationship between factors and neck and shoulder pain after using a binary logistic regression model. The risk factors such as high RULA score at right and left side, more than8 hours work per day, low decision latitude, and accepting emergency patients were significantly associated with neck and shoulder pain ($p=0.026$, $p=0.049$, $p=0.047$, $p=0.046$, respectively)

It was concluded that neck and shoulder pain was a common health problem among these nurses. Their physical workload, psychosocial and individual factors must be taken into account to improve the working conditions. The results of RULA and their work practices should be considered in guidelines for risk reduction strategies.

KEY WORDS : NURSING PERSONNEL/ MUSCULOSKELETAL COMPLAINT/ /NURSING ACTIVITY/ WORKING POSTURE

130 pages

การศึกษาความชุกและปัจจัยที่เกี่ยวข้องกับการทำงานกับอาการปวดคอ และ ไหล่ ในบุคคลากรพยาบาลแผนกวิกฤตโรงพยาบาลรามาธิบดีกรุงเทพมหานคร

THE PREVALENCE AND WORK-RELATED FACTOR NECK AND SHOULDER PAIN AMONG CRITICAL CARE NURSING PERSONNEL IN RAMATHIBODI HOSPITAL, BANGKOK

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บทคัดย่อ

การศึกษานี้เป็นการวิจัยแบบเชิงสำรวจภาคตัดขวางเพื่อศึกษาความชุกและปัจจัยที่มีความสัมพันธ์กับอาการปวดคอและไหล่จากการทำงานในบุคลากรพยาบาลในแผนกการดูแลผู้ป่วยวิกฤติโรงพยาบาลรามาธิบดีกรุงเทพฯ โดยเลือกกลุ่มตัวอย่างแบบเฉพาะเจาะจงบุคลากรเพศหญิงทั้งหมดจำนวน205คน ที่ทำงานในแผนกการดูแลผู้ป่วยวิกฤติที่มีอายุงานตั้งแต่ 1 ปีขึ้นไป เก็บรวบรวมข้อมูลช่วง15 พฤษภาคมถึงเดือนธันวาคม 2009 แบบประเมิน RULA ถูกนำมาใช้เพื่อการศึกษาท่าทางการทำงานของกลุ่มเป้าหมาย สถิติที่ใช้คือค่าร้อยละ ค่าเฉลี่ย มัชฌิมาเลขคณิต และส่วนเบี่ยงเบนมาตรฐาน วิเคราะห์หาความสัมพันธ์โดยใช้สถิติไค-สแควร์ และ ใช้ สถิติถดถอยเพื่อทำนายปัจจัยที่มีความสัมพันธ์

ผลการศึกษาพบความความชุกของการเกิดอาการปวดคอ และ ไหล่จากการทำงานในบุคลากรพยาบาลแผนกการดูแลผู้ป่วยวิกฤติคิดเป็นร้อยละ69.4 รองลงมาได้แก่บริเวณหลังส่วนล่าง(ร้อยละ57.50) และ หลังส่วนบน(ร้อยละ57) นอกจากนี้ยังพบปัจจัยที่มีความสัมพันธ์กับอาการปวดคอ และ ไหล่จากการทำงานอย่างมีนัยสำคัญทางสถิติที่ระดับนัยสำคัญ p=0.05 ได้แก่ การทำงานมากกว่า 8ชั่วโมงต่อวัน(p=0.014), คะแนน RULA ระดับสูงทั้งข้างซ้าย และ ขวา (p=0.049) และเมื่อใช้สถิติถดถอยทำนายปัจจัยที่มีความสัมพันธ์(binary logistic regression)พบว่าการทำงานมากกว่า 8ชั่วโมงต่อวัน (p=0.049) คะแนนRULAระดับสูงข้างขวา และ ซ้าย(p=0.026), การมีอำนาจตัดสินใจต่ำ(p=0.047)และท่าทางการทำงานที่มืออยู่ห่างจากลำตัวในแนวราบ(p=0.046)มีความสัมพันธ์อย่างมีนัยสำคัญทางสถิติกับอาการปวดคอ และ ไหล่จากการทำงาน

ผลการศึกษา อาการปวดคอ และ ไหล่จากการทำงานเป็นปัญหาทางสุขภาพที่พบบ่อยในบุคลากรพยาบาลแผนกวิกฤต ข้อมูลเกี่ยวกับปัจจัยจากการทำงาน ปัจจัยทางจิตสังคม และ ปัจจัยส่วนบุคคลควรนำมาใช้เป็นข้อมูลปรับปรุงการสภาพการทำงาน ผลของการประเมินโดยวิธี RULA ควรนำมาพิจารณาร่วมเพื่อลดปัจจัยเสี่ยงจากการทำงานที่จะเกิดขึ้นต่อไป

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LIST OF ABBREVIATIONS

Abbreviation or symbol	Term
ORs	Odd Ratio
RULA	Rapid Upper Limb Assessment
WMSDs	Work-related musculoskeletal disorder
hr	hour
wk	week
BMI	body mass index
Fig.	Figure
RNs	registered nurse
LPN	license practical nurse
NIOSH	The National Institute for Occupational Safety and Health
OSHA	The Occupational Safety and Health Administration

CHAPTER I
INTRODUCTION

1.1 Background and rationale

Work related neck and shoulder pain are common health problems among general population and worker (1). It has been found in many epidemiological studies that female has higher risk for work-related neck and upper limb musculoskeletal disorders than males (2, 3). Approximately 50% of worker has at least one occurrence of neck/shoulder pain during their lifetime (4).

According to the Bureau of Labor Statistics 2006, the nursing personnel were in the second rank of musculoskeletal disorder (MSDs). In 2007, this group had been reported for the highest incidence rate of MSDs (5).

The major cause of MSDs among nursing personnel is patient handling activity such as lifting, transferring and repositioning. (6,7). Several studies have been conducted to specify the physical factors such as forceful exertion, manual handling, awkward postures, bending and twisting. These are prominent factor of MSDs. Some studies identified that non-biomechanical factor such as low psychosocial job demands and lack of social support were related to low back and neck/shoulder pain among nursing staff. (8,9,10). The other personal characteristic factor such as gender, age, body mass index (BMI) and smoking were predisposed to MSDs, but these factors required further assessment (11). Related to the quality of sleep, Masaya Takahashi et al, 2006 determined the association between sleep problems and MSDs among 98 staffs at three nursing homes. The result showed that arm pain was significantly associated with less difficulty initiating sleep (OR 6.70). (12).

Besides, Health Resources and Services Administration (HRSA) had reported the shortage of registered nurses. This problem was begun in 2007 and one of the main caused were MSDs. These will be suspected to increase to 20%-29% in 2020. (13)

According to Thailand 2003, Thanes Sinsongsook has surveyed the prevalence of musculoskeletal complaints among nursing personnel at King Chulalongron Memorial Hospital. Low back pain was the major cause (33.4%), another causes were shoulder pain (19.8%) and upper back pain (19.4%). (14,15). In a 2004, Jirisuda Thaneerat has surveyed the musculoskeletal pain in Pathumthani Hospital personnel. The results showed that the highest prevalence musculoskeletal pain was at low back (28.3%); neck and right shoulder was twice from low back region (19.8%). (16).

There is few statistics report MSDs in Thailand among nursing personnel. Nursing group are at high risk group of work related MSD. The characteristic of works task is often found to transfer the patient and to change patient's position as in-out bed. The natures of lifting were mostly manual handling. These would cause strain and sprain on back, neck and shoulder muscle (7, 8). When this activity is performed for a long period, it may develop the work related MSD. In Critical care unit, the most common patients were found in a serious condition and critical situation. 95% of patients have problems of self care activity and they need help for daily activity such as eating, excretion, and turning position. All tasks have increased nursing workload. Critical care unit have more specific equipments such as ventilator, monitor, cardiac support, other life support equipment and many cables around bed. These equipments have limited activity, force and posture of nursing personnel working hours (20).

The North American Industry Classification System (NAICS) studied the workers' compensation claims in acute care unit. Ergonomics injuries were estimated 50% of claim. (17).

According to the statistic reported in Ramathibodi Hospital during three-year period (2000-2002), 1,061 staff (33.2%) was found to show sign and symptom of work-related musculoskeletal pain. 50% of symptom occurred after their work. These databases did not show the detail of occupation group and the body pain. Thus, it was not confirmed about the specific type of injury, severity and part of body pain in another unit of all staffs. In previous study, low back pain have been a common report of work-related MSDs among nursing personnel so that the hospital staff requested special equipments to reduce low back strain and to ensure safety of

low back muscle. The equipment was plate slide to move and transfer patient. In some countries, devices for raise patient in and out bed such as patient host, a sling lift and hydraulic life were used. The recently study showed high prevalence of neck and shoulder pain among nursing staffs than low back pain. (18)

This research described the prevalence rate of work-related neck and shoulder pain, and determined factors affecting neck and shoulder pain. Because there was rare study on this part of the body but now there is increasing of complaints of MSDs in this part of body than in low back. (18).

Therefore, this research study focused on critical care nursing staffs because of this unit has to expose to high working load than in other unit in hospital. This nursing staffs always perform their work task face to face with life-threatening situation and serious condition. Patients required support for daily life activity, thus this entire group expose high risk factor than general ward.

Several literature reviews have reported a relationship among musculoskeletal disorder and ergonomic risk factor in nurses. However, nursing staff in Thailand and in other country are different in term of salary, life-style and culture, etc. Then the data from overseas may not be appropriate for Thai people. There were lots of accidents such as medication error, incidence and occurrence data in many hospitals in Thailand, while there was lack of data on work- related disease. Most of work- related illnesses are chronic disease, whereas the causes of diseases or symptoms were not clear. In addition, there was no data on the severity of the disease.

Ergonomics is the science of proper job demands and work conditions to worker (19). Ergonomics in health care sector still lags far behind other industries, such as transportation, manufacture technology and chemical industry. (20) Since many years ago, there have had protections for male workers from heavy lifting, frequent lifting and holding awkward postures but there were no similar or appropriate measure for nursing personnel. (21, 22, 23).

In the future, the faculty of Medicine Ramathibodi hospital is going to be the international hospital. The vision is aimed to be the best medical service center in Asia. The mission is to improve safety and promote good quality of life for all staffs.

Therefore, there is necessary to protect all staffs from unsafe action and unsafe conditions.

The aim of this research was to determine the prevalence and related factor of neck and shoulder pain among nursing personnel. Consequently, it was expected to gain some useful data for the analysis and evaluation of work-related problems. The advantage was to improve the problems and to prevent work-related illness

1.2 Objectives

1.2.1 To determine the prevalence of work related neck and shoulder pain among Critical care Nursing Personnel in Ramathibodi Hospital.

1.2.2 To determine the associated of work related factor between neck and shoulder pain among Critical care Nursing Personnel in Ramathibodi Hospital.

1.3 Research hypotheses

1.3.1Individual factor would be associated with neck and shoulder pain among critical care nursing personnel in Ramathibodi hospital.

1.3.2Work task factor would be associated with neck and shoulder pain among critical care nursing personnel in Ramathibodi hospital.

1.3.3Psychological job demands would be associated with neck and shoulder pain among critical care nursing personnel in Ramathibodi hospital.

1.3.4Sleep quality factor would be associated with neck and shoulder pain among critical care nursing personnel in Ramathibodi hospital.

1.4 Scope and limitation of the study

This study was conducted among critical care nursing personnel in Ramathibodi Hospital. 243 nursing personnel were included in this study during 15 May to December 2009. This study had 2 stages, data collection and data analysis. The data collection started from 15 May to 30 August 2009 by using questionnaires and then the data analysis began from 1 September to 15 December 2009.The RULA assessment Tool is introduced to evaluate working posture of nursing personnel.

1.5 Variables

1.5.1 Independent variables

1.5.1.1 Individual Variable

Age

Body Mass Index(BMI)

Smoking

Drinking Alcohols

Education Level

Marital Status

Health Status

Sport

1.5.1.2 Work task related factor

Work experience

Work history

Number of hours and day for full time work

Shift work

Work over time

Part time

Working Posture

1.5.1.3Psychological Job Stress

Decision Latitude

Psychological Job Demand

Supervisor Social Support

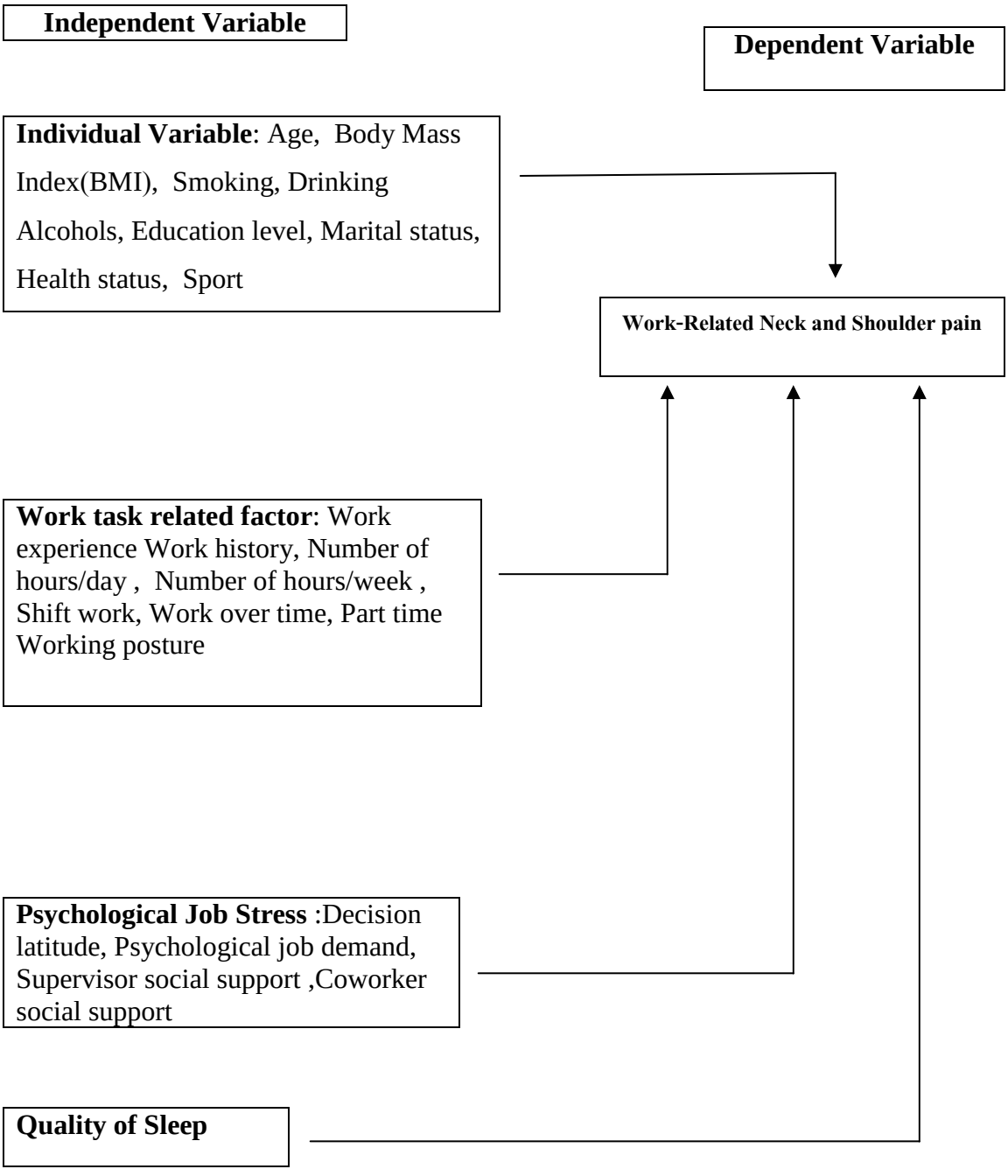
Coworker Social Support

1.5.1.4 Sleep Quality factor

1.5.2 Dependent variables

Work-Related Neck and Shoulder Pain

1.6 Conceptual Frameworks



1.7Glossary of terms and operational definitions

Critical Care Nursing Personnel refers to registerd nurse (RNs) and license practical nurse (LPN) that was working experience in critical care unit at least 1 year.

Registered Nurses refer to registered nurses (RNs) working in the intensive care unit and were trained in critical care nursing. Most of RNs jobs in critical care unit are recording vital signs, administering medications, and monitoring procedures under the direction of a physician.

License Practical Nurses refer to licensed practical nurses (LPNs) in the intensive care units responsible direct to patient care than RNs such as moving patient up , in and out bed, changing pads and taking blood pressure under the direction of RNs. According to the regulation, the LPNs‘s duties have more limited. It mentioned that patient information must be charted by RNs not by LPNs.

Neck and Shoulder pain (NSP) refers to pain of the bodily structures, such as muscles, nerve, tendons, ligaments, joints, cartilage, and spinal discs and do not include injuries result from slips, trips or similar accident that affects on around neck and shoulder region. This study considers combined pain involving the neck and shoulder and caused from primarily the performance of work. This pain is based on self report and non diagnostic examination.

Individual factor refers to age, body mass index (BMI), smoking, alcohol consumption, education level, marital stutus, and health status and sport behavior.

Work task factor refers to work experience, work history, number of hours/day, and number of hours/week, shift work, work over time, part time and working posture.

Psychological job stress refer to the psychological stress in work such as the decision latitude, the psychological job demand, the supervisor social support and the coworker social support.

Sleep quality factor refer to perceived sleep quality. This study defined to difficulty in falling asleep, difficulty in maintaining sleep**,** awakenings at night, calmness of sleep**,** premature final morning awakening. This study divides the quality of sleep 2 groups; good and poor quality of sleep.

Patient handling refers to all activities requiring force by person within the part of nursing care, such as transferring, repositioning, lifting the patients.

Conventional shift work refer to the arrangements shift pattern that forward turn shift to the clockwise such as day shift follow by evening shift, night shift and day off and start new shift work in the same pattern every time.

CHAPTER II
LITERATURE REVIEW

2.1 Background

The epidemiology of study and definition of neck and shoulder pain in the thesis is a term used to describe complaints or pain-related disability in the neck and shoulder regions, e.g. pain, ache, or trouble from muscles, tendons and skeleton. (11,24). The neck and shoulder make together a “functional unit. Several muscles have their origin in the neck and attach at the shoulder. The ergonomic evaluation of neck and shoulder pain would be described in this chapter.

2.2 Definitions of neck and shoulder pain

Work related neck and shoulder pain (NSP) is a common health problem in the general population and among workers. (1). The most common causes of NSP are strain and sprain .The ligament is injured from sprain while muscle or tendon tissue is injured from strain. (25).

2.2.1 Anatomy of the neck

The neck was consisted of seven vertebrae that called C1, C2, C3, C4, C5, C6 and C7.The first vertebrae is connected to skull and the seventh is connected the sternum. The back of neck has a spinal canal. The spinal canal is the way of spinal cord passes. This canal has functioned for receives and conducts the order from muscle to brain and brain to muscle. When this canal is stenosis or the bone grow up and press. It will increase pressure around nerves and spinal cord (26). The most symptoms are found neck and shoulder pain. In the present time, computers have become essential equipments for the job. The position of work normally performs flexion and extension around neck muscle. These are risk factor of neck pain. (27)

2.2.2Anatomy of the shoulder

The shoulder was consisted of 3 bones such as the clavical, the scapula and the humerus. The part of the shoulder joint could rotated around, forwards, backward and and strong for actions such as lifting, pushing and pulling. It were consisted of 3 joints connection for example

- Glenohumeral joint is the main of shoulder joint. It is a ball and socket joint that allows the arm to rotate in a circular fashion or to hinge out and up away from the body and at this joint easier to dislocate than other joints.
- Acromioclavicular joint is formed by the lateral end of the clavicle. It is important in transmitting forces through the upper limb and shoulder to the axial skeleton. The acromioclavicular joint has minimal mobility due to its supporting ligaments. The acromioclavicular ligament involved in the movement of the clavicle on the acromion and whiles the coracoclavicular ligament composed of the conoid and trapezoid ligaments.
- The sternoclavicular joint is the the medial end of the clavicle. This joint is limited to movement. Sternoclavicular dislocation is rare occurrence but there was found in direct trauma (26).

2.3 The pathophysiology of neck and shoulder pain

2.3.1 Neuroanatomy of pain

The cause of neck and shoulder pain was irritation and inflammation around area such as bones, nerves, discs, ligaments, muscles and joints (27). The pain can be classified as the neuropathic, the idiopathic and the nociceptive origin. Nociceptive origin is often considered in the acute phase. Whereas the pain progresses toward a chronic phase, the influence of psychological and social factors becomes more dramatically. (27).

2.3.2 Pain on tissue level

Muscle tension is the common cause of neck and shoulder pain. Especially isometric muscle contraction has been suggested to induce the intramuscular pressure. Inadequate arterial circulation leads to inadequate oxygen supply. (28). After heavy physical exertion for 24 to 48 hours, the pain was developed around muscular origin.

2.3.3 Psychology of pain

2.3.3.1Stress-induced pain

Stress can be defined widely as a discrepancy between the demands and capacity of an individual. The condition of stress always from the emotion, after the individual factor was evaluated situation. (27). The psychophysiology is the branch of psychology that is concerned with the physiological bases of psychological processes. The relationship of psychophysiologist is related to the exposure to a stressful situation. The source of stress-related pain is in the autonomic nervous system (ANS), whereas the emotional triggers the release of hormone such as cortisol, adrenaline and other hormones, then the body will response to the action for example the increasing of heart rate, blood pressure and respiration. These hormones increase muscles tension, which can cause aches and nerves irritation. (29)

2.4 There are three phases of neck and shoulder pain symptoms

2.4.1 Phase 1 or early stage

The common symptom in phase is painful and fatigue. The duration of symptom sometime is a week or month. Almost symptom can be recovered. The methods for relief symptom are for example taking a rest, days off work, use aspirin and exercise. This phase normally showed no reduction of work performance. In contrast, if the source of problem can not be improved, it can lead to the sever phase. The important in this phase was the implementation of ergonomic evaluation and facilitated equipment. (28)

2.4.2 Phase 2 or intermediate stage

This phase found painful more than phase 1 and tiredness. This symptom occurs early in the work shift and persists at night. This phase should be on treatment and consultant the doctor. The common cure is to consult the physician in case of the severe symptom the surgical is needed.

2.4.3Phase 3 or late stage

This phase mostly found sever pain more than in phase 2, aching, fatigue, weakness persist at rest, inability to sleep and to perform light duties. This symptom can occur every day and can not be resolved even during the holiday. The surgical is mostly used for the therapeutics in this phase. However, in this phase it should encourage the patient for care themselves and protect to injure around the problem site. (30)

2.5 Risk factor associated neck and shoulder pain

2.5.1 Personnel factor

2.5.1.1Occupational

The literature review of musculoskeletal disorder, the prevalence of neck and shoulder pain often found in registered nurse more than practical nurse. (65). The cause might be most of registered nurse often performed administering medications intravenously and procedure tests.(66). In 2007, H Alamgir investigated the injury rates in the healthcare settings in British Columbia, Canada. It was found that registered nurses in critical care unit was significantly associated with injury rates than licensed practical nurses.(67). In Thailand 2004, Thanes conducted the study on “Relationships between work-related factors and disorders in the musculoskeletal among nursing personnel in Chulalongkorn memorial hospital. He found that the prevalence of neck pain in nurse and practical nurse were 15% and 14.7% respectively, while the prevalence of left shoulder pain in nurse group was

12.1% and in practical nurse was 16.8%. This study collected data from nurses working in the hospital, the date were not shown in separated ward.

2.5.1.2 Gender

Female had experienced neck and shoulder pain more than male (26, 34). Male were excluded in this study because male showed the limitation of number, and in other reviews found that gender a confounding factor. (38,39). The biological differences between sexes are the anthropometric differences (40). It may accounted for gender-related difference in PRs of musculoskeletal complaints. (41). From literature review study found that females had a higher prevalence rate report than males. (42). S. Warming, 2006 found the association between neck and shoulder pain and gender (OR6.7). This gender segregation has consequences for the exposure to risk factors at work. When men and women work in the same occupation such as cleaning personnel, women more often do the lighter tasks compared with their male (44).

2.5.1.3 Level of education

Level of education will be associated with other factor such as socio-economic status, occupational or lifestyle. Education influence the health-related behaviors such as children who well educated tend to report healthier behaviors in adult life (45). The results of studies for NSP were varied. Some studies show high risk of the persistent neck and shoulder pain in low-educated employees, while the others did not show significant relationship (4, 39).

2.5.1.4 Body Mass Index (BMI) and anthropometric measures

Some studies showed an increase BMI associated with increasing neck pain (31), the American of office workers found this factor less associated with neck pain (4). In contrast, Hogg-Johnson, S. et al., 2008 did not confirm this correlation. (33). The study of Jolanda J, 2004 found the incidence of neck complaints was increased for obesity (OR 1.81).

2.5.1.5 Alcohol consumption

Some study was no association between the consumption with neck and back pain (46). Whereas Derek R. Smith et al., 2006 found this association among nursing personnel in Japans (OR1.20 and 1.36, respectively). Previous study revealed that the excessive alcohol consumption may impact the motor skills and

decrease the body's capability to fight the repetitive strain (49). In contrast, Eva Skillgate studied associated between alcohol consumption and back or neck pain. It was found that drinking twice per week or more often had a lower risk than those who drank once per month or less often (RR = 0.4, 95% CI: 0.1–1.1).

The mechanism described the possible protective effect of alcohol consumption on neck pain. It might be an anti-inflammatory effect. The ethanol consumption delayed the onset and quit the sequence of collagen-induced arthritis by interaction with innate immune responsive. (51).

2.5.1.6 Smoking

The relationship between smoking and neck/shoulder pain is not clearly defined. (52). But Korhonen, 2003 found the association between smoking and neck pain while other studies cannot confirm this association (53). Previous study found that smoking can affect the musculoskeletal system through blood flow reduction (54); hypoxia (55); or chemical changes leading to muscle, joint and disc degeneration excitatory effects of nicotine may alter the perception/threshold of pain, increasing self-reporting among smokers (54).

The mechanisms by which smoking or alcohol consumption may cause sick leave due to back or neck pain is not clear. The mechanism describing the increased risk of smoking on back or neck pain might be explained by a decreased circulation in the tissues in the spine from nicotine (51), causing ischemic pain, decreased function and degeneration of the connective tissues and muscles. As mentioned above, the mechanism explaining a protective effect of alcohol consumption on back or neck pain might be explained by an anti-inflammatory effect that has been shown in a study of mice. Another possible mechanism might be the general relaxing effect that alcohol can have on people, and which probably affects the muscles in the back and neck.

2.5.1.7 Exercises

The study of the relationship between leisure time such as physical exercise and neck/shoulder pain are not clearly shown. The study of V.H. Hildebrandt found no different association between worker participating and worker participating in sport. (47). The study of Jolanda J, 2004 demonstrated many related

factors among shoulder and neck complaints including exercise for at least once a week (OR0.87).

2.5.2 Work task factor

2.5.2.1Age/time experience

The literature review of musculoskeletal disorder, the prevalence of neck and shoulder pain often found in older worker. (4,31),but the same results were also found in middle age group.(33). Bolanle MS Tinubu. found the association of long working hour with neck and shoulder pain; working > 20 years with clinical experience develop of WMSDs (OR=3.81) than 11-20 years group. The previous study depicted that long working hours showed relative risk of neck/shoulder pain (34). The literature review of musculoskeletal disorder demonstrated the relationship of the duration of work year of and number with contact to risk factor. Related to time of work, Trinkoff 2006 showed that working hour significantly related to increased MSD; working >13 hours per day, on days off/vacation days, mandatory overtime, on-call, with <10 hrs between shifts significantly related to increased MSD. Ulrika, 2005 conducted the study on "Relationships between work-related factors and disorders in the neck-shoulder and low-back region among female and male ambulance personnel. She found that the duration of employment was significantly associated with neck and shoulder pain (P= 0.001).

2.5.2.2 Posture

Awkward posture such as stretch out line both arms and hand over shoulder along time made injury and inflame around muscle, tendon and nerves. The nursing activity such as lifting patient 9-12 time per shift significantly increased neck and shoulder pain (2). Lifting and stooping immediately associated with neck and arm pain (35). Push and pull activity associated with arm pain (9). Lifting over weight and hand over shoulder associated with arm pain in nursing personnel and other occupational (35). The study of Jolanda J, 2004 showed the incidence of neck complaints associated of work in awkward postures (OR 1.76).

2.5.4 Psychosocial factors at work (59, 60, 61, 62)

Psychosocial factors at work are the multiple complexes causes such as overtime, shift work, unemployment, and overload. Robert Karasek developed and provided the "job strain" concept and model in 1979. The work related stress resulting in physical and mental health effects as Job Control Model (59) is described as following.

2.5.4.1 Decision latitude

This decision latitude is meaning the power that affect with member's behavior in the organization. This decision latitude was sometime called frameworks. This framework is affected by the decision; its content related to the job assignment and the position of workers in the firm. The obtained score in this model would be classified into 2 groups; high and low decision latitude. The score range was 24-96. The 70% cut point for two groups was used to classify high and low group, score < 68 is defined as low group while the score ≥ 68 is defined as high group.

2.5.4.2 Psychological demands,

This psychological demand refers to the support among the social network in workplace. This factor can reduce stress and can correct all problems in workplace. It implies the attention, honor and respectability from each other. The obtained score in this model would be finally classified into 2 groups: high and low psychological demands. The score range was 12-48. The 70% cut point for two groups was used to classify high and low group, if score < 34 is defined as low group while the score ≥34 is defined as high group.

2.5.4.3 The supervisor social support

This supervisor social support meant the subjects had often used this technique in coping with stress. When the person was promoted, supported, suggested, developed and helped, this factor can reduce stress and can correct all problems from workplace. (62). This answer in the model separate 2 group from answer as high and low supervisor social support.

2.5.4.4 The coworker social support

This coworker social support means the support from co-workers. When the workers were accepted or recognized from coworker the stress level would be reduced. (60) Good mental health would be found. (61). The score

would be defined as high and low supervisor social support. The score range was 12-48. The 70% cut point for two groups was used to classify high and low risk factor, if score < 12 is defined as low group while the score ≥12 is defined as high group.

As mention above psychosocial factors at work are multiple complexes causes such as overtime, shift work, unemployment, and overload. Steven James Linton, 1990 found high level stress for long time had affected with physical and psychological of workers, low social support increased neck and back pain (OR2.42, OR3.61, respectively). High demand control was related to neck and shoulder pain in Italian nursing personnel (36). Ulrika AASA, 2005 revealed psychological demands associated with neck-shoulder pain among the female ambulance personnel (OR 2.37)

2.5.5 Quality of sleep

The association of work schedule could affect sleep pattern. Masaya Takahashi et al., 2006 studied the association between sleep problems and MSDs among nursing staffs. It was found that arm pain was associated with less difficulty initiating sleep (OR 6.70). The British of training doctors, studies the relation between few hours sleep and more hours worked. It was found that more hours working was significantly related to MSDs and somatic symptoms. The muscles had short period of rest and still work continuously. This situation affected musculoskeletal injuries (35).

2.6 Care and Treatment

Care and treatment would be performed for the improvement individually as follows;

2.6.1 Rest

The rest is easy method to do and the most common practice that necessary for decrease painful and discomfort. Rest will be for the relaxation and the reduction of muscular fatigue. When the muscle takes rest, it will be the useful for rehabilitation

and for the recovery of all disability. Rest can reduce and decrease the muscle fatigue. (63)

2.6.2 Hot and cold compression

Hot compression is used for the relaxation, the muscle pain relief and induction of circulation blood flow. It is introduced to treat chronic injuries and muscle pain. While, cold compression will use to reduce the swelling of muscle. It is for acute sprains, bruising, swelling and inflammation. (64)

2.6.3 Prevention

The main prevention of musculoskeletal disorder is the health assessment and the workplace management. The ergonomic strategies to reduce MSDs are the utilization of appropriated tool for workers such as the health education, the workplace survey and evaluation, and health risk study. The health related issue included the health care surveillances for example the implementing of the physical examination before start working, during year and after sickness. The improvement of the health risk factor should be achieved. Therefore, the engineering control and workplace evaluation are essential. (68)

2.7 The statistic of musculoskeletal disease

Musculoskeletal disorders (MSDs) often referred to ergonomic injuries. Nursing aides, orderlies, and attendants had the highest rate of injuries and illnesses and registered nurses had 10 rank of injury. (69). The highest part of body pain was at the back (51%) follow by shoulder (10%) and wrists (9%). The highest cause of injury were lifting heavy load (42%) and repetitive works (11%).(25, 69, 70)

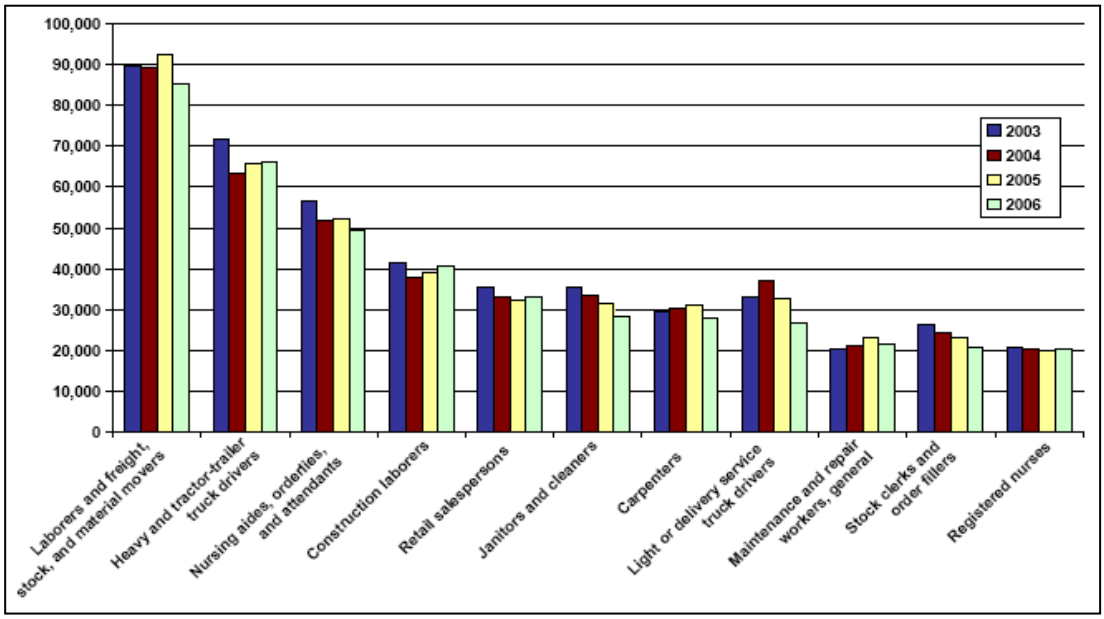


Figure 2-1. The statistics of musculoskeletal disease classified by occupations in 2003-2006. (69)

The statistics of musculoskeletal disease classified by occupations in 2003-2006 was shown in Figure 2-1. The highest of MSDs was found in laborers and freight stock and material move, followed by heavy and tractor-trailer truck driver, and nursing aid. The registered nurse was at the eleventh ranks of MSDs.

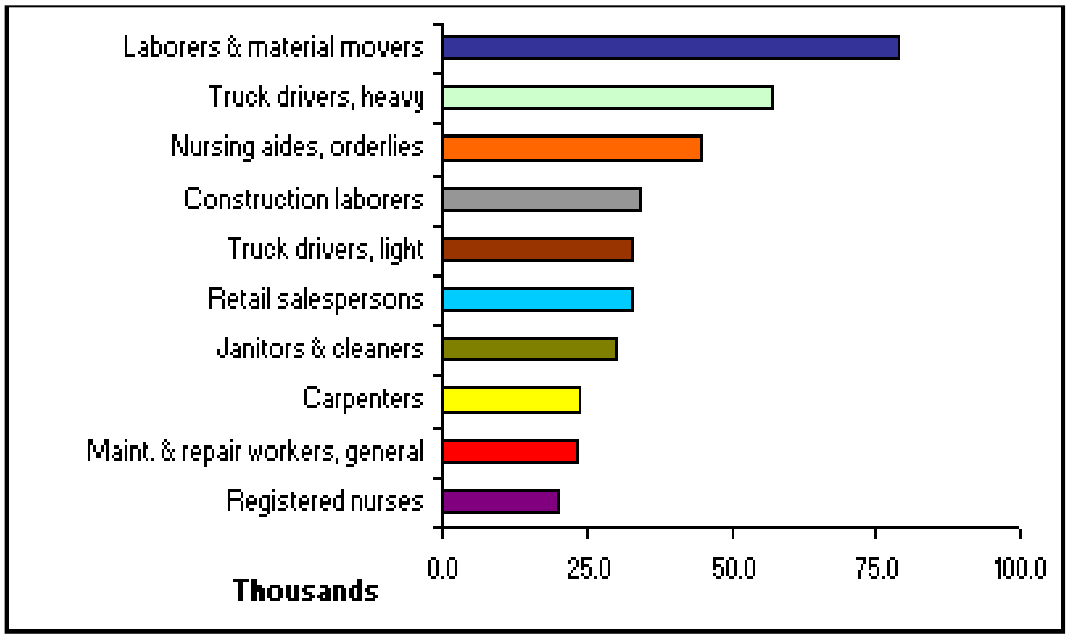


Figure2-2. Occupational injuries and illness involving days away from work for selected occupations, 2007(thousands) (70)

Figure2-2 revealed the statistics of musculoskeletal disease classified by occupations in 2007. The highest of MSDs was exhibited in laborers and freight stock and material move, followed by heavy and tractor-trailer truck driver, and nursing aid. The registered nurse was at ten ranks of MSDs.

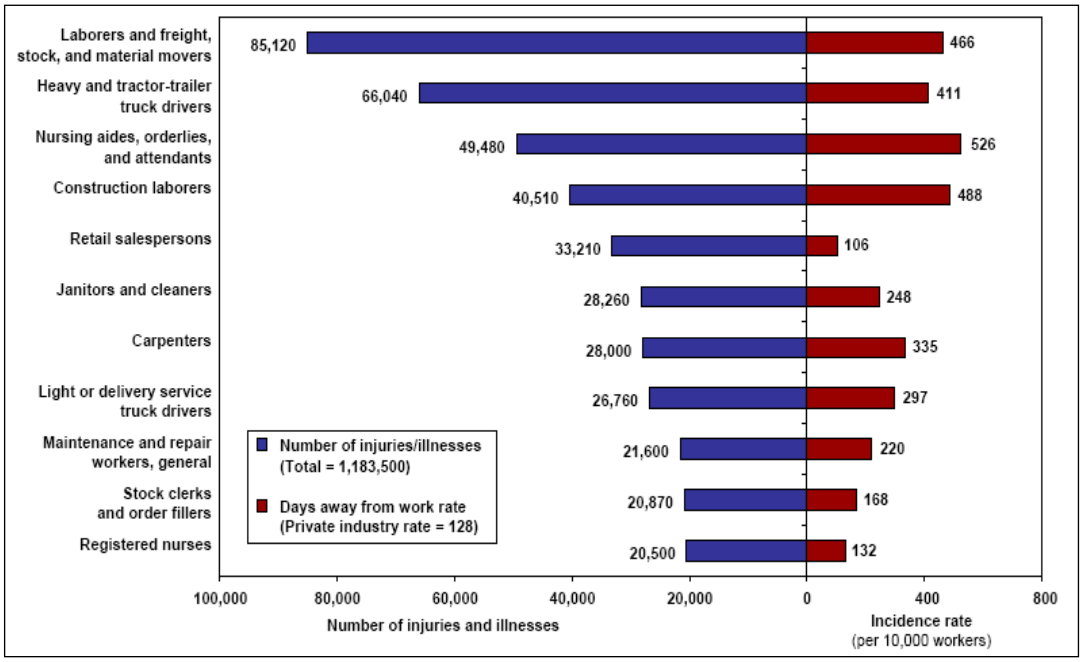


Figure2-3. The number of injuries and illnesses and day away from work of MSDs when divided from occupations, 2006. (25)

Figure2-3 demonstrated the statistics of injuries and illnesses and day away from work of musculoskeletal disease classified by occupations in 2006. The highest group of injuries and illnesses was laborers and freight stock and material move, followed by heavy and tractor-trailer truck driver, and nursing aid. The registered nurse was at eleventh ranks of MSDs. The day away from work from MSDs in nursing aid and registered nurse depicted at 3rd ranks and eleventh rank, respectively

2.7.1 Causes of Musculoskeletal disorder in nursing personnel

World Health organization (WHO) 2000-2010 defined injury and illness from work by include back and other musculoskeletal body site. (71) These injuries were caused by variety factors such as psychological, physical, individual factor and culture.

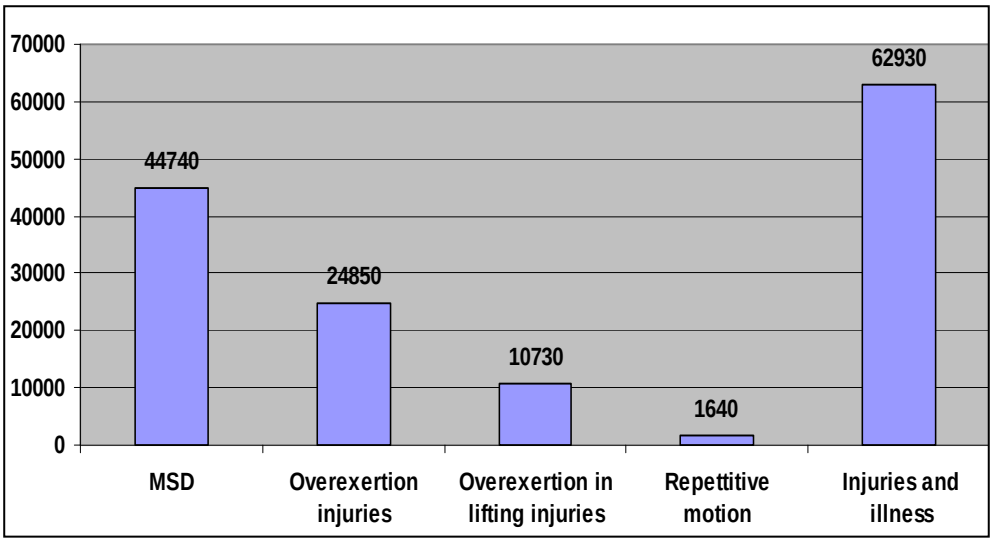


Figure2-4. Hazard in hospital' staff, 2007

The hazard in hospital' staff, 2007 was shown in Fig. 2-4 (69). The highest of hazard was the injuries and illnesses, followed by MSD and overexertion injuries.

2.7.2 The posture usually uses among transfer patients (72).

2.7.2.1 Fore /aft lift (two-person lift)

This posture has been used to move a patient from bed to chair. The risk factor, the patient is supported at a distance away from the base of both workers' spines. This long lever effect places high levels of compression force on the workers' spinal discs and associated support tissue.

2.7.2.2 The chicken lift

This posture has been used for transferring a patient from bed to chair, lifting a patient up from the floor after falling, and repositioning the patient. Risk factor was lifting force at a distance from the spine. This type of lifting can result in patient pain and shoulder dislocation. Accordingly, patients may react and strike back against the workers.

2.7.2.3 Cradle lift or basket lift.

This posture is high-risk technique to transfer a patient from bed to chair or reposition a patient in a chair. Risk factors lifting force, the weight of the

patient is at a distance from the worker's spine, resulting in high levels of force being supported by the worker's spinal discs. An awkward posture is lift requires the workers to flex and bend sideways at the waist while supporting the patient. At the end of the lift, the workers have to twist at the waist.

2.7.2.3 The three-person lift.

This posture has been used to transfer a patient from bed to stretcher. Risk factors lifting force reaching under the patient. This changes the patient's centre of gravity, thus increasing the risk. Most of the load is taken by one or two workers. An awkward posture is lift requires workers to bend forward at the waist while holding a load.

2.7.2.4 One-person through arm lift.

The through arm lift (one-person) has been used to reposition a patient in bed, or transfer a patient from bed to chair. The worker cannot use leg muscles to perform an effective weight shift; the application of force is generated by a shrugging of the worker's shoulders. Lower back can be in a forward flexed and twisted posture, therefore, this posture is at risk to muscular pain.

2.7.2.5 Australian shoulder lifts.

This posture shoulder lift has been used to reposition a patient in bed or to transfer a patient from bed to chair. Risk were those of two workers must lift the patient by using one shoulder as the support for the load. It causes a high level of force through the shoulder of the patient and the lower backs of the workers. The workers must adopt a forward flexed position at the beginning and end of the lift. The workers can twist their lower backs while supporting the load of the patient.

2.7.3 Work-Related Musculoskeletal Disorders (WMSD)

According to the National Institute of Safety and Health (NIOSH), work-related musculoskeletal disorders are musculoskeletal disorders caused or made worse by the work environment. WMSD can cause severe and debilitating symptoms such as pain, numbness, and tingling; reduced worker productivity; lost time from work; temporary or permanent disability; inability to perform job tasks; and an increase in workers compensation costs.

2.7.4 Equipments for ergonomic evaluation

2.7.4.1 The Rapid Upper Limb Assessment (RULA) is a screening measurement and evaluation of biomechanics and postural load in occupational work. This tool is used for assess the whole body with especially attention to the neck, trunk and upper limbs. This tool is quick for assessment of the risk posture of worker. The score of result is between 1-7, The level of score consisted of 4 level – 1 or 2 mean acceptable level , 3 or 4 mean further investigation ,5 or 6 mean further investigation and will be changed soon and 7 mean investigate and will be changed immediately. This tool has been limited for analyzing data and assume by eyesight, it inconsistent to record. The limitation of this RULA evaluation is that the obtained data is from the rough measurement which is assumed by eyesight instead of the actual measurement. It might cause the error in the data collection (74, 75).

2.7.4.2 Body discomfort is a basic survey method in several works. This tool was used to localize the body pain. This measurement is to analyze work characteristic problems and to evaluate the work station (76).

2.7.4.3 Heart rate monitor is a personal monitoring device for the data collection and to evaluate high loaded work, high activity in work and continuous use of high static muscle. The signal interfere might be the limitation, and it sometimes can not be analysed because of the fast ripid changes in the heart rate (77).

2.7.4.4The Ovako Working Posture Analyzing System (OWAS) is a tool to evaluate postural load during work. The OWAS method can identify risk level by implementing ergonomic surveys, planning of a new work place and occupational health surveys. This method is a convenient method but there are many points to be carefully considered such as posture and work task which showed details of work and characteristic of force to muscle. (78)

2.7.4.5 The Motion Analyzer is a combination measurement between mechanical and control engineering facilitated. It is used in several fields such as sport science and physiotherapy. Typical motion analysis tool acquire dynamic and kinetic data. This tool has been limited for data analyzing and more troubles in use but this measurement is accuracy more than assume by eyesight (79).

2.7.4.6 The questionnaires measurement tool was developed and used to identify musculoskeletal symptoms and individual and work-related risk factors in worker populations in 7 days and 12 months ago such as Nordic musculoskeletal questionnaires (80,81), Dutch Musculoskeletal Questionnaires (DMQ). This is a standardize questionnaire, partly decreed from Nordic questionnaires and was developed by occupational health professionals (82). The DMQ questionnaire is introduced in this study because DMQ was more specified for neck and shoulder regions more than Nordic questionnaires.

2.8 Literature Review

In 2005, Sinsoongsook T et al. (15) studied on work related shoulder pain among female nursing personals in King Chulalongkorn memorial hospital. The subjects were 223 registered nurse and 133 licensed practical nurses (86.2% responded rate) and the questionnaires were sent during January to March 2004. The study showed the persistence of shoulder pain was 20.3% (95% CI 0.16-0.24). Multivariate logistic modeling showed that age group 41-50 (OR 2.95, 95% CI 1.02-8.52), transferred patients by wheelchair (OR 5.48, 95% CI 1.11-27.05), moved and lifted object between 10-25 kg (OR 2.27, 95% CI 1.01-5.12) were related with shoulder pain.

In 2003, Alison M Trinkoff et al. (57) examined the association between the physical demand and MSDs among 1163 nursing personals (74% responded rate). The study showed the moderate and high perceived physical demands were significantly associated with neck, shoulder, and back MSDs (OR 4.98-6.13).

In 2007, Antonio Lorusso et al. (99)described the prevalence of musculoskeletal complaints and relationship between physical and psychosocial factor among 203 X-ray staffs in 13 hospital in the Apulia, southern of Italy. A questionnaire was used to analyse data of musculoskeletal symptom in 12 months ago. It was found that low back pain was the most symptoms (59.6%) followed by shoulder pain (21.2%) and neck pain (19.7%). The univariate analysis showed that poor physical activity and high job demands were significant associated with neck and shoulder pain

($p<0.05$). In Multivariate logistic regression was confirmed, except that between poor physical activity and neck complains were associated.

In 2005, Ayfer Tezel (99) determined the prevalence and distribution of musculoskeletal pain among 120 nursing personals in general ward from four hospitals in Erzurum, Turkey. A Nordic questionnaire was used to analyst data about musculoskeletal symptom in 12 months ago. It was found that low back pain was the most symptoms (69%) followed by shoulder pain (54%) and neck pain (46%).And this study was found that chronic complaints was correlation with working department. The nurses who working in gynecology, surgery and obstetric had more chronic complaints than other department ($P<0.05$).

In 2006, Derek R. Smite et al. (48) investigated the prevalence of musculoskeletal complaints and relationship among nurses in mainland Chaina. A Nordic questionnaire was used to analyst data about musculoskeletal symptom in 12 months ago. It was found that low back pain was the most report MSDs (56%) followed by neck pain 45% and shoulder pain 40%.The high mental pressure, boring in task and limited work support were identified significant correlation with MSDs (OR 1.79-2.52). And no correlation among manual handling, perceived physical exertion and increased report of MSDs.

In 2005, Derek R. Smite (83) studied on the prevalence of musculoskeletal symptoms (MSS) and relationship among nursing students in Korean. It was found that shoulder pain was the most report MSS (46%) followed by low back pain 39.1% and neck pain 40%. The logistic regression showed that regular exercised group were reported an MSS at any body site (OR 0.5 95% CI 0.2-0.9, P=0.035). The decrease of MSS was correlated with increasing body weight (OR 0.04 95% CI 0.002-0.9, P=0.046).

In 2005, Derek R. (18) examined the prevalence of musculoskeletal complaints and relationship among nursing home in South Korean. It was found that shoulder pain was the most symptoms (35.2%) followed by arm pain 22% and knee pain 20.9%. The risks factor were significant associated all 4 MSD site; manual handling patients (OR 5.1-20.8) and changing a patients' clothes (OR 6.7-30.1)

In 2006, Derek R. Smite et al. (84) investigated the prevalence of musculoskeletal complaints and relationship among nursing personals in Japan. A

Nordic questionnaire was used to analyst data about musculoskeletal symptom in 12 months ago. It was found that shoulder pain was the most report MSDs (71.9%) followed by low back pain 45%, neck pain 54.7 and upper back pain 33.9%. The risks factor were significant associated all 4 MSD site; drinking alcohol (OR 1.87, 95% CI 1.17-2.96), smoking (OR 2.45, 95% CI 1.43-4.35) and having child (OR 2.53, 95% CI 1.32-4.91). The factors about high mental stress were correlated with neck pain (OR 1.53) and shoulder pain (OR 2.07)

In 2001, D P Pope (85) determined the individual and combined relationship between physical demands and psychological factor with disabling shoulder pain among five manual occupational groups: 169 cashiers worker, 198 supermarket worker, 135mail worker, 250 packaging worker and 179 nurse aid in south Manchester, United Kingdom (83.7% responded rate). A Modified Manchester Occupational Physical Demands Questionnaire was used to analyst data. It was found that both duration of occupational physical demands and psychosocial working environment were significant associated with shoulder pain.

In 2005, Ellen Bos et al. (86) investigated the prevalence of neck-shoulder and low back pain and determine the relationship between physical and psychosocial factor among non-specialize nurse, operation room nurse, intensive care nurse and X-ray technologists in Netherlands. It was found the prevalence of neck-shoulder pain in operation room nurse was higher rate than other group nurses (60%). It was found that dynamic load, static load, repetitive load, ergonomic environment and psychosocial factor were related with low back pain in all groups but this factor were not relation with neck-shoulder pain. And physical demands and psychosocial working environment were significant associated with shoulder pain.

In 2005, Evangelos C. Alexopoulos et al. (87) reviewed the prevalence and association of MSDs among 393 nurses and caregiver in nursing home in Netherlands and 351 nurses in general hospital in Athens, Greece. It was found that shoulder pain was the most report MSS (46%) followed by low back pain 39.1% and neck pain 40%. Greek nurses (75%) was significantly reported more back complaints than Dutch nurses (62%) in 12 moths ago. Multivariate analyses showed that in both countries strenuous back postures (OR1.9 and 1.9) and especially a moderate general health (OR 4.3 and 2.9) were the significant risk factors for back pain.

In 2005, Geertje A.M. et al. (88) studied the cohort during the 3-year follow-up among 1334 worker. Cox regression analysis was applied to examine the relation between the work related psychosocial factors and the incidence of neck pain. The data reported that they had experienced neck pain at least once during the 3-year follow-up period. The relation of neck pain to high quantitative job demanded (Relative Risk, RR 2.14 (95% CI 1.28-3.58) and low coworker support (RR 2.43, 99% CI 3.11-5.29) was statistically significant. An increased risk was found for low decision authority in relation to neck pain (RR 1.60 95% CI, 0.74-3.45), but this relation was not statistically significant.

In 1996, Joesphine A Engle et al. (58) examined the prevalence of musculoskeletal complaints and work related factor among nursing home in Netherlands. A questionnaire was used to analyst data about musculoskeletal symptom in 12 months ago. It was found that that back pain was the most report complaints (36%) followed by arm or neck pain 30% and leg pain 16%. The most complaints were found in working under time pressure (69%), and no take a break between working times (70%), working in awkward posture (47%). Lifting heavy loads was found the strongest association with musculoskeletal complaints and physical stress was found the strong association.

In 2004, Jolanda J. Luimea (31) studied the differences and similarities in the incidence and recurrence of shoulder and neck complaints with respect to work-related physical, psychosocial, and personal risk factors among 769 workers of nursing homes and homes for the elderly. Multivariate logistic modeling showed that age and gender, obesity (OR 2.12, 95% CI 1.23-3.65) was related to incidence of shoulder pain. The incidence of neck pain was increased for obesity (OR 1.81, 95% CI 1.07-3.05) and work in awkward postures (OR 1.76, 95% CI 1.11-2.78). The recurrence of shoulders and neck pain were associated with chronic pain at baseline (shoulder: OR 1.91, 95% 1.36-2.67; neck: OR 1.71, 95% 1.14-2.55).

In 2006, Masaya Takahashi et al. (12)determined the association between sleep problems and MSDs among 98 staffs (79 women) at three nursing home. Nordic questionnaires were collected data about musculoskeletal symptom in 12 months ago and the daytime sleepiness was collected by Epworth Sleep Questionnaires. The result

was showed that arm pain was significantly associated with less difficulty initiating sleep (OR 6.70, 95% CI 1.4-31.97).

In 1996, M. J. Luster et al. (89)studied the musculoskeletal symptom among 30 nurse in two resident care center. Nordic questionnaires were collected data about musculoskeletal symptom in 12 months ago. The result was found that 22 staffs had experienced musculoskeletal symptom. Neck symptom was the high significantly associated with ankle and wrists symptoms. Shoulders symptom was significantly associated with wrists symptoms and male gender. And other variable was no significantly associated such as back symptom, age, years of work, height, weight and smoke. There were significantly associated more neck symptoms ($P<0.01$) and shoulder symptoms ($P<0.05$) experienced by nurse in unit 2 than nurse unit1.

In 2000, Shoko Ando S (90) investigated the prevalence of neck, shoulder and arm pain (NSP) and Low back pain (LBP) and relationship of work task and self estimated risk factor among nurse in general ward in Japan. It was found that low back pain was the most reported pain (54.7%) followed by shoulder pain 42.8%, neck pain 31.3% and arm pain 18.6%. In cox's model, LBP and NSP had no significant associated with demographic, actual task or self estimated factor. The relative risk for accept emergency patients and transfer patient were 1.29 and 1.14. Similarly relative risk of NSP for moving beds, helping patients to bath and helping patients to shampoo tended to be higher.

In 2008, S.Warming (43)determined the associated risk factor among musculoskeletal complaints(MSC) and patient handling task in log book and psychological factor. It found MSC and level of pain were increased significantly association between three working days ($P<0.05$) and decreased on the day off (15%-30%, and 17%-37%). Stress and transfer task were related with low back pain and transfer tasks were related with knee pain. The number of nurses reporting pain varied (increased) during the three working days: $p=0.025$, 0.001, and 0.017, respectively.

In2003, Willy Eriksen (91) studied the prevalence of musculoskeletal pain among nurse aid in Norwegian union of health and social worker. It was mailed questionnaires in 1999. It found the prevalence of severe musculoskeletal pain 51.1% (95% CI 49.9-52.3). The prevalence rate of neck pain increased with increasing working hours per week and the prevalence rate vary with age, working per week and

service area. Neck, shoulders, elbow, upper back and hip pain were found the prevalent in female more than men and were found lowest in psychiatric and pediatric unit.

In 2008, Wannapira Wiroj (92) investigated the prevalence of neck/shoulder complaints and relationship among personals in Buddhachinaraj hospital. A self questionnaire was used to diagnose data about musculoskeletal symptom in 12 months ago. It was found that neck/shoulder pain was the most complaints 66.6%, in dentist unit had found higher neck/shoulder pain (85.2%) followed by rehabilitation unit (81.8%) and academic unit (76.5%). Age, gender and exercise factor were significantly associated with neck/shoulder pain ($P<0.001$, $P<0.001$, $P=0.012$, respectively)

In 2005, Ostergren Per-Olo (39) examined the impact of mechanical exposure and work related psychosocial factors on shoulder and neck pain. This study was using a prospective cohort study. 4919 randomly chosen, vocationally active men and women ages 45–65 residing in a Swedish city. Neck and shoulder pain were determined by the standardised Nordic questionnaire. Work related psychosocial factors were measured by the Karasek and theorell demand-control instrument. This study shown that high mechanical exposure was associated with heightened risk for shoulder and neck pain among men and women during follow up. The odds ratios were 2.17 and 1.59,respectively.

In 2002, B Cassou Aims (38) studied the effects of age and occupational factors on both the incidence and the disappearance of chronic neck and shoulder pain after a five year follow up period. A prospective longitudinal investigation (ESTEV) was carried out in 1990 and 1995 in seven regions of France. 21378 subjects were interviewed (88% of those contacted). Chronic neck and shoulder pain were investigated by a structured self administered questionnaire and a clinical examination. Prevalence (men 7.8%, women 14.8% in 1990) and incidence (men 7.3%, women 12.5% for the period 1990–95) of chronic neck and shoulder pain increased with age, and were more frequent among women than men in every birth cohort. The disappearance rate of chronic neck and shoulder pain decreased with age.

In 2003, J Smedley, et al (9) analyzed the incident of neck/shoulder pain and relation to patient handling tasks carried out without the assistance of nursing colleagues or mechanical aids. There was a clear increase of risk in nurses who frequently assisted patients to mobilise using a walking stick, zimmer frame, or crutches (HR for highest versus lowest frequency 1.6), moved patients in a wheelchair, bed, hoist, trolley, or commode (HR for highest versus lowest frequency 1.6),or washed and dressed patients while they were seated on a chair or commode (HR for highest versus lowest frequency 1.7). The tasks were significantly associated with high risk of incident neck and shoulder pain (HR $\geq$1.5 and $p < 0.05$).

In 2007, H Alamgir (99) investigated the injury rates and injury types differ across direct care occupations in the healthcare settings in British Columbia, Canada. Poisson regression and generalized estimating equations were used to determine injury risks associated with direct care occupations (registered nurses [RNs], licensed practical nurses (LPNs) and care aides setting (acute care, nursing homes and community care). It was found that CAs had higher injury rates in every setting (37.0 injuries per 100 FTE). LPNs had higher injury rates (30.0) within acute care than within nursing homes. For RNs, the highest injury rates (21.9) occurred in acute care, but their highest (13.0) musculoskeletal injury (MSI) rate occurred in nursing homes. In both acute care and nursing homes, CAs had twice the MSI risk of RNs.

In 2005, Bolanle MS Tinubu (32) studied on the musculoskeletal health problem among nurses in Sub-Sahara Africa. A self administered questionnaire was used to determine the demographics, the prevalence and the pattern of WMSDs, associated job risk factors and coping strategies was employed as the survey instrument. A total of 160 questionnaires were distributed (80% response rate). 84%t of the nurses had WMSDs once or more in their occupational lives. The most complaints were low back (44.1%), followed by neck (28.0%), and knees (22.4%). Nurses with > 20 years of clinical experience are about 4 times more likely to develop WMSDs (OR 3.81) than those with 11-20 years experience. The most perceived job risk factors for WMSDs were working in the same positions for long periods (55.1%), lifting or transferring dependent patients (50.8%) and treating an excessive number of patients in one day (44.9%).

The musculoskeletal disorder and complaints are major problem in nursing personnel. Previous studies showed that low back pain is often found among this group. The studies among Thai hospital staffs were focused mostly on lower back region in order to prevent the injury in this region. Many researchers determined the pain of low back but few studies were done to investigate the pain in neck and shoulder region. The awkward working posture during patient transfer and activity among working hour were mentioned as the cause of injuries and illness linked to MSDs. Some factor such as inadequate sleep might affect the muscle pain such as turning of shift works. The muscles had short period of rest and still work continuously. This situation affected musculoskeletal injuries (35).

This study selected the subjects working in critical care nursing unit and the goal of studies was to examine the prevalence of neck and shoulder pain among critical care nursing personnel in Thailand, Bangkok. There are many questionnaires used in the reviewed literatures. Four questionnaires were selected in this study because it is necessary to understand the summary data such as demographics, past illness, past symptom. Dutch musculoskeletal questionnaire is approved to determine the prevalence of neck and shoulder pain. This questionnaire was more specific to the neck and shoulder than the Nordic questionnaires. The Job Content Questionnaires (JCQ) would be introduced to access psychological job stress at work. All questions are based on Job Content Questionnaires (JCQ, Karasek, 1985). The Rapid Upper Limb Assessment (RULA) was introduced to evaluate risk factors and to determine one frequented working posture in this activity, while the Pittsburgh Sleep Quality Index (PSQI) questionnaire was used to evaluate the quality of sleep in 1 year ago.

Ramathibodi hospital is a tertiary care hospital. It is wildly recognized as a high quality hospital in Thailand. But unfortunately, the nursing staffs still confront to health risk hazard such as ergonomic, indoor air quality, psychosocial job stress and sleep disturbances. The ergonomic interventions and the occupational health service for all staffs were remarkably different from other sectors such as in industrial sectors. Therefore, this study aimed to determine the prevalence of work related factor neck and shoulder pain and might reduce work-related factor causing pain. And it is

expected that the obtained result would initiate the adaptation the related factors and the promotion of well-being with the nursing (care activity) in this group.

CHAPTER III

MATERIALS AND METHODS

3.1 Study Design

This study was a cross-sectional study a using self-administered questionnaire to investigate the prevalence rate of work-related neck and shoulder pain and determines factors affecting neck and shoulder pain in critical care nursing personnel at Ramathibodi hospital in Thailand.

3.2 Study Population

This population group was female nursing personnel in Ramathibodi hospital. They were 243 nursing personnel who worked in critical care unit (84.36% response rate). This population consisted of registered nurses and license practical nurses in critical care unit. All staffs from 3 divisions were medicine, surgical and pediatric that was selected in this study as follows.

: 3 wards in medicine department; intensive care unit (9ICU), cardiac cares unit (9CCU), stroke unit (MDJK).

: 3 wards in surgical department; surgical cardiac care unit (3ICU), intensive surgical care unit or post operative surgical care unit (5ICU), intensive surgical care unit (4IK).

: 2 wards in pediatric department; neonatal intensive care unit (NICU), pediatrics intensive care unit (PICU).

Inclusion criteria

An inclusion criterion was working experience in critical care unit at least 1 year.

Exclusion criteria

Nursing personnel who had been diagnosed for musculoskeletal disorder by doctor and had been experienced the accident in musculoskeletal which affected present work.

The Calculation for the sample number was based on the formula from Krejcie and Morgan

Where: n = Z^2NPQ / { e^2 (N-1) + Z^2NPQ}

N = The given population size

n = Sample size

e = The degree of accuracy expressed as a proportion (0.05)

Z^2 = Table value of chi square for one degree of freedom relative to the desired level of confidence, which was 3.841 for the 95% confidence level represented by entries in the table

P = population proportion that for table construction has been assumed to be 0.50, as this magnitude yields the maximum possible sample size required

Q = 1-P = 1-0.5 = 0.5

Calculation of sample number

n = Z^2NPQ / { e^2(N-1) + Z^2NPQ }

= 1.96^2 x 243 x 0.5x 0.5 / {0.05^2 x (243-1) + 1.96^2 x 0.5 x 0.5}

= 233.28/1.565

= 149.06

The calculated sample size equaled to 150 persons and when it was calculated for 20 % of non response rate thus the sample size became 180 person.

3. 3 Materials and equipment

3.3.1 Questionnaires

Self-administered questionnaire in Thai language was used for the collection data to all subjects in this study. These questionnaires consisted of five parts as follows:

Part 1: The modified Dutch Musculoskeletal Questionnaires (DMQ) consisted of:

1. Demographic data

This section consisted of individual characteristics including occupational, level of education, age, weight, height, body mass index (BMI), marital status, pregnancy, smoking, alcohol consumption, exercise, work status, health status and history of accident or injury.

2. Characteristic of work data

This section consisted of division of work, wards, time of work, time per day, time per week, over time, part- time, work task including shift work, rotate of work, position usual in work. The physical data in works consisted of 15 questions in nursing activity and 13 postures in work task. The answers would be seldom or never, sometimes, often and always.

3. Musculoskeletal complaint data

This section consisted of question related to musculoskeletal trouble, pain or discomfort in the past, 7 days ago and in the past 12 months in fifteen body areas. And the answers would be yes or no in the past, 7 day ago and in past 12 month. The “yes” answer would be further referred to sometime, regular, and chronic while “no” was never.

Part2: Musculoskeletal Pain Assessment

Pain level was ratio scale. It consisted of ten point – 0 mean no pain,1-5 scales was low level of pain, 6-7 scale was moderate pain and 8-10 scale was high level of pain .

Part3: The Psychological job stress:

The 22-item Job Content Questionnaires (JCQ) would be introduced to access psychological job stress at work. All questions are based on Job Content Questionnaires (JCQ, Karasek, 1985). Before using the questionnaire, we contacted Professor R. Karasek for the permission. Two month later, he sent the approval to us by the post as shown in Appendix F.

In this study, all sections have 4-point likert scales. 1, 2 3, and 4 scale represented strongly disagrees, disagree, agree and strongly agree, respectively. All questionnaires were ordinal scale. The questions showed 4 component of stress based on JCQ : decision latitude from question 1-9(9item), psychological demands from question 10-14 (5item), supervisor social support from question 15-18(4item), and coworker social support from question 19-22(4item). The total score will be calculated using the standardized formula. The total scores obtained from 22items in a four-point rating scale as follows:

1. The decision latitude means the power that affect with member's behavior in the organization. This decision latitude was sometimes called frameworks. This framework is affected by the decision; its content related to the job assignment and the position of workers in the firm. The obtained score would be classified into 2 groups; high and low decision latitude. The score range was 24-96. The 70% cut point for two groups was used to classify high and low group, score < 68 is defined as low group while the score ≥ 68 is defined as high group.

2. The psychological demand refers to the support among the social network in workplace. This factor can reduce stress and can correct all problems in workplace. It implies the attention, honor and respectability from each other. The obtained score would be finally classified into 2 groups: high and low psychological demands. The score range was 12-48. The 70% cut point for two groups was used to

classify high and low group, if score < 34 is defined as low group while the score ≥34 is defined as high group.

3. The supervisor social support means the support from supervisor. The worker had often used this support to cope with stress. This factor can also influence stress level in workplace. (62). The score in this part would be classified as high and low supervisor social support. The score range was 12-48. The 70% cut point for two groups was used to classify high and low risk factor, if score < 12 is defined as low group while score ≥12 is defined as high group.

4. The coworker social support means the support from co-workers. When the workers were accepted or recognized from coworker the stress level would be reduced. (60) Good mental health would be found. (61). The score would be defined as high and low supervisor social support. The score range was 12-48. The 70% cut point for two groups was used to classify high and low risk factor, if score < 12 is defined as low group while the score ≥12 is defined as high group.

Part4: The quality of sleep:

This section was to determine the quality of sleep in 12 months ago. A Pittsburgh Sleep Quality Index, PSQI questionnaire was introduced to all nursing personnel. The score of 21were total scale if score ≥5 meaned poor quality of sleep.

Section2: The posture evaluation

The Rapid Upper Limb Assessment (RULA) was used in this section to evaluate risk factors and determine one working posture that usually performed in this group. This posture was obtained from the RULA questionnaire. The level of score consisted of 4 level – 1 or 2 mean acceptable level , 3 or 4 mean further investigation ,5 or 6 mean further investigation and will be changed soon and 7 mean investigate and will be changed immediately.

3.3.2 Questionnaires development strategy

The steps to develop the questionnaire for this study were as followed:

3.3.2.1 To reviews the literature, which were related to the target group and the other related factors to neck and shoulder pain.

3.3.2.2 To determine the appropriated tool for the thesis project.

3.3.2.3 To ask for the permission to use all questionnaires from questionnaires establisher.

3.3.2.4 To modify all questionnaires for appropriated group.

3. 3.3 Validity and reliability of instruments

3.3.3.1Validity

The questionnaires were verified by 3 nursing instructors experienced in occupational health, medicine and critical care working in (Rama!) Mahidol University. The questionnaires were revised according to their comments and suggestions.

3.3.3.2 Reliability

All questionnaires consisted of the modified Dutch musculoskeletal questionnaires (DMQ), the job content questionnaires (JCQ), the musculoskeletal pain assessment and the Pittsburgh sleep quality index (PSQI) questionnaire were reviewed, improved and translated into Thai language by occupational health specialists working in Mahidol University. The questionnaires tried out among 32 female nursing personnel in critical care unit in Somdejprapinklao hospital was performed.

The Cronbach's alpha coefficients were obtained as follows:

The DMQ questionnaires	0.89
The activity of nursing	0.92
The posture of nursing	0.86
The Pittsburgh sleep quality index questionnaires	0.71
The job content questionnaires (JCQ)	0.81

3. 4 Data collection

3.4.1 This study search the name lists all nursing personnel in the nursing faculty in Ramathibodi hospital.

3.4.2 The permission document was submitted to the dean of a Ramathibodi medical faculty for the data collection among critical care nursing personnel.

3.4.3 Self-administered questionnaires were distributed to nursing personnel in critical care unit and the purposes of this study were explained. The duration for filling in form was approximately 30-45 minutes. All data will be kept confidentially.

3.4.4 The period of data collection was 2 sections:

-The first period was taken from 15 May to 30 August 2009.

-The second period used the RULA assessment to evaluate risk posture. The data was taken from 1 September to 15 December 2009.

3.4.5 All complete questionnaires were analyzed after its return to researcher

3.5 Data Analysis

All data from this survey were analyzed by using program computers.

3.5.1 Descriptive statistics were used to analyze the data such as percentage, frequency, mean, standard deviation (SD) and prevalence rate of neck and shoulder pain.

3.5.2 Chi-square statistic test was introduced for the statistic analysis. It was used to determine independence variable and the related factor of independence variable (i.e. demographic factor, characteristic of work, psychosocial factor and quality of sleep) and neck and shoulder pain.

3.5.3 Odds ratio and 95% confidence interval were used to analyze the relationship between independence variable and neck and shoulder pain. The data

compare between 2 groups of the answer. Yes, sometimes and never neck and shoulder pain are the first group. Yes, always and chronic neck and shoulder pain are the second group.

3.5.4 The binary regression was used to analyze the relationship between independence variable and neck and shoulder pain.

3.5.5 The confidence level was set at 95%.

CHAPTER IV
RESULTS

This study was a cross-sectional survey design study using a self-administered questionnaire to investigate the prevalence rate of work-related neck and shoulder pain and determine factors affecting neck and shoulder pain in critical care nursing personnel at Ramathibodi hospital in Thailand 2009. This population group consisted of registered nurses and practical nurses that experienced working in critical care unit at least 1 year. 205 questionnaires were returned (84.4% response rate) and 19 staffs had been diagnosed for musculoskeletal disorder by doctor and had been experienced the accident in musculoskeletal which affected present work. Total 186 questionnaires were collected in this study that consisted of 158 registered nurses (84.9%) and 28 practical nurses (15.1 %). All data were divided 2 parts as follows:

1. All questionnaires showed internal consistency and a reliability coefficient (Cronbach's alpha) of 0.71-0.81. The questionnaires were consisted of question related to musculoskeletal trouble in the past 7 days and in the past 12 months in fifteen body areas, all questions were based on Dutch Musculoskeletal Questionnaires (DMQ). The psychological job stress, all questions are based on Job Content Questionnaires (JCQ, Karasek, 1985) that consisted of decision latitude, psychological demand, supervisor social support and coworker social support. Quality of sleep; all questions were based on a Pittsburgh Sleep Quality Index (PSQI) and Musculoskeletal Pain Assessment; all questions were based on pain scale.

2. The Rapid Upper Limb Assessment (RULA) was used to evaluate risk factors among often used posture.

This study was presented in table as follow:

Part 1: the demonstrate shows the distribution and response rate of questionnaire separated by division, individual factor, the work characteristic of nursing personnel, psychological job stress, quality of sleep, musculoskeletal symptom, musculoskeletal pain assessment, the Rapid Upper Limb Assessment (RULA). This factor was presented by the percentage.

Table1. The distribution and response rate of questionnaire separated by division

Division	Questionnaires distribute(number)	Questionnaires response rate (number)	Response rate (%)
Medicine	85	70	82.4
Surgery	84	76	90.5
Pediatric	74	59	79.7
Total	243	205	84.4

Table 1 shows a distribution and return rate of questionnaires. 243 questionnaires (84.4% response rate) was consisted of 3 divisions, 85 nursing personnel from medicine (82.4% response rate), 84 nursing personnel from surgical (90.5% response rate), and 74 nursing personnel from pediatric (79.7 %response rate).

4.1 Demographic Characteristics

Table 2 shows the demographic data such as group of nurse, level of education, age, body weight, height, body mass index (BMI), marital status, child, smoking, alcohol consumption, exercise, status of work, accidental and experienced the accident in musculoskeletal which affected present work.

Table 2 Demographic data of all nursing personnel

Individual factor	Nursing personnel (%)
Group of nurse	
Nurse	158(84.9)
Practical nurses	28(15.1)
Total	186(100)
Highest education	
Lower bachelor degree	17(9.1)
Bachelor degree	156(83.9)
Master degree	12(6.5)
Doctoral degree	1(0.5)
Age (Year)	
21-25	45(24.2)
26-30	85(45.7)
31-35	36(19.4)
>35	20(10.8)
Mean ±SD	33.00 ±7.99
Body weight (Kg.)	
<40-50	90(48.4)
51-60	75(40.3)
>60	21(11.3)
Mean ±SD	52.19±7.73
Height (Cm.)	
150-155	49(26.3)
156-160	79(42.5)
>160	58(31.2)
Mean ±SD	159.18±4.67

Individual factor	Nursing personnel (%)
BMI	
<18.5	41(22)
18.5-24.9	133(71.5)
25-29.9	10(5.4)
>30	2(1.1)
Mean ±SD	20.63±2.93
Marital status	
Single	146(78.5)
Married	39(21)
Widow/Divorce/Separated	1(0.5)
Child	
No child	162(87.1)
Child	24(12.9)
Number of child	
No	162(87.1)
1 Child	16(8.6)
2 Children	7(3.8)
3 Children	1(0.5)
Smoking behavior	
Yes	2(1.1)
No	184(98.9)
Alcohol consumption	
Yes	1(0.5)
Sometimes	41(22.1)
No	144(77.4)
Regular Exercise(3 times/week)	
Yes	21(11.3)
No	165(88.7)

Individual factor	Nursing personnel (%)
Work status	11(5.9)
Permanent employee	160(86)
University official	
Government official	15(8.1)
Accidental	
Experienced accident but no effected with present work.	2(1.1)
Never	184(98.9)

Table 2 demonstrates the demographic data of the subject. The subject were 158 registered nurse (84.9%) and 28 practical nurses (15.1%), the highest of education was bachelors degree (83.9 %). The most of age were between 26-30 year (45.7%), the most body weight was below 40-50 kg (48.4%) and the most of height was 156-160 centimeter (42.5%).The range of body mass index (BMI) were between 18.5-24.9 (71.5%), single marital status (78.5%), work status in university official(86%),no alcohol consumption (77.4%), non smoking (98.9%), and non exercise behavior (88.7%)

Table 3 The work characteristic of nursing personnel

Work characteristic	Nursing personnel (%)
Division	
Medicine	68(36.6)
Surgery	62(33.3)
Pediatric	56(30.1)
Wards	
9CCU	28(15.1)
9ICU	28(15.1)
5ICU	12(6.5)
3ICU	21(11.3)
1JK	12(6.5)
4ICU	29(15.6)
9PICU	25(13.4)
8NICU	31(16.7)
Duration of work (Year)	
1-5	95(51.1)
6-10	59(31.7)
>10	32(17.2)
Mean ±SD	6.94±5.43
Working experience in this section (Year)	
1-5	97(52.2)
6-10	62(33.3)
>10	27(14.5)
Mean ±SD	6.52±5.15
working hour/day	
8 hour/day	93(50)
>8 hour/day	93(50)

Work characteristic	Nursing personnel (%)
Time/week	
≤40hours/week	40(21.5)
41-50 hours/week	87(46.8)
>50 hours/week	59(31.7)
Overtime	
Yes	86(46.2)
No	100(53.8)
Overtime(hours/week)	
≤ 1-8 Hr/WK	40(46.5)
9-16 Hr/WK	24(27.9)
≥ 16Hr/WK	22(25.6)
Mean ±SD	6.30±9.22
Supervisor status	
Yes	2(1.1)
No	184(98.9)
Shift work experience	
Yes	181(97.3)
No	5(2.7)
Characteristic of rotation shift work	
Conventional	29(15.6)
Unconventional	157(84.4)
Type of work	
Normal work	37(19.9)
Heavy work	108(58.1)
Very heavy work	41(22)

Table 3 demonstrates work characteristics data. It was found that the most of nurses worked in medicine division (36.6), some nurses worked in NICU (16.7). The range of frequency occupational time was 1-5 year (51.1%). 50% of nurses spent 8

hours and over 8 hours per day and the most of nurses worked 41-50 hours per week (46.8%). 53.8% of nurses did not work overtime. The duration for over time group (46.51%) was ≤ 1-8 hours per week. 98.9% of nurses work as operational level. Most of nurses performed a shift work (97.3 %) and among those the shift was regular turn shift (84.4%). 58.1% of nurses felt that their work was very heavy while 22 % of nurses felt that it was heavy work.

4.2 Prevalence of neck and shoulder pain among nursing personnel

The prevalence of neck and shoulder pain in other region among nursing personnel in Ramathibodi hospital in the part, during 12 months ago and 7 days ago are shown in Table 4, Table 5 and Table 6, respectively. The results demonstrate as followed:

Table 4 The body part and the prevalence of musculoskeletal complaint in the past

Body part of musculoskeletal pain in past	**Number of nursing personnel (%)**
Neck and shoulder	156(83.9)
Upper back	98(52.7)
Lower back	100(53.8)
Elbows	12(6.5)
Wrists/hands	53(28.5)
Hips	69(37.1)
Knees	70(37.6)
Ankles/feet	62(33.3)

*%=total nursing personnel who had musculoskeletal pain in at least one part of their body region in the part

Table 4 shows the prevalence of musculoskeletal complained among nursing personnel in the past. The prevalence rates of musculoskeletal complaint were neck and shoulder pain (83.9 %.) followed by lower back pain (53.8) and upper back pain (52.7), respectively.

Table 5 The body part and the prevalence of musculoskeletal complaint in 7 days ago

Body part of musculoskeletal pain in 7 days ago	**Number of nursing personnel (%)**
Neck and shoulder	81(43.5)
Upper back	57(30.6)
Lower back	64(34.4)
Elbows	6(3.2)
Wrists/hands	22(1.8)
Hips	32(17.2)
Knees	24(12.9)
Ankles	32(17.2)

*%=total nursing personnel who had musculoskeletal pain in at least one part of their body region in 7 day ago.

Table 5 reveals the prevalence of musculoskeletal complained among nursing personnel in 7 day ago and the prevalence of neck and shoulder pain was 43.5% followed by lower back pain (34.4%) and upper back pain (30.6%), respectively.

Table 6 The body part and the prevalence of musculoskeletal complaint in 12 months ago

Body part of musculoskeletal pain in 12 months ago	**Number of nursing personnel (%)**
Neck and shoulder	129(69.4)
Upper back	106(57)
Lower back	107(57.5)
Left elbow	13(7)
Right elbow	13(7)
Left wrist/hand	53(28.5)
Right wrist/hand	56(30.1)
Left hip/thigh	67(36)
Right hip/thigh	61(32.8)
Left knee	57(30.6)
Right knee	63(33.9)
Left ankle/foot	67(36)
Right ankle/foot	68(36.6)

*%=total nursing personnel who had musculoskeletal pain in at least one part of their body region in 12 months ago.

Table 6 reveals the prevalence of musculoskeletal complained among nursing personnel in last 12 months and the prevalence of neck and shoulder pain was 69.4% followed by lower back (57.5%) and upper back pain (57%), respectively.

Table7 Causes of neck and shoulder pain during the last 12 months

Causes of neck and shoulder pain	**Number of nursing personnel (%)**
Sport	19(3.3)
Accident	6(1)
Pregnancy	9(1.6)
Sudden movement	76(13.2)
Lifting of heavy load	97(16.8)
Stress	82(14.2)
Bad posture during long time	107(18.6)
Weather(draught, coldness, moisture)	15(2.6)
Work	134(23.3)
Leisured time	31(5.4)

* Subject can choose over 1 choice you can choose

Table 7 shows causes of neck and shoulder pain during past 12 months. The 3 highest causes of neck and shoulder pain were working in the present (23.3%), bad posture during long time (18.6%) and lifting of heavy load (16.8%).

Table 8 The frequencies of neck and shoulder pain past in 12 months

Frequency of neck and shoulder pain in 12 months ago	**Number of nursing personnel (%)**
1 time	19(17.3)
2-4 times	6(5.4)
5-10 times	9(8.2)
>10 times	76(69.1)

* Subject can choose over 1 choice you can choose

Table 8 demonstrates that most of nurses got neck and shoulder complained in 12 months ago. Among those nurses who experienced pain, 69.1% of nurses had pain > 10 times follow by 1 time (17.3%) and 5-10 times (8.2%).

Table 9 The coping strategies of neck and shoulder complained in 12 months ago

Coping strategies of neck and shoulder pain past 12 months	**Number of nursing personnel (%)**
Sick leave 1-7 days	4(2)
Sick leave 8-14 days	3(1.5)
Use medicine to relive pain	36(17.8)
Admission in the hospital	8(3.9)
Consult physician/physical therapy	4(2)
Use alternative medicine such as massage, acupuncture	88(43.6)
No treatment	59(29.2)

*Subject can choose over 1 choice you can choose

Table 9 shows the coping strategies of neck and shoulder complaint in 12 months ago. It was found that 43.6% of nurses used alternative medicine to recover the symptom such as massage, acupuncture. 29.2% of nurses belief that the symptom could be recover by themselves and 17.8% of nurses used medicine for relive symptom.

Table 10 The level of neck and shoulder complain in12 months ago

Level of neck and shoulder pain in12 months ago	**Number of nursing personnel (%)**
Low (score1-5)	98(64.1)
Moderate (score6-7)	38(24.8)
Sever (score 8-10)	17(11.1)

Table 10 shows the level of neck and shoulder complain in 12 months ago. Most of nurses demonstrated low pain (64.1%). The moderate pain level and sever pain level were 24.8% and 11.1%, respectively.

Table 11 Job tasks in 1 shift work (8 hours)

Job task in 1 shift work (8 hours)	**seldom or never** Number (%)	**sometimes** Number (%)	**often** Number (%)	**(almost), always** Number (%)
Accepting emergency patient	27(14.5)	95(51.2)	55(29.5)	9(4.8)
Transferring patient	3(1.6)	32(17.2)	103(55.4)	48(25.8)
Moving bed	8(4.4)	65(34.9)	83(44.6)	30(16.1)
Changing and absorb pad	5(2.7)	12(6.5)	98(52.6)	71(38.2)
Bathing patient in bed	1(0.6)	15(8.1)	90(48.3)	80(43)
Medication	26(13.9)	9(4.9)	63(33.9)	88(47.3)
Repositioning a patient in bed side to side	2(1.1)	12(6.4)	82(44.2)	90(48.3)
Assisting the patients to move up such as form sit to sleep or sleep to sit	12(6.5)	27(14.5)	77(41.4)	70(37.6)
Taking patient to an operation room and receiving	11(5.9)	93(50)	54(29)	28(15.1)
Dressing a patient in bed	1(0.5)	33(17.7)	87(46.8)	65(35)
Feeding bedridden patient	2(1.1)	35(18.8)	89(47.8)	60(32.3)
Sending patient to an exam and receiving	11(5.9)	75(40.3)	73(39.3)	27(14.5)
Making a bed while the patient is not in it	15(8.1)	74(39.8)	66(35.4)	31(16.7)
Making a bed with the patient in it	1(0.5)	16(8.6)	97(52.2)	72(38.7)
Accept and discharge a patient	2(1.1)	64(34.4)	92(49.4)	28(15.1)

Table 11 shows the nursing activity in 1 shift work; repositioning a patient in bed side to side was the most activity followed by bathing patient in bed and making a bed with the patient in it. The five highest job task of nurses were repositioning a patient in bed side to side, bathing patient in bed, making a bed with the patient in it, changing and absorb pad, dressing a patient in bed, respectively while accepting emergency patient respectively was seldom performed in 1 shift work.

Table 12 The working posture and percentage and amount of posture in 1 shift (8hr)

Posture in 1 shift (8 hr)	**seldom or never** Number (%)	**sometimes** Number (%)	**often** Number (%)	**(almost), always** Number (%)
Standing for long period such as on the working procedure	3(1.6)	42(22.6)	97(52.2)	44(23.6)
Sitting for long period	45(24.2)	110(59.1)	24(12.9)	7(3.8)
Moving load until 5kg - <10 kg	10(5.4)	49(26.3)	96(51.6)	31(16.7)
Moving load until 10 kg-< 25kg	21(11.3)	67(36)	77(41.4)	21(11.3)
Moving load ≥25 kg	19(10.2)	82(44.1)	67(36)	18(9.7)
Works which require exertion of arms/ hands such as resuscitate	23(12.4)	87(46.8)	54(29)	22(11.8)
Working with vibration tool	19(10.2)	40(21.5)	92(49.5)	35(18.8)
Working with uncomfortable posture	18(9.6)	62(33.3)	82(44.1)	24(12.1)
Working with your hand above shoulder level	7(3.8)	54(29)	101(54.3)	24(12.9)
Working with hand distance from trunk in horizontal such as pushing the patient in bed for turning position	4(2.2)	18(9.7)	105(56.5)	59(31.7)
Bending of neck forward (neck and shoulder is not in vertical line)	4(2.2)	47(25.3)	99(53.2)	36(19.3)

Posture in 1 shift (8 hr)	**seldom or never Number (%)**	**sometimes Number (%)**	**often Number (%)**	**(almost), always Number (%)**
Squatting/kneeing for long period such as recording urine output	6(3.3)	53(28.5)	93(50)	34(18.2)
VDU working for long period	28(15.1)	95(51.1)	54(29)	9(4.8)

Table 12 reveals nursing posture in 1 shift work. The five highest working postures were working with hand distance from trunk in horizontal, standing for long period, bending of neck forward, squatting/kneeing for long period, working with vibration tool, respectively while sitting for long period was seldom performed in 1 shift work.

Table 13 The working posture after used Rapid Upper limb Assessment (RULA) separate from division

Divisions	**RULA score (Left side) (number)**					
	3-4 Score Pain		**5-6 Score Pain**		**7 Score Pain**	
	Yes (%)	**No (%)**	**Yes (%)**	**No (%)**	**Yes (%)**	**No (%)**
Medicine	0 (0)	0 (0)	0 (0)	0 (0)	7 (10.9)	57 (89.1)
Surgery	0 (0)	0 (0)	0 (0)	0 (0)	6 (10.2)	53 (89.8)
Pediatric	2 (3.9)	2(3.9)	3 (5.7)	43 (82.6)	0 (0)	2(3.9)

*total 175 subject

Table 13 demonstrates the posture in 1 shift. As mentioned above, one working posture from routine activity that often used among nursing personnel was

selected to be evaluated by RULA Assessment (RULA).5-6 was found to be the high frequent score in pediatric wards. Beside medicine and surgery wards, it was found that 10.9% and 10.2% respectively of nurses had ever experience the neck and shoulder pain. The RULA assessment in adult wards were equal score (7 score).

Table 14 The working posture after used Rapid Upper limb Assessment (RULA) separate from division

Divisions	RULA score (Right side) (number)					
	3-4 Score		5-6 Score		7 Score	
	Pain		Pain		Pain	
	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)
Medicine	0 (0)	0 (0)	0 (0)	0 (0)	7 (10.9)	57 (89.1)
Surgery	0 (0)	0 (0)	0 (0)	0 (0)	6 (10.2)	53 (89.8)
Pediatric	2 (3.8)	2(3.8)	3 (5.8)	42(80.8)	0 (0)	3 (5.8)

*total 175 subject

Table 14 demonstrates the posture in 1 shift. As mentioned above, one working posture from routine activity that often used among nursing personnel was selected to be evaluated by RULA Assessment (RULA). In pediatric wards, this nurses who experience neck and shoulder pain was 5.8%. 5-6 was found to be the high frequent score. Beside medicine and surgery wards, it was found that 10.94% and 10.17% respectively of nurses had ever experience the neck and shoulder pain. The RULA assessment in adult wards were equal score (7 score).

Table 15 The psychological job stress among nursing personnel about decision latitude, psychological job demand, supervisor social support and coworker social support

Psychological job stress	**Number of nursing personnel (%)**
Decision Latitude (Score 24-96)	
High (≥68)	114(61.3)
Low (<68)	72(38.7)
mean ± SD	66.34±6.83
Psychological Job demand (Score 12-48)	
High (≥34)	102(54.8)
Low (<34)	84(45.2)
Mean ± SD	33.29±4.25
Supervisor social support(Score 4-16)	
High (≥12)	96(51.6)
Low (<12)	90(48.4)
mean ± SD	10.63±2.47
Coworker social support(Score 4-16)	
High (≥12)	38(20.4)
Low (<12)	148(79.6)
Mean ± SD	12.09±1.6

Table 15 shows the psychological job stress aspect of nursing personnel. High decision latitude (61.3%), high psychological job demands (54.8%) were found. The percentage of high and low supervisor social support was equal (50%) and Most of nurses (79.6 %) revealed low coworker social support.

Table 16 The quality of sleep among nursing personnel in 12 months ago

Quality of sleep in 12 months ago	Number of nursing personnel (%)
Good	48(25.8)
Poor	138(74.2)

Table 16 reveals the quality of sleep among nursing personnel in 12 months ago. The Modified Pittsburgh Sleep Quality Index; PSQI was used to evaluate the quality of sleep. The total score was 21; if the total scores were more than 5, it would classify as poor quality of sleep. This most of nursing personnel demonstrated poor quality of sleep (74.2%).

Part 2: The association between neck and shoulder pain.

Demonstrate shows the factor that related with neck and shoulder pain among nursing personnel such as individual factor, physical factor, psychological job stress, quality of sleep, posture of worker. The comparison between 2 groups: chronic or always symptom and sometime or never symptom was determined. Chi-square and Odd ratio with 95% Confidence interval were introduced to evaluate its relationship.

Table 17 The relationship between individual factor and neck and shoulder pain among nursing personnel

Individual factor	Neck and Shoulder pain		OR(95% CI)	P-value
	Yes (%)	No (%)		
Group of nurses				
Nurse	18(11.4)	140(88.6)	3.47(0.44-27.11)	0.316
Practical nurses	1(3.56)	27(96.4)	1	
Highest Education				
Lower bachelor degree	0(0)	17(100)	1.12(1.06-1.18)	0.225
bachelor degree	19(11.2)	150(88.8)	1	
->bachelor degree				
Age (Year)				
21-25	4(8.9)	41(91.1)	1	
26-30	11(12.9)	74(87.1)	1.52(0.46-5.09)	0.575
31-35	8(22.2)	28(77.8)	2.93(0.80-10.67)	0.120
>35	4(20)	16(80)	2.56(0.57-11.50)	0.237
BMI				
<18.5	7(17.1)	34(82.9)	1.90(0.69-5.22)	0.258
18.5-23.49	12(9.7)	111(90.3)	1	
>23.5	0(0)	22(100)	NA	-

Individual factor	Neck and Shoulder pain		OR(95% CI)	P-value
	Yes (%)	No (%)		
Marital status				
Single	17(11.6)	129(88.4)	1	
Married/Divorce/ separated	2(5)	38(95)	2.50(0.55-11.32)	0.375
Child				
Have a child	2(8.3)	22(91.7)	1.29(0.279-5.96)	0.999
No child	17(10.5)	145(89.5)	1	
Number of child				
No	17(10.5)	145(89.5)	1	
1 person	0(0)	16(100)	NA	-
2-3 persons	2(25)	6(75)	2.84(0.53-15.21)	0.220
Smoking behavior				
Yes	1(50)	1(50)	6.07(0.36-100.20)	0.270
No	26(14.1)	158(85.9)	1	
Alcohol consumption				
Yes	18(12.5)	126(87.5)	5.86(0.76-45.24)	0.194
No	1(2.3)	41(97.7)	1	
Exercise (3/week)				
No	16(9.7)	149(90.3)	1	
Yes	3(14.3)	18(85.7)	0.64(0.17-2.43)	0.455
Work status				
Permanent employee	1(9.1)	10(90.9)	1.40(0.08-25.15)	0.999
University official	17(10.6)	143(89.4)	1.66(0.21-13.46)	0.999
Government official	1(6.7)	14(93.3)	1	

Individual factor	Neck and Shoulder pain		OR(95% CI)	P-value
	Yes (%)	No (%)		
Accidental				
Never	19(10.3)	165(89.7)	1	
Ever but no effect with present work	0(0)	2(100)	0.89(0.85-0.94)	0.999
Quality of sleep				
Good	4(8.5)	43(91.5)	1	
Poor	15(10.8)	124(89.2)	1.30(0.40-4.13)	0.786

Chi-square with Significant level at the 0.05

*=Significant difference

All individual factors were not significant associated with neck and shoulder pain (Table 17). ORs for neck and shoulder pain of smoking habit was the most prominent (OR=6.07), followed by alcohol consumption (OR=5.86). However, the risk of pain also showed in different group of nurses, registered and license practical nurses (OR=3.47).The trend of pain would be increase by age (OR=1.52, OR=2.93, OR=2.56, respectively). A single and marital group was associated with pain (OR=2.50). Having a child group was associated with pain (OR=1.29), and have a child 2-3 person was increasing associated pain (OR=2.84). The quality of sleep was no significantly associated with pain. Poor quality of sleep was associated with neck and shoulder pain (OR=1.30).

Table 18 The relationship between factor of work and neck and shoulder pain among nursing personnel

Work factor	Neck and Shoulder pain		OR(95% CI)	P-value
	Yes (%)	No (%)		
Division				
Medicine	7(10.3)	61(89.7)	1.07(0.34-3.38)	0.999
Surgery	6(9.7)	56(90.3)	1	
Pediatric	6(10.7)	50(89.3)	1.12(0.34-3.70)	0.999
Ward				
9CCU	3(10.7)	25(89.3)	1.14(0.17-7.52)	0.999
9ICU	3((10.7)	25(89.3)	1.14(0.17-7.52)	0.999
1MDJK	1(8.3)	11(91.7)	0.86(0.07-10.66)	0.999
5ICU	1(8.3)	11(91.7)	0.86(0.07-10.66)	0.999
3ICU	2(9.5)	19(90.5)	1	
4ICU	3(10.3)	26(89.7)	1.10(0.17-7.22)	0.999
9PICU	2(8)	23(92)	0.83(0.11-6.43)	0.999
8NICU	4(12.9)	27(87.1)	1.41(0.23-8.48)	0.999
Duration of work				
1-5 year	9(9.5)	86(90.5)	1	
6-10year	7(11.9)	52(88.1)	1.29(0.45-3.66)	0.786
>10 year	3(9.4)	29(90.6)	0.99(0.25-3.90)	0.999
Occupational time				
1-5 year	9(9.3)	88(90.7)	1	
6-10 year	7(11.3)	55(88.7)	1.29(0.44-3.53)	0.788
>10 year	3(11.1)	24(88.9)	1.22(0.31-4.87)	0.722
Time/day				
>8 hr/day	15(16.2)	78(83.8)	4.28 (1.36-13.43)	0.014*
8 hr /day	4(4.3)	89(95.7)	1	

Work factor	Neck and Shoulder pain		OR(95% CI)	P-value
	Yes (%)	No (%)		
Time/week(hour/week)				
≤40 hr /weeks	3(7.5)	37(92.5)	1	
41-50 hr /weeks	8(9.2)	79(90.8)	1.25(0.31-4.98)	0.999
>50 hr /weeks	8 (13.6)	51(86.4)	1.93(0.48-7.79)	0.517
Overtime				
Yes	10(11.6)	76(88.4)	1.33(0.51-3.44)	0.728
No	9(9)	91(91)	1	
Overtime(hours/week)				
≤ 1-8 hr /weeks	15(10.7)	125(89.3)	1	
9-16 hr /weeks	1(4.2)	23(95.8)	0.36(0.05-2.88)	0.471
Supervisor status				
Yes	0(0)	2 (100)	1.11(1.06-1.17)	0.999
No	19(10.3)	165(89.7)	1	
Shift work				
Yes	19(10.5)	162(89.5)	0.89(0.85-0.94)	0.999
No	0(0)	5(100)	1	
Characteristic of rotate shift				
Unconventional	15(12.1)	142(87.9)	0.66(0.20-2.15)	0.505
Conventional	4(13.8)	25(86.2)	1	
Type of work				
Normal work	5(13.5)	32(86.5)	1	
Heavy work	7(6.5)	101(93.5)	0.44(0.13-1.49)	0.183
Very heavy work	7(17.1)	34(82.9)	1.32(0.38-4.58)	0.759

Chi-square with Significant level at the 0.05

*=Significant difference

Table 18 **s**hows that working hour longer than 8 hr per day was significantly associated with neck and shoulder pain (P=0.014). ORs for neck and shoulder pain of occupational time were 1.29 and 1.22, respectively. Related to the working duration, it was found that 41-50 hours and >50 hours was increasing

associated with neck and shoulder pain (OR 1.25 and 1.93, respectively). An odds ratio of overtime and neck and shoulder pain was 1.33. Over time ≥ 16 hours per weeks and a very heavy work group were of equal average odd ratio (OR=1.32) and supervisor status (OR 1.11).

Table 19 The relationship between activity in 1 shift work and neck and shoulder pain among nursing personnel

Activity in 1 shift (8 hr)	Neck and Shoulder pain		OR(95% CI)	P-value
	Yes (%)	No (%)		
Accepting emergency patients				
Seldom or never/sometimes	4(6.3)	60(93.7)	1	
Often/always	15(12.3)	107(87.7)	2.10(0.66-6.62)	0.307
Transferring patients				
Seldom or never/sometimes	16(10.6)	135(89.4)	1	
Often/always	3(8.6)	32(91.4)	0.79(0.21-2.87)	0.999
Moving bed				
Seldom or never/sometimes	13(11.5)	100(88.5)	1	
Often/always	6(8.2)	67(91.8)	0.68(0.24-1.90)	0.622
Changing pad				
Seldom or never/sometimes	16(9.5)	153(90.5)	1	
Often/always	3(17.6)	14(82.34)	2.04(0.53-7.89)	0.390
Bathing patients in bed				
Seldom or never/sometimes	18(10.6)	152(89.4)	1	
Often/always	1(6.3)	15(93.7)	0.56(0.07-4.51)	0.999
Medications				
Seldom or never/sometimes	18(11.9)	133(88.1)	1	
Often/always	1(2.9)	34(97.1)	0.21(0.02-1.68)	0.132
Repositioning the patients in bed side to side				
Seldom or never/sometimes	18(10.5)	154(89.5)	1	
Often/always	1(7.2)	13(92.8)	0.65(0.08-5.33)	0.999

Activity in 1 shift (8 hr)	Neck and Shoulder pain Yes (%)	No (%)	OR(95% CI)	P-value
Assist the patients to move up such as from sit to sleep or sleep to sit				
Seldom or never/sometimes	14(9.5)	133(90.5)	1	
Often/always	5(12.8)	34(87.2)	1.39(0.47-4.14)	0.556
Taking the patients to an operation room and receiving				
Seldom or never/sometimes	10(12.2)	72(87.8)	1	
Often/always	9(8.6)	95(91.4)	0.68(0.26-1.76)	0.471
Dressing the patients in bed				
Seldom or never/sometimes	16(15.8)	136(84.2)	1	
Often/always	3(8.8)	31(91.2)	0.82(0.22-2.99)	0.999
Feeding bedridden patients				
Seldom or never/sometimes	14(9.4)	135(90.6)	1	
Often/always	5(13.5)	32(86.5)	1.50(0.50-4.48)	0.543
Sending patient to an exam and receiving				
Seldom or never/sometimes	12(12)	88(88)	1	
Often/always	7(8.1)	79(91.9)	0.65(0.24-173)	0.470
Making a bed while the patients is not in it				
Seldom or never/sometimes	8(8.3)	89(91.7)	1	
Often/always	11(12.4)	78(87.6)	1.56(0.60-4.09)	0.495
Making a bed with the patients in it				
Seldom or never/sometimes	16(9.5)	153(890.5)	1	
Often/always	3(17.6)	14(82.4)	2.04(0.53-7.89)	0.390
Accept and discharge the patients				
Seldom or never/sometimes	15(10.6)	126(89.4)	1	
Often/always	4(18.9)	41(91.1)	0.82(0.25-2.60)	0.999

Chi-square with Significant level at the 0.05

*=Significant difference

Table 19 demonstrates that all activity factors were not significantly associated with neck and shoulder pain. The factor such as accepting emergency patients, changing pad, assist the patients to move up, making a bed with the patients in it, making a bed while the patients is not in it, feeding bedridden patients and assist the patients to move up were also associated with neck and shoulder pain which ORs were 2.10, 2.04, 2.04, 1.50, 1.56, 1.39and respectively.

Table 20 The relationship between posture in 1 shift work and neck and shoulder pain among nursing personnel

Posture in1 shift (8 hr)	**Neck and Shoulder pain**		**OR(95% CI)**	**P-value**
	Yes (%)	**No (%)**		
Standing for a long time such as on the working procedure				
Seldom or never/sometimes	15(10.6)	126(89.7)	1	
Often/always	4(8.9)	41(91.1)	0.82(0.25-2.60)	0.999
Sitting for a long time				
Seldom or never/sometimes	4(12.9)	27(87.1)	1	
Often/always	15(9.7)	140(90.3)	0.72(0.22-2.34)	0.529
Moving load 5 - <10 kg				
Seldom or never/sometimes	13(10.2)	114(89.8)	1	
Often/always	6(10.2)	53(89.8)	0.99(0.35-2.75)	0.999
Moving load 10 - <25 kg				
Seldom or never/sometimes	14(14.3)	84(85.7)	1	
Often/always	5(7.9)	83(92.1)	0.36(0.12-1.04)	0.091

Posture in1 shift (8 hr)	Neck and Shoulder pain Yes (%)	No (%)	OR(95% CI)	P-value
Moving load ≥25 kg				
Seldom or never/sometimes	10(11.8)	75(88.2)	1	
Often/always	9(8.9)	92(91.1)	0.73(0.28-1.89)	0.691
Working with require exertion of arms/hands such as resuscitate				
Seldom or never/sometimes	9(11.8)	67(88.2)	1	
Often/always	10(9.1)	100(90.9)	0.74(0.28-1.92)	0.717
Working with vibration tool				
Seldom or never/sometimes	14(11.01)	113(88.9)	1	
Often/always	5(8.5)	54(91.5)	0.74(0.25-2.18)	0.784
Working with uncomfortable posture				
Seldom or never/sometimes	13(12.3)	93(87.7)	1	
Often/always	6(7.5)	74(92.5)	0.58(0.21-1.60)	0.336
Working with hand above shoulder level				
Seldom or never/sometimes	13(11)	105(89)	1	
Often/always	6(8.8)	62(91.2)	0.78(0.28-2.16)	0.822
Working with hands distance from trunk in horizontal line such as pushing the patients in bed for turning position				
Seldom or never/sometimes	14(9.9)	128(890.1)	1	
Often/always	5(11.4)	39(88.6)	1.17(0.39-3.45)	0.778

Posture in1 shift (8 hr)	Neck and Shoulder pain Yes (%)	No (%)	OR(95% CI)	P-value
Bending of neck forward (neck and shoulder is not in vertical line)				
Seldom or never/sometimes	14(10.4)	121(89.6)	1	
Often/always	5(9.8)	46(90.2)	0.93(0.32-2.75)	0.999
Squatting/kneeing for a long time such as recording urine output				
Seldom or never/sometimes	15(11.8)	112(88.2)	1	
Often/always	4(6.8)	55(93.2)	0.54(0.17-1.71)	0.427
VDU working for a long time				
Seldom or never/sometimes	10(15.8)	53(84.2)	1	
Often/always	9(7.3)	114(92.7)	0.41(0.16-1.09)	0.117

Chi-square with Significant level at the 0.05

*=Significant difference

Table 20 demonstrates that all posture were not significantly associated with neck and shoulder pain. The protection risk of neck and shoulder pain also showed in all factor except hands distance from trunk in horizontal line such as pushing the patients in bed for turning position, this factor was the risk factor for neck and shoulder pain (OR1.17).

Table 21 The relationship between the Rapid Upper Limb Assessment (RULA) and neck and shoulder pain among nursing personnel

RULA	Neck and Shoulder pain		OR(95% CI)	P-value
	Yes (%)	No (%)		
RULA at right side				
3-4 score	2(50)	2(50)	1	
5-7 score	16(9.4)	155(90.6)	0.10(0.01-0.78)	0.049*
RULA at left side				
3-4 score	2(50)	2(50)	1	
5-7 score	16(9.4)	155(90.6)	0.10(0.01-0.78)	0.049*

Chi-square with Significant level at the 0.05

*=Significant difference

Table 21 shows the relationship between RULA and neck and shoulder pain. It was found that RULA score for left and right side showed significant associated with neck and shoulder pain (P=0.049)

Table 22 The relationship between the Psychological job stresses and neck and shoulder pain among nursing personnel

Psychological job stress	Neck and Shoulder pain		OR(95% CI)	P- value
	Yes (%)	No (%)		
Decision Latitude				
High (≥68)	5(7.1)	65 (92.9)	1	
Low (<68)	14(12.3)	100(87.7)	1.87(0.64-5.45)	0.323
Psychological Job demand				
High (≥34)	7(8.3)	77(91.7)	1	
Low (<34)	12(11.7)	90(88.3)	1.46(0.55-3.91)	0.477
Supervisor social support				
High (≥12)	7(7.8)	83(92.2)	1	
Low (<12)	12(12.5)	84(87.5)	1.64(0.64-4.51)	0.338
Coworker social support				
High (≥12)	12(8.1)	136(91.9)	1	
Low (<12)	7(18.4)	31(81.6)	2.55(0.93-7.03)	0.074

Chi-square with Significant level at the 0.05

*=Significant difference

Table 22 shows all psychological job stress factor was not significant associated with neck and shoulder pain. ORs for neck and shoulder pain of low coworker social support were the most prominent (OR2.55). However, the risk of pain also showed in low decision Latitude, low psychological Job demand, low supervisor social support (OR1.87, OR1.46 and OR1.46, respectively).

Part2: Predictors of neck and shoulder pain among nursing personnel.

The result from binary logistic regression analysis demonstrate showed the relationship between other factor and neck and shoulder pain such as individual factor, physical factor, psychological job stress, quality of sleep, posture of worker as shown in table 23.

Table 23 The relationship between the factors and neck and shoulder pain

Factor	**OR(95% CI)**	**P-value**
RULA score right or left side	0.02(0.03-0.59)	0.026*
Time per day>8 hours/day	4. 29(1.07-18.29)	0.049*
Decision Latitude	5.02(1.02-24.62)	0.047*
Accepting emergency patients	5.36(1.02-24.62)	0.046*

*=Significant level at the 0.05

Table 23 shows the final binary logistic regression model. It was found that only four variables were significantly associated with neck and shoulder pain. These were found the high RULA score at right and left side (P=0.026), working hour per day greater than8 hours (P=0.049), low decision latitude (P=0.047) and accepting emergency patients (P=0.046) were significant associated with neck and shoulder pain.

CHAPTER V
DISCUSSION

5.1 Methodological Aspects

The objective of this study was to determine the prevalence rate of work-related neck and shoulder pain and the associated of work related factor between neck and shoulder pain in critical care nursing personnel at Ramathibodi hospital in Thailand.

The results of this study are discussion as follows:

5.1.1 The prevalence of work related neck and shoulder pain among in critical care nursing personnel

5.1.2 The individual factor in critical care nursing personnel

5.1.3 The work task factor in critical care nursing personnel

5.1.4 The psychological job demands in critical care nursing personnel

5.1.5 The sleep quality factor in critical care nursing personnel

This study was a cross-sectional designed and using a self-administered questionnaire to investigate the prevalence rate of work-related neck and shoulder pain and determine factors affecting neck and shoulder pain in critical care nursing personnel at Ramathibodi hospital in Thailand. 243 nursing personnel were included in this study (84.36% response rate). The data collections were using five questionnaires. The questionnaires were verified by 3 nursing lectureship. The questionnaires were revised according to 3 nursing instructors' comments and suggestions. All questionnaires tried out among 32 female nursing personnel in critical care unit in Somdejprapinklao hospital. The Cronbach's alpha coefficients of this subject were the DMQ questionnaires, the activity of nursing, the posture of nursing, the Pittsburgh sleep quality index questionnaires, the job content questionnaires were 0.89, 0.92, 0.92, 0.86, 0.71, and 0.81, respectively.

All data were analyzed by descriptive statistic such as percentage, frequency, mean, standard deviation (SD) and prevalence rate of neck and shoulder

pain. The Chi-square statistic test, the odd ratio, the 95% confidence interval and the binary logistic regression were used to determine independence variables and the related factor of independence variable. The discussions are described as follows:

5.2 The prevalence of work related neck and shoulder pain among critical care nursing personnel

The prevalence of work related neck and shoulder pain in 12 months ago among critical care nursing personnel was 69.4% followed by low back pain (57.50%) and upper back pain (57%) respectively (Table 6). The result in this study is similar other studies on nursing personnel, for example Derek R. Smite, 2006 review the study. He found the shoulder pain was the most report complaint (46%) followed by neck pain (40%) and low back pain (39.1%). Beside in European 2005, Evangelos C. Alexopoulos reviewed the prevalence of MSDs among 393 nurses, caregivers in nursing home and home for the elderly in Netherlands. He found low back region was the most complaint (62%) followed by shoulder pain (41%). and neck (39.1%).

This study investigate cause of neck and shoulder pain during 12 months ago, the frequencies of pain, the symptom of pain in the past, 7 days ago and in 12 months ago, the coping strategies of pain and the level of pain. However, these results were from the critical care unit. This sample size is too small when comparing with the other unit. The future study should increase more staffs to participate in the study.

The working environment in Thailand and other countries is different in term of psychological job stress, posture on working hours and culture, etc. However, the increasing trend of the health risk particular for neck and shoulder pain seems to be similar among different countries.

5.3 The association between works related neck and shoulder pain among critical care nursing personnel as follows:

5. 3. 1 Individual Factor

The individual factor in this study showed that all individual factors were not significantly associated with neck and shoulder pain. (Table17). ORs for neck and shoulder pain of smoking habit was the most prominent (OR6.07), followed by alcohol consumption (OR5.86). However, the risk of pain also showed in different group of nurses, registered and license practical nurses (OR3.47).The trend of pain would be increased by age (OR1.52, OR2.93, OR2.56, respectively). A single and marital group was associated with pain (OR2.50). Have a child group was associated with pain (OR1.29), and have a child 2-3 person was increasing associated pain (OR2.84).

Even there were not many studies on the factors associated with both neck and shoulder pain, but in some studies showed the factors such as age, weight, height and body mass index (BMI) were not significantly associated with neck and shoulder pain (71). The result in this study showed same pattern as in Gers F's study, it might be because of the BMI value was normal. Luime 2004 demonstrated that high body weight clearly induced shoulder pain. The factors such as marital status and having children were not significantly associated with neck and shoulder pain. It was differ from the study of Sinsongsook T, 2003 in King Chulalongkorn Memorial hospital. They determined the association of work-related factor and shoulder pain among hospital nursing personnel. They concluded that married status was significantly associated with neck pain ($P<0.05$). Smoking and alcohol consumption showed no significant association with neck and shoulder pain. This finding agreed with the study of Hildebrand, 2000. The OR among smoking was 6.07. It is well known that nicotine impaired the cardiovascular system, and finally link to the muscular pain. As in some studies indicated the significant associated with neck and shoulder pain (9). Most of nursing personnel did not perform exercise. This study showed no significant association of exercise with neck and shoulder pain. It is agreed with the study of Hildebrand, 2000, whereas the regular exercise showed the protection neck and shoulder pain as indicated by the OR which was 0.64. This protection pattern could be found in the study of Cassou, 2002, and Van den Heuvel, 2005. The exercises strongly improve musculoskeletal system and efficiency of the heart, lung and circulatory system and can strengthen tendons and ligaments (93). The accidental to

musculoskeletal region, in this group was cut of group that accident affects with present work, and group diagnose by the physician. So, the accidental was rarely found in this group. The result showed no significant associated with neck and shoulder pain (P>0.05). Meanwhile, the positive association in registered nurse with neck and shoulder pain (OR3.47) was demonstrated. It is noticed that there was less number of license practical nurses in this study, it is the policy of the Ramathibodi hospital to reduce this group of nurses.

5.3.2 Work Characteristic Factor

The working longer than 8 hour was significantly associated with neck and shoulder pain (P= 0.014) and other work characteristic factor were not significantly associated with neck and shoulder pain. ORs for neck and shoulder pain of occupational time (OR1.29 and 1.22, respectively). Time per week 41-50 hours and over 50 hours per weeks were increasing associated with neck and shoulder pain (OR 1.25 and 1.93, respectively). An odds ratio of overtime and neck and shoulder pain was 1.33. Over time ≥ 16 hours per weeks and a very heavy work group were of equal average odd ratio (OR1.32) and supervisor status (OR 1.11).

The result clearly revealed that working longer than 8 hour was significantly associated with neck and shoulder pain (P= 0.014). This study agreed with the study M. Trinkoff, 2003 and Larease 1994. They designed to investigate physical demands and reported musculoskeletal problems in registered nurses. They emphasized that the long working hours showed more risk to musculoskeletal disorder. Trinkoff 2006 showed that working hour significantly related to increased MSD; working >13 hours per day, on days off/vacation days, mandatory overtime, on-call, with <10 hrs between shifts significantly related to increased MSD. Ulrika, 2005 found that the duration of employment was significantly associated with neck and shoulder pain (P= 0.001). The finding of this study was different from Ulrike‘s study. The association of duration with neck and shoulder pain was found, nurses with 6-10 years of clinical experience to develop musculoskeletal pain (OR 1.29) than group with longer than 10years experience (OR 1.22). This study agreed with the study of Bolanle MS Tinubu. They found the association of long working hour with neck and shoulder pain; working > 20 years with clinical experience and the development of WMSDs (OR 3.81) than those who work for 11-20 years experience. And Malin

Josephson, 1998 found long hours of paid work had increased relative risk of neck/shoulder pain. The supervisor status factor was not significantly associated with neck and shoulder pain in this study. It is agreed with the study of Shoko Ando, 2000 they found this factor no significantly associated with neck/shoulder pain. Their results showed that most of nursing personnel were working in the operational level, 98.90% and 1.10% were working in the management level so that the association could not be found. In contrast, Thanes Sinsoongsuk, 2003 found the significant association of the working status with shoulder pain ($P<0.05$). This study determined the association of working in different section with the pain. No association was found in different division and ward and pain.

5. 3.3 Work Task Factor

5. 3.3.1 The working activity factors

The working activity factors in this study were not significantly associated with neck and shoulder pain. The studied factors such as accepting emergency patients, changing pad, assist the patients to move up, making a bed with the patients in it, making a bed while the patients is not in it, feeding bedridden patients and assist the patients to move up were also associated with neck and shoulder pain. ORs were 2.10, 2.04, 2.04, 1.50, 1.56, 1.39and respectively.

This study agreed with the study of J Smedly et al., 2003. She determined the association of patients handling activity such as reaching, pushing, and pulling, moving the patients in bed or wheel chair with neck and shoulder pain ($P< 0.05$). Ulrika AASA, 2005 found that the task activity such as work in awkward postures and handling heavy tasks were associated with neck and shoulder pain (OR 1.29 and OR 1.10, respectively).

5. 3.3.2 The working posture factors

The working posture factors in this study demonstrated that all posture were not significantly associated with neck and shoulder pain. The protection risk of neck and shoulder pain also showed in all factor except hands distance from trunk in horizontal line such as pushing the patients in bed for turning position, this factor was the risk factor for neck and shoulder pain (OR1.17).

This study agreed with Jolanda J, 2004, they found the incidence of neck complaints associated with work especially the awkward postures

(OR 1.76). J Smedly 2003 found the nursing activity such as lifting patient 9-12 times per shift was significantly increased with neck and shoulder pain.

The working postures among nursing staff were investigated using RULA. One working posture was selected for the analysis. The posture was significantly associated with neck and shoulder pain. As mentioned above, one working posture from routine activity that often used among nursing personnel was selected to be evaluated by RULA. High right and left RULA score was significantly associated with neck and shoulder pain (P=0.049). When introducing the odd ratio (OR0.07) to describe the relationship of RULA score in different ward, high RULA score was found in adult ward. The body weight of patients in this division was not less than 60 Kg. When nurse staffs performed nursing care, there were at less 3-4 staffs worked together for moving patient thus the real weight would be less than 60 Kg. The load for lifting one patient was approximately 15 Kg/a nurse. It was different from working in pediatric ward; the body weight of patients in this division was approximately 1-10 Kg. Thus, only one nurse could transfer patient, it meaned the loading was 10 Kg/a nurse. It was interesting that the OR was lower in adult ward than in pediatric ward. The reason might be sharing lifting weight could help feeling pain. Then when the subjects were asked about pain, they said no pain even they exposed to higher risk.

It was noted that RULA did not investigate the sharing load of the subject, but it determined the weight or the load of the object, which subject exposed to. Therefore it would be recommended that either average weight or average load must be taken into consideration in order to increase the accuracy.

5. 3.4 Psychological Job Demands.

The psychological factor including decision latitude, psychological job demand, supervisor social support and coworker social support were determined in this study. The defined psychological factors were not significantly associated with neck and shoulder pain. (Table22). ORs for neck and shoulder pain of low coworker social support was the most prominent (OR2.55). After using a binary logistic regression model, it was found that low decision latitude was significantly associated with neck and shoulder pain (P= 0.043).

This study agrees with Ulrika AASA, 2005 showed psychological demands and lack of social support were associated with neck-shoulder (OR 1.86 and OR 1.58, respectively). Ahlberg-Hulten GK, 1995 conducted the study on social support, job strain and musculoskeletal pain among female healthcare personnel. They showed that low social support was associated with severity of neck (OR 1.35) and shoulder.

5. 3.5 Sleep Quality Factor

The sleep quality factors in this study showed no significantly association with pain. Poor quality of sleep was associated with neck and shoulder pain (OR1.30).

This study agreed with Masaya Takahashi, 2006 who showed the association between sleep problems and MSDs among nursing staffs. It was found that arm pain was associated with less difficulty initiating sleep (OR 6.70). The British of training doctors studied the relationship between few hours sleep and more hours worked. It was found that long working hours was significantly related to MSDs and somatic symptoms. The muscles had short period of rest and still work continuously. This situation affected musculoskeletal injuries (35).

5.4 Limitation of Study

This study was designed to investigate the prevalence rate of work-related neck and shoulder pain in critical unit. The association between factors affecting neck and shoulder pain and the prevalence rate would be determined. The limitation of this study might be the limited in the number of nurses in this critical unit.

5.5 Implication for prevention work related neck and shoulder pain in hospital staffs.

The result of data collected in this study revealed the prevalence rate of work related neck and shoulder pain in 12 months ago and the association between

works related neck and shoulder pain among critical care nursing personnel in Ramathibodi hospital.

The high risk of work related musculoskeletal disorder, prevention measures and using the equipments for reducing the prevalence of work related neck and shoulder pain in hospital staffs should be consider as follow;

5. 5.1The curriculum of professional nurse should cover the patient handling, for example; lifting, and transferring. The course content should include the practice of patient handling.

5. 5.2The encouragement on better working atmosphere or team work construction should be considered.

5. 5.3The log-book should be introduced to nursing personnel for obtaining the appropriate working time and enhance the quality of sleep.

5. 5.4The exercise behavior should be encouraged for increasing the muscular strength.

5. 5.5The appropriated ergonomic tool should be selected for staff. While, the patient handling training programs should be introduced to nursing personnel.

5.6 Suggestions for future study

5.6.1 Future study should increase the number of sample size. The comparison between this group and the other group nurses such as other wards nurses, other division should be performed. In Ramathibodi hospital composed of several wards such as general ward, operative ward (OR), emergency ward. The nurses working in different ward confront to difference types of risk factors. For example, the nursing personnel in different ward might expose to different working environment. Therefore the study should be performed in other wards. The sample size of nursing staffs should be taken into account.

5.6.2 Future research should be studied in other groups of population such as teachers, policemen, soldiers, engineer and in middle-elderly age both women and men in order to investigate the factor affecting pain.

5. 6.3 Future study should perform the prospective design study to decrease bias from the recall data because some data had existed long time ago. The cross-sectional study can contribute the estimation of the prevalence of neck and shoulder pain in this group. It will be useful to identify risk factors which should be further tested. The prospective study follows on over time to assess their later outcome status. It should be conducted in the future in order to gain the etiology of disease.

5.6.4 The in-depth studies on the factor such as individual factor, level of salary and activity in leisure time affecting to neck and shoulder pain should be conducted in future.

5.6.5 The rapid upper limb assessment (RULA) in the future study should evaluate more than one working posture. More working postures should be specified and analyzed.

5.6.6 This data showed result from the ergonomic evaluation, and then the ergonomic intervention should be implemented in the future to compare the muscular pain between the implemented group and non implemented group.

CHAPTER VI
CONCLUSION

6. Conclusion

This study was a cross-sectional designed study using a self-administered questionnaire to investigate the prevalence rate of work-related neck and shoulder pain and determine factors affecting neck and shoulder pain in critical care nursing personnel at Ramathibodi hospital in Thailand. This study was conducted among critical care nursing personnel in Ramathibodi Hospital. 243 nursing personnel (84.36% response rate) were included in this study during 15 May to December 2009. The subjects were consisted of 3 divisions, 85 nursing personnel from medicine (82.35% response rate), 84 nursing personnel from surgical (90.47% response rate), and 74 nursing personnel from pediatric (79.72 %response rate).

This study had 2 stages, data collection and data analysis. The data collection started from 15 May to 30 August 2009 by using questionnaires to collection all data and then the data analysis began from 1 September to 15 December 2009.The RULA assessment tool is introduced to evaluate working posture of nursing personnel. The conclusions were as follows:

6.1 To determine the prevalence of work related neck and shoulder pain among critical care nursing personnel in Ramathibodi hospital.

6.1.1 The prevalence of work related neck and shoulder pain

The prevalence of work related neck and shoulder pain among critical care nursing personnel was 69.4percent, followed by low back pain (57%) and upper back pain (57%). The nursing activity in 1 shift work, the three highest job tasks of nurses were repositioning a patient in bed side to side, bathing patient in bed and making a bed with the patient in it, respectively while, the emergency patient activity

was seldom performed in 1 shift work. Related nursing posture in 1 shift work, the three highest working postures were working with hand distance from trunk in horizontal, standing for long period, bending of neck forward, respectively while sitting for long period was seldom performed in 1 shift work. However, this result base on small data and the specific group, furthers study should be concern about other group of nursing personnel.

6.1.2 The results from bivariate analysis

The results from bivariate analysis shown that working hours per day greater than 8 hours and high RULA score at right and left side were significantly associated with neck and shoulder pain among nursing personnel in critical care unit in Ramathibodi hospital($p=0.014$ and $p=0.049$, respectively).

6.1.3 The final binary logistic regression model

The final binary logistic regression model found that only four variables were significantly associated with neck and shoulder pain. These were found the high RULA score at right and left side, time more than 8 hours, low decision latitude and accepting emergency patients were significantly associated with neck and shoulder pain ($p=0.026$, $p=0.049$, $p=0.047$, $p=0.046$, respectively).

The high prevalence of work related neck and shoulder pain among nursing personnel in Ramathibodi hospital was found in this study. The risk factors such as high RULA score at right and left side, more than8 hours work per day, low decision latitude, and accepting emergency patients were significantly associated with neck and shoulder pain. Their physical workload, psychosocial and individual factors must be taken into account to improve the working conditions. The results of RULA and their work practices should be considered in guidelines for risk reduction strategies.

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APPENDICES

APPENDIX A
LIST OF EXPERTS

The name of qualified persons who examined the validity of the instrument of this study

1. Assistant Professor. Phakong Intarasombat
Lecture of nursing science,
Faculty of Medicine Ramathibodi Hospital, Mahidol University

2. Assistant Professor Ph.D. Suchinda Jarupat Maruo
Lecture of nursing science,
Faculty of Medicine Ramathibodi Hospital, Mahidol University

3. Assistant Professor. Pikul Tantitham.
Lecture of Medical intensive care unit.
Faculty of Medicine Ramathibodi Hospital, Mahidol University

APPENDIX B
INFORMATION SHEET AND CONSENT FORM

เอกสารชี้แจงข้อมูล/คำแนะนำแก่ผู้เข้าร่วมการวิจัย

(Patient/Participant Information Sheet)

ชื่อโครงการ การศึกษาความชุกและปัจจัยที่เกี่ยวข้องกับการทำงานกับอาการปวดคอ และ ไหล่ในบุคคลากรพยาบาลแผนกวิกฤตโรงพยาบาลรามาธิบดี

The Prevalence and work-Related Factor Neck and shoulder pain Among Critical care Nursing Personnel in Ramathibodi Hospital

ชื่อผู้วิจัย นางสาว วาสนา พาวิน

Miss Wasana Ravin

สถานที่วิจัย หอผู้ป่วยวิกฤติ โรงพยาบาลรามาธิบดี

บุคคลและวิธีการติดต่อเมื่อมีเหตุฉุกเฉินหรือความผิดปกติที่เกี่ยวข้องกับการวิจัย

1. ผศ. ดร. สรา อาภรณ์
อาจารย์ที่ปรึกษาวิทยานิพนธ์หลัก
ภาควิชาอาชีวอนามัยและความปลอดภัย คณะสาธารณสุข มหาวิทยาลัยมหิดล
โทรศัพท์ 0-816928071

2. รศ.ดร. เฉลิมชัย ชัยกิตติภรณ์
อาจารย์ที่ปรึกษาวิทยานิพนธ์รอง
ภาควิชาอาชีวอนามัยและความปลอดภัยคณะสาธารณสุขมหาวิทยาลัยมหิดล
โทรศัพท์ 0-876717772

3. รศ.วิชัย พฤกษ์ธาราธิกูล
อาจารย์ที่ปรึกษาวิทยานิพนธ์รอง
ภาควิชาอาชีวอนามัยและความปลอดภัยคณะสาธารณสุขมหาวิทยาลัยมหิดล
โทรศัพท์ 0-815650777

ความเป็นมาของโครงการ

ปัจจุบันนี้ปัญหาการติดเชื้อในโรงพยาบาล ยังคงเป็นปัญหาสาธารณสุขที่สำคัญของโลกและประเทศไทย เนื่องจากโรงพยาบาลเป็นแหล่งรวมของเชื้อโรคจำนวนมากที่มากับผู้ป่วย ญาติ หรือคนที่มาเยี่ยม รวมทั้งจากบุคลากรทางการแพทย์ และสิ่งปนเปื้อนจากสิ่งแวดล้อมภายในโรงพยาบาล ที่ไม่สามารถมองเห็นได้ แผนกที่มีการติดเชื้อสูงสุดคือ หอผู้ป่วยหนักเนื่องจากผู้ป่วยที่รับไว้อยู่ในภาวะวิกฤต มีภาวะเสี่ยงต่อการติดเชื้อสูงจากภาวะแทรกซ้อนของโรค การได้รับ การรักษาที่ทำให้ภูมิคุ้มกันโรคลดลงเช่น การได้รับยาเคมีบำบัด การได้รับยาปฏิชีวนะนานๆ การได้รับบาดเจ็บรุนแรง ,การได้รับการสอดใส่อุปกรณ์ทางการแพทย์ เข้าในร่างกายผู้ป่วย ซึ่งจะทำให้เชื้อโรคสามารถผ่านเข้าสู่ร่างกายได้โดยตรง เช่น การใส่สายสวนเข้าหลอดเลือด การเจาะคอ การดูดเสมหะ ฯลฯ รวมทั้งการใช้อุปกรณ์ช่วยหายใจ สิ่งต่างๆเหล่านี้ทำให้ผู้ป่วยในหอผู้ป่วยหนักมีโอกาสติดเชื้อได้ง่ายขึ้น การป้องกันการแพร่กระจายเชื้อโรค ในโรงพยาบาลสามารถทำได้หลายวิธี วิธีการที่ดีที่สุด ทำได้ง่ายและสิ้นเปลืองค่าใช่จ่ายน้อยที่สุดได้แก่ การล้างมือทั้งนี้เพราะในขณะปฏิบัติการพยาบาลแก่ผู้ป่วยนั้น มือของพยาบาลมีโอกาสสัมผัสกับสิ่งต่างๆที่มีการติดเชื้อหรือมีการปนเปื้อนของเชื้อโรค การล้างมือย่างถูกต้องเหมาะสม สามารถลดการติดเชื้อในโรงพยาบาลได้ถึงร้อยละ50 แต่อย่างไรก็ตามการศึกษาจากหลายโรงพยาบาลพบว่า บุคลากรในโรงพยาบาลมีการทำความสะอาดมือไม่เกินร้อยละ 50 ผู้วิจัย จึงสนใจที่จะศึกษาพฤติกรรมการล้างมือ ระดับความรู้เกี่ยวกับหลักการล้างมือ ทัศนคติต่อการล้างมือและปัจจัยสนับสนุนที่เกี่ยวข้องกับการล้างมือของพยาบาลวิชาชีพที่ปฏิบัติงานในหอผู้ป่วยหนัก เพื่อนำมาวางแผนปรับปรุงวิธีดำเนินการป้องกันและลดการติดเชื้อในโรงพยาบาลรามาธิบดี อันจะเป็นประโยชน์ในการป้องกันการแพร่กระจาย เชื้อโรคไปสู่ผู้ป่วยบุคลากรที่เกี่ยวข้อง เป็นข้อมูลพื้นฐานสำหรับผู้บริหารโรงพยาบาลได้ดำเนินงานพัฒนาบุคลากรเพื่อส่งเสริมให้พยาบาลวิชาชีพที่ปฏิบัติงานในหอผู้ป่วยหนักในโรงพยาบาลรามาธิบดีมีพฤติกรรมการล้างมือที่ถูกต้องเหมาะสมและมีประสิทธิภาพมากขึ้นต่อไป

วัตถุประสงค์

1. เพื่อศึกษาความชุกของการเกิดอาการปวดคอ และ ไหล่จากการทำงานใน บุคลากรพยาบาลในแผนกการดูแลผู้ป่วยวิกฤติ
2. เพื่อศึกษาปัจจัยที่เกี่ยวข้องกับการทำงานกับ การเกิดอาการปวดคอ และ ไหล่จากการทำงานในบุคลากรพยาบาลแผนกการดูแลผู้ป่วยวิกฤติ

รายละเอียดที่จะปฏิบัติต่อผู้เข้าร่วมการวิจัย

ประชากร คือพยาบาล และ ผู้ช่วยพยาบาลเพศหญิง ที่ปฏิบัติงานในหอผู้ป่วยวิกฤติโรงพยาบาลรามาธิบดี มหาวิทยาลัยมหิดล ทั้งหมดรวม 243 คน โดยใช้แบบสอบถามที่ทำการขออนุญาต จากเจ้าของแบบสอบถาม และตรวจสอบโดยผู้เชี่ยวชาญ เพื่อเป็นเครื่องมือในการเก็บรวบรวมข้อมูล
โดยแบ่งคำถามออกเป็น 3 ส่วน ดังต่อไปนี้

ส่วนที่ 1 ส่วนของแบบสอบถามอาการปวดกล้ามเนื้อและกระดูกโครงร่างซึ่งดัดแปลงมาจากแบบสอบถามดัชต์ (Modified Dutch Musculoskeletal Questionnaires) เนื้อหาประกอบด้วย

1. คำถามเกี่ยวกับข้อมูลส่วนบุคคลของผู้ตอบแบบสอบถาม เช่น อายุ เพศ สถานภาพสมรส น้ำหนัก ส่วนสูง การสูบบุหรี่ การออกกำลังกาย อาชีพ แผนก/หอผู้ป่วย ระยะเวลาการทำงาน เป็นต้น

2. คำถามที่ใช้สอบถามถึงส่วนของร่างกายที่มีปัญหาระบบกล้ามเนื้อและกระดูกโครงร่างโดยถามถึงอาการปวดหรือไม่สบายในส่วนต่างๆของร่างกายในช่วง 12 เดือนที่ผ่านมา (คำตอบที่ได้แบ่งเป็น มีอาการเป็นบางครั้ง เป็นประจำ เป็นเรื้อรังหรือไม่มีอาการ อาการในช่วง12 เดือนที่ผ่านมาที่ทำให้ไม่สามารถทำงานประจำวันได้ตามปกติ และอาการในช่วง 7 วันที่ผ่านมา(คำตอบที่ได้จะเป็น มีอาการหรือไม่มีอาการ) ผลที่ตามมาหลังเกิดอาการทางระบบกล้ามเนื้อและกระดูกโครงร่าง และระดับความเจ็บปวดในช่วง 12 เดือนที่ผ่านมา

3. คำถามข้อมูลปัจจัยที่เกี่ยวข้องกับการทำงาน ได้แก่ กิจกรรมทางการพยาบาล15 ข้อ ท่าทางการทำงาน 13 ข้อ คำตอบที่ได้เป็นการวัดแบบอันดับ (Ordinal scale) ตามความถี่ของการปฏิบัติงานในกิจกรรมนั้นๆ (ไม่เคยปฏิบัติ บางครั้ง บ่อยครั้ง บ่อยมากเกือบตลอดเวลา)

ส่วนที่ 2 การประเมินท่าทางการทำงานโดยใช้แบบประเมินท่าทางการทำงานของ Rapid Upper limb Assessment (RULA) โดยเลือกท่าทางการทำงานที่ใช้บ่อยๆ 2 ท่าทางการทำงานจากแบบสอบถามมาวัดท่าทางการทำงานคำตอบที่ได้เป็นการวัดระดับอัตราส่วน (Ratio scale)

ส่วนที่ 3 ส่วนของแบบสอบถามเกี่ยวกับปัจจัยทางจิตสังคมในที่ทำงานซึ่งดัดแปลงมาจากแบบประเมินความเครียดของ Karasek Questionnaires ซึ่งประกอบด้วยคำถามจำนวน22ข้อแบ่งเป็นลักษณะงาน การควบคุมงาน และการช่วยเหลือทางสังคม คำตอบที่ได้เป็นการวัดแบบอันดับ (Ordinal scale) และแบ่งเป็นกลุ่มที่มีปัจจัยเสี่ยงสูงหรือต่ำในแต่ละปัจจัย

ส่วนที่ 4 ส่วนของแบบสอบถามเกี่ยวกับคุณภาพการนอนหลับในในช่วง 1 ปีที่ผ่านมาซึ่งดัดแปลงมาจากแบบประเมินคุณภาพการนอนของPittsburgh Sleep Quality Index (PSQI) จำนวน 9 ข้อ ซึ่งคำตอบที่ได้แบ่งเป็น คะแนน ถ้าผลรวมของคะแนนมากกว่า 5 คะแนนชี้ให้เห็นถึงคุณภาพการนอนที่ไม่ดี

ประโยชน์และผลข้างเคียงที่จะเกิดแก่ผู้เข้าร่วมการวิจัย

ประโยชน์ที่ได้รับ

1. ผลจากการทำแบบสอบถาม ของผู้เข้าร่วมการวิจัยครั้งนี้ ทำให้ทราบข้อมูลภาวะสุขภาพของกลุ่มบุคลากรพยาบาลในหอผู้ป่วยวิกฤติ เพื่อหาแนวทางป้องกันและแก้ไข โรคจากการทำงานที่จะเกิดขึ้นในอนาคต เพื่อให้เกิดความปลอดภัยในการปฏิบัติงานของบุคลากร

2. ผลจากการทำแบบสอบถาม ของผู้เข้าร่วมการวิจัยครั้งนี้ จะเป็นแนวทางสำหรับเพื่อให้ผู้บริหารระดับสูงได้ทราบภาวะสุขภาพของกลุ่มบุคลากรพยาบาลในหอผู้ป่วยหนัก เพื่อหาแนวทางป้องกันและแก้ไข โรคจากการทำงานที่จะเกิดขึ้นในอนาคต

ผลข้างเคียงที่อาจเกิดขึ้น เสียเวลาในการตอบแบบสอบถามประมาณ 30-45 นาที

การเก็บข้อมูลเป็นความลับ

ข้อมูลเกี่ยวกับการวิจัยนี้ จะถูกเก็บเป็นความลับ และจะเปิดเผยเฉพาะในรูปผลสรุปทางสถิติเชิงพรรณนาของการวิจัยทั้งกลุ่ม ข้อมูลอาจถูกตรวจสอบโดยคณะกรรมการพิจารณาของสถาบัน/คณะกรรมการจริยธรรม ผลการวิจัยนี้อาจถูกนำเสนอในงานประชุมหรือในงานตีพิมพ์ อย่างไรก็ตามจะไม่มีการเปิดเผยระบุถึงตัวผู้เข้าร่วมการวิจัยในการทำวิจัยครั้งนี้

หนังสือยินยอมโดยได้รับการบอกกล่าวและเต็มใจ

(Informed Consent Form)

ชื่อโครงการ การศึกษาความชุกและปัจจัยที่เกี่ยวข้องกับการทำงานกับอาการปวดคอ และ ไหล่ ในบุคลากรพยาบาลแผนกวิกฤตโรงพยาบาลรามาธิบดี

ชื่อผู้วิจัย นางสาว วาสนา พาวิน

*ชื่อผู้เข้าร่วมการวิจัย ----------

อายุ ----------เลขที่เวชระเบียน ----------

คำยินยอมของผู้เข้าร่วมการวิจัย

ข้าพเจ้า นาย/นาง/นางสาว ---------- ได้ทราบรายละเอียดของโครงการวิจัย ตลอดจนประโยชน์ และข้อเสี่ยงที่จะเกิดขึ้นต่อข้าพเจ้าจากผู้วิจัยแล้วอย่างชัดเจน ไม่มีสิ่งใดปิดบังซ่อนเร้นและยินยอมให้ทำการวิจัยในโครงการที่มีชื่อข้างต้น และข้าพเจ้ารู้ว่าถ้ามีปัญหาหรือข้อสงสัยเกิดขึ้นข้าพเจ้าสามารถสอบถามผู้วิจัยได้ และข้าพเจ้าสามารถไม่เข้าร่วมโครงการวิจัยนี้เมื่อใดก็ได้ โดยไม่มีผลกระทบต่อการรักษาที่ข้าพเจ้าพึงได้รับ นอกจากนี้ผู้วิจัยจะเก็บข้อมูลเฉพาะเกี่ยวกับตัวข้าพเจ้าเป็นความลับและจะเปิดเผยได้เฉพาะในรูปที่เป็นสรุปผลการวิจัย การเปิดเผยข้อมูลเกี่ยวกับตัวข้าพเจ้าต่อหน่วยงานต่างๆที่เกี่ยวข้อง กระทำได้เฉพาะกรณีจำเป็นด้วยเหตุผลทางวิชาการเท่านั้น

ลงชื่อ.....(ผู้เข้าร่วมการวิจัย)

.....(พยาน)

.....(พยาน)

วันที่ .....

คำอธิบายของแพทย์หรือผู้วิจัย

ข้าพเจ้าได้อธิบายรายละเอียดของโครงการ ตลอดจนประโยชน์ของการวิจัย รวมทั้งข้อเสี่ยงที่อาจจะเกิดขึ้นแก่ผู้เข้าร่วมการวิจัยทราบแล้วอย่างชัดเจนโดยไม่มีสิ่งใดปิดบังซ่อนเร้น

ลงชื่อ.....(แพทย์หรือผู้วิจัย)

วันที่.....

หมายเหตุ : กรณีผู้เข้าร่วมการวิจัยไม่สามารถอ่านหนังสือได้ ให้ผู้วิจัยอ่านข้อความในหนังสือยินยอมฯ นี้ให้แก่ผู้เข้าร่วมการวิจัยฟังจนเข้าใจดีแล้ว และให้ผู้เข้าร่วมการวิจัยลงนามหรือพิมพ์ลายนิ้วหัวแม่มือรับทราบในการให้ความยินยอมดังกล่าวข้างต้นไว้ด้วย

* ผู้เข้าร่วมการวิจัย หมายถึง ผู้ยินยอมตนให้ทำวิจัย

APPENDIX C
QUESTIONNAIRE FORM

<u>แบบสอบถามเรื่อง การศึกษาความชุกและปัจจัยที่เกี่ยวข้องกับอาการปวดคอ และ ไหล่ ในบุคลากรพยาบาลโรงพยาบาลรามาธิบดี</u>

กรุณาทำเครื่องหมาย X ในช่องที่ตรงกับคำตอบของท่านตามความเป็นจริง

<u>ส่วนที่ 1</u> ข้อมูลส่วนบุคคล

1.อายุ …….... ปี

2.วิชาชีพ

☐ พยาบาล ☐ ผู้ช่วยพยาบาล ☐ อื่นๆระบุ…….

3.ระดับการศึกษาสูงสุด

☐ ต่ำกว่าปริญญาตรี ☐ปริญญาตรี

☐ปริญญาโท ☐ปริญญาเอก

4.ส่วนสูง……เซนติเมตร

น้ำหนักปัจจุบัน…… กิโลกรัม

5.สถานภาพสมรส

☐ โสด ☐สมรสแล้ว ☐หม้าย/หย่าร้าง/แยกทาง

6.จำนวนบุตรในปัจจุบัน……..คน

7.ท่านดูแลผู้ป่วยวิกฤตแผนก

☐ อายุรกรรม ☐ศัลยกรรม ☐กุมารเวชกรรม

8.ระยะเวลาที่ทำงานในอาชีพนี้รวม……ปี

9.ระยะเวลาที่ทำงานในแผนกวิกฤติ……ปี

10.ระยะเวลาที่ทำงาน……ชั่วโมงต่อวัน

11.ระยะเวลาที่ทำงาน……ชั่วโมงต่อสัปดาห์

12. ท่านสูบบุหรี่หรือไม่

□ไม่สูบ □สูบ

□ เคยสูบแต่ขณะนี้เลิกสูบแล้ว เลิกสูบมานาน……ปี

13.ท่านดื่มสุรา/เครื่องดื่มที่มีแอลกอฮอล์

□ไม่ดื่ม □ดื่ม □ดื่มนานๆครั้งบางโอกาส

14. ท่านเล่นกีฬา หรือ ออกกำลังกายเป็นประจำ (อย่างน้อย 30 นาที 3 วันต่อสัปดาห์)

□ไม่ใช่ □ใช่

15. ท่านมีงานอื่นนอกเหนือจากงานประจำหรือไม่ เช่น ปฏิบัติงานที่โรงพยาบาลอื่น (part time) ปฏิบัติงานนอกเวลา (over time)

□ไม่มี □มี

16. ระยะเวลาการทำงานล่วงเวลา.....ชั่วโมง ต่อ สัปดาห์

17. สถานภาพการทำงาน

□ลูกจ้างชั่วคราว □ลูกจ้างประจำ □ พนักงานมหาวิทยาลัย

□ ข้าราชการ □อื่นๆ ระบุ

18. ท่านมีตำแหน่งหน้าที่ในการ**<u>บริหาร</u>**หรือไม่

□ ไม่ใช่ □ ใช่

19. ท่านทำงานที่ต้องหมุนเวียนกะหรือไม่

□ไม่ใช่ □ใช่

20.ถ้าท่านทำงานเป็นกะ งานกะของท่านเป็นลักษณะหมุนเป็นรายสัปดาห์**ทุกครั้ง**หรือไม่ เช่น มีเวรเช้า **ตามด้วย** เวรบ่าย เวรดึก ทุกครั้ง

□ไม่ใช่ □ใช่

21. ในการปฏิบัติงานการพยาบาลที่ทำอยู่ในปัจจุบัน ท่านคิดว่า**ลักษณะงานพยาบาลเป็นงาน**

□งานเบา □งานปกติ

□งานหนัก □งานหนักมาก

22. ท่านมีโรคประจำตัวทางระบบกล้ามเนื้อ และกระดูกโครงร่าง ที่ได้รับการวินิจฉัย โดยแพทย์ (ต่อเนื่องเรื้อรัง) หรือไม่

□ไม่มี □มี (โปรดระบุชื่อโรค) .....

23.ท่านเคยมีอุบัติเหตุลื่นล้มหรืออุบัติเหตุทางจราจรที่ต้องนอนรักษาตัวที่โรงพยาบาลด้วย ปัญหาโรคระบบกล้ามเนื้อและกระดูกโครงร่าง

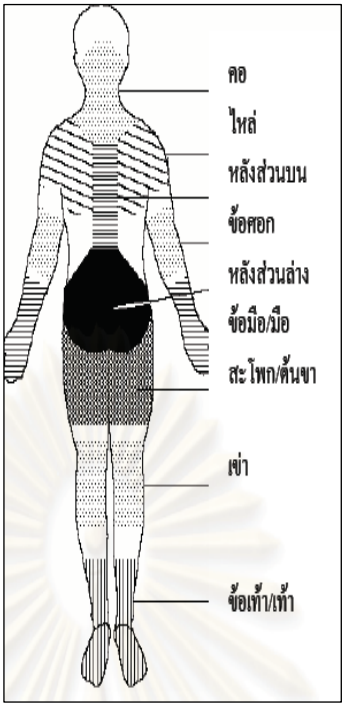
□ไม่เคย

□เคย แต่ไม่มีผลต่อการทำงานในระยะต่อมา

□เคย และมีผลต่อการทำงานในระยะต่อมา (โปรดระบุ)……

<u>คำถามส่วนที่ 2 คำถามเกี่ยวกับสุขภาพ</u> กรุณาทำเครื่องหมายXในช่องที่ตรงกับคำตอบของท่านตามความเป็นจริง

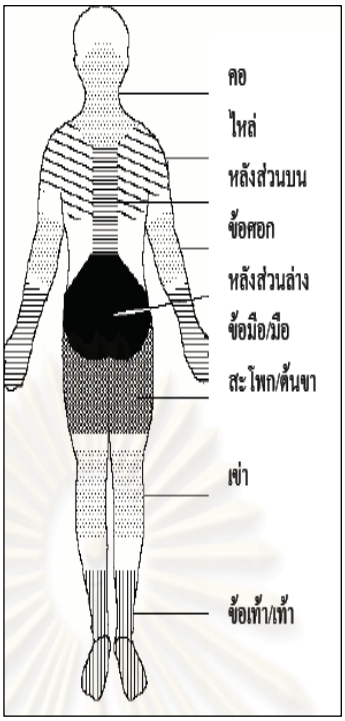
2.1ที่ผ่านมาท่าน**<u>เคย</u>**มีอาการปวด หรือ ไม่สบายในบริเวณใดบ้าง:



:

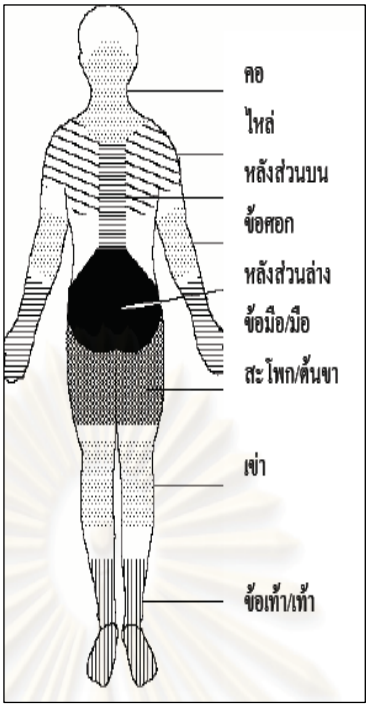
• <u>คอ</u>	• <u>ใช่</u>$_1$ □<u>ไม่ใช่</u>$_0$
• <u>หลังส่วนบน</u>	• <u>ใช่</u>$_1$ □<u>ไม่ใช่</u>$_0$
• <u>หลังส่วนล่าง</u>	• <u>ใช่</u>$_1$ □<u>ไม่ใช่</u>$_0$
• <u>ไหล่ ซ้ายขวา</u>	• <u>ใช่</u>$_1$ □<u>ไม่ใช่</u>$_0$
• <u>ข้อศอก ซ้ายขวา</u>	• <u>ใช่</u>$_1$ □<u>ไม่ใช่</u>$_0$
• <u>ข้อมือ/แขน ซ้ายขวา</u>	• <u>ใช่</u>$_1$ □<u>ไม่ใช่</u>$_0$
• <u>สะโพก/ต้นขา ซ้ายขวา</u>	• <u>ใช่</u>$_1$ □<u>ไม่ใช่</u>$_0$
• <u>เข่า ซ้ายขวา</u>	• <u>ใช่</u>$_1$ □<u>ไม่ใช่</u>$_0$
• <u>ข้อเท้า/เท้า ซ้ายขวา</u>	• <u>ใช่</u>$_1$ □<u>ไม่ใช่</u>$_0$

2.2ท่านเคยมีอาการปวดหรือไม่สบายในบริเวณดังภาพ**ในช่วง 12 เดือนที่ผ่านมา**:



	ใช่เป็นบางครั้ง (1)	ใช่เป็นประจำ (2)	ใช่เป็นแบบเรื้อรัง (3)	ไม่ใช่ (4)
● คอ	$\square_1$	$\square_2$	$\square_3$	$\square_4$
● หลังส่วนบน	$\square_1$	$\square_2$	$\square_3$	$\square_4$
● หลังส่วนล่าง	$\square_1$	$\square_2$	$\square_3$	$\square_4$
● ไหล่ซ้าย	$\square_1$	$\square_2$	$\square_3$	$\square_4$
● ไหล่ขวา	$\square_1$	$\square_2$	$\square_3$	$\square_4$
● ข้อศอกซ้าย	$\square_1$	$\square_2$	$\square_3$	$\square_4$
● ข้อศอกขวา	$\square_1$	$\square_2$	$\square_3$	$\square_4$
● ข้อมือ/แขนซ้าย	$\square_1$	$\square_2$	$\square_3$	$\square_4$
● ข้อมือ/แขนขวา	$\square_1$	$\square_2$	$\square_3$	$\square_4$
● สะโพก/ต้นขาซ้าย	$\square_1$	$\square_2$	$\square_3$	$\square_4$
● สะโพก/ต้นขาขวา	$\square_1$	$\square_2$	$\square_3$	$\square_4$
● เข่าซ้าย	$\square_1$	$\square_2$	$\square_3$	$\square_4$
● เข่าขวา	$\square_1$	$\square_2$	$\square_3$	$\square_4$
● ข้อเท้า/เท้าซ้าย	$\square_1$	$\square_2$	$\square_3$	$\square_4$
● ข้อเท้า/เท้าขวา	$\square_1$	$\square_2$	$\square_3$	$\square_4$

2.3ท่านเคยมีอาการปวดหรือไม่สบายในบริเวณดังภาพ**ในช่วง 7 วันที่ผ่านมา:**



• คอ	• ใช่$_1$ □ไม่ใช่$_0$
• หลังส่วนบน	• ใช่$_1$ □ไม่ใช่$_0$
• หลังส่วนล่าง	• ใช่$_1$ □ไม่ใช่$_0$
• ไหล่ ซ้ายขวา	• ใช่$_1$ □ไม่ใช่$_0$
• ข้อศอก ซ้ายขวา	• ใช่$_1$ □ไม่ใช่$_0$
• ข้อมือ/แขน ซ้ายขวา	• ใช่$_1$ □ไม่ใช่$_0$
• สะโพก/ต้นขา ซ้ายขวา	• ใช่$_1$ □ไม่ใช่$_0$
• เข่า ซ้ายขวา	• ใช่$_1$ □ไม่ใช่$_0$
• ข้อเท้า/เท้า ซ้ายขวา	• ใช่$_1$ □ไม่ใช่$_0$

<u>คำถามส่วนที่ 3</u> กรุณาทำเครื่องหมาย X ในช่องที่ตรงกับคำตอบของท่านตามความเป็นจริง

<u>กิจกรรมพยาบาลในช่วง 1 กะการทำงาน (8 ชั่วโมง) ท่านกระทำสิ่งต่อไปนี้บ่อยเพียงใด</u>

กิจกรรมทำงาน	ไม่เคยปฏิบัติ/ปฏิบัติน้อยมาก (1)	บางครั้ง (2)	บ่อยครั้ง (3)	บ่อยมากเกือบตลอดเวลา (4)
1. การรับผู้ป่วยจากแผนกฉุกเฉิน				
2.การเคลื่อนย้ายผู้ป่วย				
3.เคลื่อนย้ายเตียง				
4. การเปลี่ยนแผ่นรองซับ				
5. การอาบน้ำผู้ป่วยที่เตียง				
6. การจัดและแจกยาผู้ป่วย				
7. การเปลี่ยนท่าทางผู้ป่วยบนเตียงจากซ้ายไปขวา หรือ จากขวาไปซ้าย				
8. การยกผู้ป่วยขึ้นจากท่านอนเป็นท่านั่ง หรือ จากท่านั่งเป็นท่านอน				
9. การส่งผู้ป่วยไปห้องผ่าตัด และ รับผู้ป่วยกลับจากห้องผ่าตัด				
10.การแต่งตัวผู้ป่วยที่เตียง				
11. การให้อาหารผู้ป่วยที่นอนอยู่ที่เตียง				
12.การส่งผู้ป่วยไปตรวจและรับกลับจากตรวจ				
13. การทำเตียงผู้ป่วยโดยไม่มีผู้ป่วยอยู่ที่เตียง				
14. การทำเตียงผู้ป่วยโดยมีผู้ป่วยอยู่ที่เตียง				
15. การรับและการจำหน่ายผู้ป่วย				

<u>คำถามส่วนที่ 4</u> กรุณาทำเครื่องหมาย X ในช่องที่ตรงกับคำตอบของท่านตามความเป็นจริง

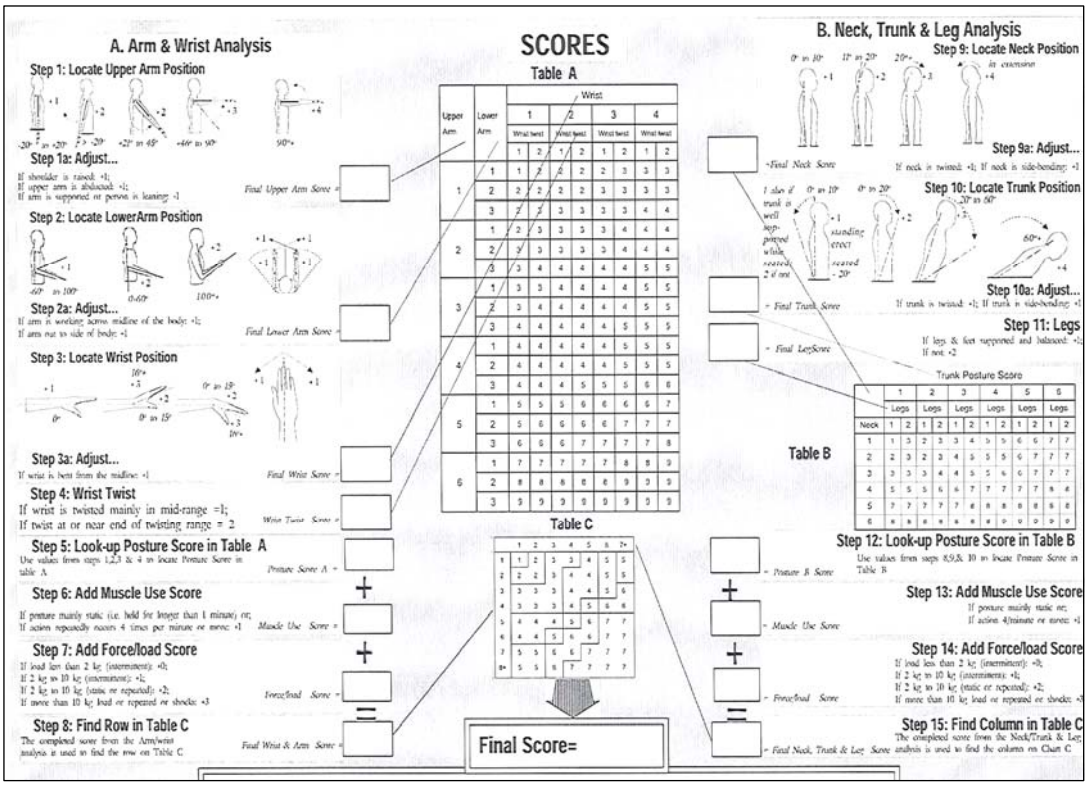
<u>ท่าทางการทำงานในช่วง 1 กะการทำงาน (8 ชั่วโมง) ท่านกระทำสิ่งต่อไปนี้บ่อยเพียงใด</u>

ท่าทางการทำงาน	ไม่เคยปฏิบัติ/ปฏิบัติน้อยมาก (1)	บางครั้ง (2)	บ่อยครั้ง (3)	บ่อยมากเกือบตลอดเวลา (4)
1.ต้องยืนทำงานอยู่กับที่เป็นเวลานาน เช่น ระหว่างทำหัตถการ				
2.ต้องนั่งทำงานอยู่กับที่เป็นเวลานาน				
3.ยกเคลื่อนย้ายวัสดุหนักตั้งแต่ 5 กิโลกรัมแต่ไม่ถึง 10กิโลกรัม เช่น เสาน้ำเกลือ ถุงน้ำเกลือ				
4.ยกเคลื่อนย้ายวัสดุหนักตั้งแต่ 10 กิโลกรัมแต่ไม่ถึง 25กิโลกรัม เช่น เก้าอี้ ถังออกซิเจน				
5.ยกเคลื่อนย้ายวัสดุหนัก 25 กิโลกรัมขึ้นไป เช่น เข็นเครื่องช่วยหายใจ				
6.ทำงานที่ต้องออกแรงที่มือหรือแขนมาก เช่นกดห้ามเลือด ,ขณะกู้ชีพ(Resuscitate)				
7.ทำงานที่ใช้เครื่องมือที่มีการสั่นสะเทือน เช่น เครื่องดูดเสมหะ				
8.ทำงานในท่าทางที่รู้สึกไม่สบาย เช่น ก้ม เจาะเลือด				
9.ทำงานโดยมืออยู่เหนือระดับไหล่ เช่น ขณะเปลี่ยนขวดน้ำเกลือ				
10.ทำงานโดยมืออยู่ห่างกับลำตัวในแนวราบ เช่น ขณะผลักผู้ป่วยเพื่อเปลี่ยนท่าทางที่เตียง				
11.ก้มและเงยคอ (โดยคอ และ ไหล่ไม่ได้อยู่แนวตรง)				

ท่าทางการทำงาน	ไม่เคยปฏิบัติ/ปฏิบัติน้อยมาก (1)	บางครั้ง (2)	บ่อยครั้ง (3)	บ่อยมากเกือบตลอดเวลา (4)
12.ทำกิจกรรมที่ต้องนั่งคุกเข่า หรือ นั่งยองๆ เช่น ดูปัสสาวะในกระบอกตวง				
13.ทำงานกับคอมพิวเตอร์เป็นเวลานาน (VDU)				

<u>แบบประเมินส่วนที่ 2 ประเมินท่าทางการทำงาน</u>

<u>(Rapid Entitle Upper Limb Assessment)</u>



<u>คำถามส่วนที่ 5 เกี่ยวกับการปวดคอ และ ไหล่ในช่วง 12 เดือนที่ผ่านมา</u>

กรุณาทำเครื่องหมาย X ในช่องที่ตรงกับคำตอบของท่านตามความเป็นจริง

1. โปรดระบุอายุที่เริ่มมีอาการปวดคอ / ไหล่..... ปี

2. สาเหตุของอาการปวดคอ/ไหล่เกิดจาก (ตอบได้มากกว่า1 ข้อ)

☐เล่นกีฬา ☐อุบัติเหตุ ☐ตั้งครรภ์

☐การเคลื่อนไหวคอ / ไหล่ทันที ☐ การยกของที่มีน้ำหนักมาก

☐ความเครียด ☐การอยู่ในอิริยาบถหรือท่าทางที่ผิดเป็นเวลานาน

☐อากาศร้อน/เย็น/ชื้น ☐ไม่เคยมีอาการ

3. เกี่ยวกับอาการปวดคอ/ไหล่ (ตอบได้มากกว่า1 ข้อ)

☐ อาการปวดคอและไหล่สัมพันธ์กับการทำงาน

☐อาการปวดคอ/ ไหล่สัมพันธ์กิจกรรมช่วงเวลาว่างจากงาน

☐ อาการปวดคอ / ไหล่เริ่มเกิดขณะทำงานปัจจุบัน

☐ไม่เคยมีอาการ

4. ความถี่ของการเกิดอาการใน 12 เดือนที่ผ่านมา

☐ 1 ครั้ง ☐ 2-4 ครั้ง

☐ 5-10 ครั้ง ☐ มากกว่า 10 ครั้ง ☐ อาการปวดเกิดขึ้นบ่อยๆ

5.จำนวนวันที่ท่านเคยหยุดงานด้วยปัญหาปวดคอ / ไหล่ในช่วง 12 เดือนที่ผ่านมา

☐ ไม่มี ☐ 1-7 วัน ☐ 8-14 วัน

☐ 15-28 วัน ☐ 1-3 เดือน ☐ มากกว่า3 เดือน

6.อาการปวดคอ/ไหล่ที่ท่านเคยเป็นนานที่สุดในช่วง 12 เดือนที่ผ่านมา

☐ น้อยกว่า 1 วัน ☐ 1-7 วัน ☐ 1-4 สัปดาห์

☐ 5-7 สัปดาห์ ☐ 8สัปดาห์-3 เดือน ☐ 3-12 เดือน

7. ท่านเคยมีอาการปวดคอ/ไหล่ร้าวไปบริเวณต่อไปนี้ในช่วง 12เดือนที่ผ่านมา (ตอบได้มากกว่า1 ข้อ)

☐ บริเวณต้นแขนซ้ายและ / หรือบริเวณต้นแขนขวา/ข้อศอก

☐ บริเวณปลายแขนซ้าย (แขนช่วงล่าง) และ / หรือปลายแขนขวา/ข้อมือ/ มือ

☐ ไม่เคยมีอาการ

8. โปรดอธิบายเกี่ยวกับอาการปวดคอ / ไหล่**ครั้งล่าสุด**ที่ผ่านมา (ตอบได้มากกว่า1 ข้อ)

☐ อาการหายไปโดยใช้เวลาเป็นวัน

☐ อาการหายไปแต่ใช้เวลาเป็นสัปดาห์

☐ อาการไม่หายสนิท และ บางครั้งยังกลับมามีอาการอีก

☐ อาการไม่หายไป และ ยังมีอาการอยู่

☐ อาการไม่หายไป และ เมื่อเร็วๆนี้ยังมีอาการ

9. เกี่ยวกับอาการปวดคอ/ไหล่ของท่าน (ตอบได้มากกว่า1 ข้อ)

☐ อาการปวดคอ/ ไหล่ของท่านแย่ลง

☐ ความรุนแรงของอาการปวดคอ / ไหล่เริ่มมากขึ้น

☐อาการปวดคอ/ ไหล่ของท่านรบกวนการนอน

☐ อาการปวดคอ/ ไหล่ของท่านยังมีอยู่เมื่อหยุดทำงาน

☐มีอาการไร้ความรู้สึกบริเวณแขน หรือ มือ

☐อาการปวดคอ/ ไหล่ของท่านร้าวไปที่แขนเมื่อท่านไอ/จาม

☐ มีอาการไหล่ติด

☐มีกระดูกคอเคลื่อน

☐ไม่เคยมีอาการ

10. **<u>ถ้าท่านเคยมีอาการ</u>**ปวดหรือไม่สบายบริเวณคอ /ไหล่ **ในช่วง 12 เดือนที่ผ่านมา** ท่าน (ตอบได้มากกว่า1 ข้อ)

☐ รับประทานยารักษาอาการปวดคอ / ไหล่ ☐ ปรึกษาแพทย์

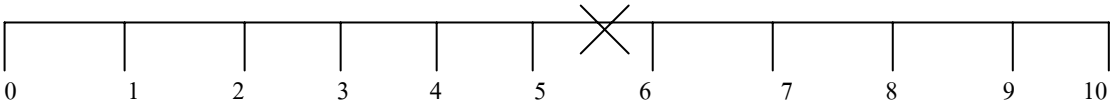
☐ นอนโรงพยาบาลเนื่องจากอาการปวดคอ / ไหล่ ☐ ปรึกษานักกายภาพบำบัด

☐ นวด ☐ ไม่ได้รักษา อาการหายไปเอง

11. **<u>ถ้าท่านมีอาการ</u>**ปวดหรือไม่สบายในบริเวณต่างๆ ในช่วง 12 เดือนที่ผ่านมา โปรดระบุระดับความเจ็บปวดของท่าน (กาX ลงบนเส้นตรงถึงระดับความเจ็บปวดจากไม่เจ็บเลยจนถึงเจ็บจนทนไม่ได้

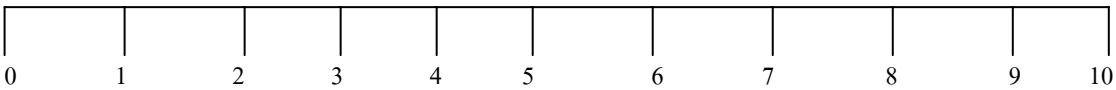
ระดับความเจ็บปวด / ไม่สบายของท่าน: อาการปวดครั้งที่<u>รุนแรงที่สุด</u>

11.4 ถ้าท่านมีอาการปวดหรือไม่สบายในบริเวณต่างๆ ในช่วง 12 เดือนที่ผ่านมา โปรดระบุระดับความเจ็บปวดของท่าน (กาX ลงบนเส้นตรงถึงระดับความเจ็บปวดจากไม่เจ็บเลยจนถึงเจ็บจนทนไม่ได้) เช่น



ไม่มีอาการเจ็บปวดเลย เจ็บมากจนทนไม่ได้

11.5 ระดับความเจ็บปวด / ไม่สบายของท่าน : อาการปวดครั้งที่รุนแรงที่สุด



ไม่มีอาการเจ็บปวดเลย เจ็บมากจนทนไม่ได้

<u>คำถามส่วนที่ 6 คำถามเกี่ยวกับปัจจัยทางจิตสังคมในที่ทำงาน</u>

กรุณาทำเครื่องหมาย X ในช่องที่ตรงกับคำตอบของท่านตามความเป็นจริง

บรรยากาศในการทำงานที่ท่านทำทุกวันนี้ ท่านมีความเห็นว่า	ไม่เห็นด้วยอย่างยิ่ง (1)	ไม่เห็นด้วย (2)	เห็นด้วย (3)	เห็นด้วยอย่างยิ่ง (4)
1. ท่านจำเป็นต้องเรียนรู้สิ่งใหม่ๆในการทำงาน				
2. งานที่ท่านทำเป็นงานที่ซ้ำซาก จำเจ น่าเบื่อ				
3. งานที่ท่านทำต้องการความคิด ริเริ่ม สร้างสรรค์				
4. งานที่ท่านทำสามารถตัดสินใจได้ด้วยตนเอง				
5. งานที่ท่านทำต้องใช้ความชำนาญสูง				
6. ท่านมีอิสระในการตัดสินใจเกี่ยวกับงานน้อย				
7. งานที่ท่านทำมีความหลากหลายในการปฏิบัติ				
8. ท่านสามารถวิจารณ์เกี่ยวกับงานที่ทำได้				
9. ท่านมีโอกาสที่จะพัฒนาความสามารถของตนเอง				
10. ท่านทำงานได้รวดเร็ว				
11. ท่านรู้สึกว่าทำงานหนัก				
12. งานที่ท่านทำมีปริมาณที่เหมาะสม				
13. ท่านมีเวลาพียงพอในการทำงานตามที่ได้รับมอบหมายในแต่ละวัน				
14. จุดที่ท่านทำงานอยู่ทำให้ร่างกายของท่านเมื่อยล้า				
15. หัวหน้าของท่านให้ความห่วงใยต่อสวัสดิการของลูกน้อง				
16. หัวหน้าของท่านให้ความสนใจต่อสิ่งที่ท่านทำเสมอ				
17. หัวหน้าของท่านให้ความช่วยเหลือต่อการปฏิบัติงานของท่านเป็นอย่างดี				

บรรยากาศในการทำงานที่ท่านทำทุกวันนี้ ท่านมีความเห็นว่า	ไม่เห็นด้วยอย่างยิ่ง (1)	ไม่เห็นด้วย (2)	เห็นด้วย (3)	เห็นด้วยอย่างยิ่ง (4)
18. หัวหน้าของท่านเป็นผู้นำที่ดีและทำให้ผู้ร่วมงานทำงานร่วมกันเป็นอย่างดี				
19. เพื่อนร่วมงานที่ท่านทำงานเป็นผู้มีความสามารถและรอบรู้ในงาน				
20. เพื่อนร่วมงานสนใจในสิ่งที่ท่านพูด				
21. เพื่อนร่วมงานส่วนใหญ่เป็นมิตรกับท่าน				
22. เพื่อนร่วมงานช่วยเหลือท่านเป็นอย่างดี				

<u>คำถามส่วนที่ 7</u> คำถามต่อไปนี้เกี่ยวข้องกับพฤติกรรมการนอนหลับในช่วง 1ปีที่ผ่านมา

โปรดตอบคำถามให้ใกล้เคียงความเป็นจริงมากที่สุด **<u>กรุณากรอกข้อมูลให้ครบทุกข้อ</u>**

7.1 โดยปกติท่านเข้านอนเวลาใด .....น. (**กรณี เข้ากะเดียวกันติดต่อกัน**)

7.2 ใช้เวลานานกี่นาทีที่สามารถทำให้ท่านหลับได้.....นาที

7.3 โดยปกติในตอนเช้าท่านตื่นนอนเวลาใด.....น.

7.4 ท่านนอนหลับสนิทในแต่ละคืนนานกี่ชั่วโมง (ซึ่งบางทีอาจแตกต่างจากจำนวนชั่วโมงที่เข้านอนทั้งหมด).....ชั่วโมง

กรุณาทำเครื่องหมาย X ในช่องที่ตรงกับคำตอบของท่านตามความเป็นจริง

7.5 ในระหว่าง 1ปีที่ผ่านมา บ่อยครั้งแค่ไหนที่ ท่านมีความลำบากหรือสิ่งรบกวนในการนอนเพราะท่าน.....	ไม่เคยมีอาการใน 1ปีที่ผ่านมา(0)	น้อยกว่า 10 ครั้ง ใน 1ปีที่ผ่านมา (1)	10 -20 ครั้ง ใน 1ปีที่ผ่านมา (2)	มากกว่า30ครั้งใน 1ปีที่ผ่านมา (3)
7.5.1 ไม่สามารถนอนหลับได้ภายใน 30 นาที				
7.5.2 ตื่นหรือรู้สึกตัวกลางดึกหรือตื่นเช้ากว่าปกติ				
7.5.3 ตื่นเพื่อเข้าห้องน้ำ				
7.5.4 ไม่สามารถหายใจได้สะดวก				
7.5.5 ไอหรือนอนกรนเสียงดัง				
7.5.6 รู้สึกหนาวมาก				
7.5.7 รู้สึกร้อนมาก				
7.5.8 มีฝันร้าย				
7.5.9 มีอาการปวด				
7.5.10 มีสาเหตุอื่นๆ ที่รบกวนการนอน**<u>โปรดระบุ</u>** เช่น เสียงดัง				

	ไม่เคยมีอาการใน 1ปีที่ผ่านมา(0)	น้อยกว่า 10 ครั้ง ใน 1ปีที่ผ่านมา (1)	10 -20 ครั้ง ใน 1ปีที่ผ่านมา (2)	มากกว่า30ครั้งใน 1ปีที่ผ่านมา (3)
7.6 ในระหว่าง1ปีที่ผ่านมา บ่อยครั้งแค่ไหนที่ท่านต้องรับประทานยาเพื่อช่วยนอนหลับ				
7.7 ในระหว่าง1ปีที่ผ่านมา บ่อยครั้งแค่ไหนที่ท่านมีความลำบากในการตื่นตัวขณะขับรถ, รับประทานอาหาร, หรือเข้าร่วมกิจกรรมสังคม				
7.8 ในระหว่าง1ปีที่ผ่านมา บ่อยครั้งแค่ไหนที่ท่านมีปัญหาในการกระตือรือร้นต่อการทำสิ่งต่างๆ				
	ดีมาก (0)	ดีพอใช้ (1)	ไม่ดี(2)	แย่มาก (3)
7.9 ในระหว่าง1ปีที่ผ่านมา ท่านประเมินหรือจัดระดับคุณภาพการนอนหลับของท่านอยู่ในระดับใด				

APPENDIX D
THE ANALYTICAL RESULTS OF THE SAMPLES

Table4. The body part and the prevalence of musculoskeletal complaint in the past.

Body part of musculoskeletal pain in past	Number of nursing personnel (%)
Neck and shoulder	156(83.9)
Upper back	98(52.7)
Lower back	100(53.8)
Elbows	12(6.5)
Wrists/hands	53(28.5)
Hips	69(37.1)
Knees	70(37.6)
Ankles/feet	62(33.3)

Table5. The body part and the prevalence of musculoskeletal complaint in 7 days ago.

Body part of musculoskeletal pain in 7 days ago	Number of nursing personnel (%)
Neck and shoulder	81(43.5)
Upper back	57(30.6)
Lower back	64(34.4)
Elbows	6(3.2)
Wrists/hands	22(1.8)
Hips	32(17.2)
Knees	24(12.9)
Ankles	32(17.2)

Table6. The body part and the prevalence of musculoskeletal complaint in 12 months ago

Body part of musculoskeletal pain in 12 months ago	Number of nursing personnel (%)
Neck and shoulder	129(69.4)
Upper back	106(57)
Lower back	107(57.5)
Left elbow	13(7)
Right elbow	13(7)
Left wrist/hand	53(28.5)
Right wrist/hand	56(30.1)
Left hip/thigh	67(36)
Right hip/thigh	61(32.8)
Left knee	57(30.6)
Right knee	63(33.9)
Left ankle/foot	67(36)
Right ankle/foot	68(36.6)

Table7. Causes of neck and shoulder pain during the last 12 months.

Causes of neck and shoulder pain	Number of nursing personnel (%)
Sport	19(3.3)
Accident	6(1)
Pregnancy	9(1.6)
Sudden movement	76(13.2)
Lifting of heavy load	97(16.8)
Stress	82(14.2)
Bad posture during long time	107(18.6)
Weather(draught, coldness, moisture)	15(2.6)
Work	134(23.3)
Leisured time	31(5.4)

Table9. The coping strategies of neck and shoulder complained in 12 months ago.

Coping strategies of neck and shoulder pain past 12 months	Number of nursing personnel (%)
Sick leave 1-7 days	4(2)
Sick leave 8-14 days	3(1.5)
Use medicine to relive pain	36(17.8)
Admission in the hospital	8(3.9)
Consult physician/physical therapy	4(2)
Use alternative medicine such as massage, acupuncture	88(43.6)
No treatment	59(29.2)

Table11. Job tasks in 1 shift work (8 hours)

Job task in 1 shift work (8 hours)	seldom or never N (%)	sometimes N (%)	often N (%)	(almost), always N (%)
Accepting emergency patient	27(14.5)	95(51.2)	55(29.5)	9(4.8)
Transferring patient	3(1.6)	32(17.2)	103(55.4)	48(25.8)
Moving bed	8(4.4)	65(34.9)	83(44.6)	30(16.1)
Changing and absorb pad	5(2.7)	12(6.5)	98(52.6)	71(38.2)
Bathing patient in bed	1(0.6)	15(8.1)	90(48.3)	80(43)
Medication	26(13.9)	9(4.9)	63(33.9)	88(47.3)
Repositioning a patient in bed side to side	2(1.1)	12(6.4)	82(44.2)	90(48.3)
Assisting the patients to move up such as form sit to sleep or sleep to sit	12(6.5)	27(14.5)	77(41.4)	70(37.6)
Taking patient to an operation room and receiving	11(5.9)	93(50)	54(29)	28(15.1)
Dressing a patient in bed	1(0.5)	33(17.7)	87(46.8)	65(35)
Feeding bedridden patient	2(1.1)	35(18.8)	89(47.8)	60(32.3)
Sending patient to an exam and receiving	11(5.9)	75(40.3)	73(39.3)	27(14.5)
Making a bed while the patient is not in it	15(8.1)	74(39.8)	66(35.4)	31(16.7)
Making a bed with the patient in it	1(0.5)	16(8.6)	97(52.2)	72(38.7)
Accept and discharge a patient	2(1.1)	64(34.4)	92(49.4)	28(15.1)

Table12. The working posture and percentage and amount of posture in 1 shift (8hr)

Posture in 1 shift (8 hr)	seldom or never N (%)	sometimes N (%)	often N (%)	(almost), always N (%)
Standing for long period such as on the working procedure	3(1.6)	42(22.6)	97(52.2)	44(23.6)
Sitting for long period	45(24.2)	110(59.1)	24(12.9)	7(3.8)
Moving load until 5kg - <10 kg	10(5.4)	49(26.3)	96(51.6)	31(16.7)
Moving load until 10 kg- < 25kg	21(11.3)	67(36)	77(41.4)	21(11.3)
Moving load ≥25 kg	19(10.2)	82(44.1)	67(36)	18(9.7)
Works which require exertion of arms/ hands such as resuscitate	23(12.4)	87(46.8)	54(29)	22(11.8)
Working with vibration tool	19(10.2)	40(21.5)	92(49.5)	35(18.8)
Working with uncomfortable posture	18(9.6)	62(33.3)	82(44.1)	24(12.1)
Working with your hand above shoulder level	7(3.8)	54(29)	101(54.3)	24(12.9)
Working with hand distance from trunk in horizontal such as pushing the patient in bed for turning position	4(2.2)	18(9.7)	105(56.5)	59(31.7)
Bending of neck forward (neck and shoulder is not in vertical line)	4(2.2)	47(25.3)	99(53.2)	36(19.3)

Posture in 1 shift (8 hr)	seldom or never N (%)	sometimes N (%)	often N (%)	(almost), always N (%)
Squatting/kneeing for long period such as recording urine output	6(3.3)	53(28.5)	93(50)	34(18.2)
VDU working for long period	28(15.1)	95(51.1)	54(29)	9(4.8)

Table15. The psychological job stress among nursing personnel about decision latitude, psychological job demand, supervisor social support and coworker social support

Psychological job stress	Number of nursing personnel (%)
Decision Latitude (Score 24-96)	
High (≥68)	114(61.3)
Low (<68)	72(38.7)
mean ± SD	66.34±6.83
Psychological Job demand (Score 12-48)	
High (≥34)	102(54.8)
Low (<34)	84(45.2)
Mean ± SD	33.29±4.25
Supervisor social support(Score 4-16)	
High (≥12)	96(51.6)
Low (<12)	90(48.4)
mean ± SD	10.63±2.47
Coworker social support(Score 4-16)	
High (≥12)	38(20.4)
Low (<12)	148(79.6)
Mean ± SD	12.09±1.6

Table16. The quality of sleep among nursing personnel in 12 months ago.

Quality of sleep in 12 months ago	Number of nursing personnel (%)
Good	48(25.8)
Poor	138(74.2)

APPENDIX E

DOCUMENTARY PROOF OF ETHICAL CLEARANCE

คณะแพทยศาสตร์ โรงพยาบาลรามาธิบดี มหาวิทยาลัยมหิดล
ถนนพระราม 6 กทม. 10400
โทร. (662) 354-7275, 201-1296 โทรสาร (662) 354-7233
Faculty of Medicine, Ramathibodi Hospital, Mahidol University
Rama VI Road, Bangkok 10400, Thailand
Tel. (662) 354-7275, 201-1296 Fax (662) 354-7233

Documentary Proof of Ethical Clearance Committee on Human Rights Related to Researches Involving Human Subjects Faculty of Medicine, Ramathibodi Hospital, Mahidol University

MURA2009/1374

Title of Project	The Prevalence and Work-Related Factor Neck and Shoulder Pain among Critical Care Nursing Personnel in Ramathibodi Hospital
Protocol Number	ID 03-52-91
Principal Investigator	Miss. Wasana Ravin
Official Address	Department of Nursing Faculty of Medicine, Ramathibodi Hospital Mahidol University

The aforementioned project has been reviewed and approved by Committee on Human Rights Related to Researches Involving Human Subjects, based on the Declaration of Helsinki.

Signature of Secretary
Committee on Human Rights Related to
Researches Involving Human Subjects ..... Assoc. Prof. Duangrurdee Wattanasirichaigoon, M.D.

Signature of Chairman
Committee on Human Rights Related to
Researches Involving Human Subjects ..... Prof. Boonsong Ongphiphadhanakul, M.D.

Date of Approval May 4, 2009

APPENDIX F

KARASEK IS ALLOWED TO USED QUESTIONNAIR FORM

Simplified Form A- Supersedes Sect. IV of Job Content questionnaire User's Guide v 1.1 1985
Sign this form and return it immediately to the JCQ Center -

Contract for Use of the Job Content Questionnaire for Research Use

The JCQ instrument, now translated into more than ten languages, is one of the most frequently used instruments in the world for psycho-social job analysis. Return of a copy of the JCQ data is required of medium and larger sized projects (over 100 subjects [see note below*]). This insures for the JCQ instrument adequate treatment of scale validation issues and attention to scale strengths and weaknesses: specifically: (a) consistency of JCQ scale use; (b) revalidation of the questionnaire scales - including revalidation for important sub-populations; (c) performance of inter-group comparisons between non-representative sub-population; (d) facilitation of understanding of sources of scale covariance variance from demographics, industry, occupational, organizational and community factors; and (e) development of new JCQ scales. Your cooperation can help insure that the JCQ instrument has a long-term future.

User/Study Director: Wasana Ravin

Study Name: The Prevalence and work-Related Factor Neck and shoulder pain Among Critical care Nursing Personnel in Ramathibodi Hospital

Research Institution: Master of Public Health, Faculty of Public Health, Mahidol University

Address: Rajvithee Rd. Rachathewee Bangkok, Thailand 10400.

Permission for use of the Job Content Questionnaire is granted to the Study Director for the above study with the following requirements relating to providing a copy of the data, and payment (for large projects only, as noted).

Section A. Data File- A copy of the JCQ job data and selected ancillary data (not all data) is to be provided to the JCQ Center (see address below) after the data has been collected, cleaned, and used for your preliminary analyses. The file should include the following variable scores:

a. Subject ID (and location ID if relevant)
b. All JCQ job content question scores (raw data)
c. Demographic question scores:
   Age; Sex; Education; Marital Status; Occupation-usual occupation (the JCQ User's Guide occupation lists [3 digit] give examples of the detailed occupation coding that should be followed); Industry.
   If collected, the additional information should be included;
   Children (#at home/ ages); Hours of work per week; Income; Race; Previous occupation.
d. JCQ psychological strain scales, if used (and not the dependent variable of the study)

1. Data File Labels:
The data file should have the variables labeled with JCQ Questions numbers for the raw data (ex. q23), and scale labels in Section III of the JCQ Users Guide for demographic variables and any scales constructed.

2. Data Format:

APPENDIX F (cont.)

The data should be written on standard 3 1/2" floppy disks under IBM MS-DOS/Windows (state software version), on IBM tape (state machine and operating system version), or Apple Macintosh OS (state operating system, application program name, file type, and version number).

3. Codebook:
A codebook giving appropriate variable label information and information on each variable (including missing value codes) is to be provided to the JCQ Center with the data file. Enclose a printout of the first three subject records.

4. Translations:
Translations of the JCQ questions into the languages of the site countries, and back translation of the questions into English (approved by R. Karasek) are to be provided to the JCQ Center. These may be distributed by the JCQ Center in the future to other users under the same conditions as the English version.

* Study sizes with data copy requirements:
1. U.S. Canada: 100 subjects or over.
2. Europe, Asia, Other Countries: 250 subjects or over; or studies of single occupations of over 100 subjects.
3. Commercial use, health service (other service use): Contact JCQ Center.

Section B: Payment Obligations for Large Studies (only)

Payment for JCQ use is made for usage of a psychosocial work characteristic assessment procedure. Payments support standardization, methodological improvements, distribution of information related to methodological effectiveness, and development of an international research project on reliability and standardization of psychosocial job characteristics assessments.

Services and user's obligations are detailed in the JCQ User's Policy.

For projects which are supported by current funding, payment for use of the JCQ is due and payable to the JCQ Center 30 days after receipt of a bill.

Projects which are seeking funding via competitive grant application, will receive permission and the JCQ packet, as in the case of non-paying users (Initial Mailing).

Study directors agree that they will take all necessary steps to see that the financial institution responsible for administering the project: (a) consider the fees as payable as a part of research expense, and (b) agree to pay them upon receipt of project funding (fee schedule from JCQ Usage Fees, from the JCQ Center).

Funding Organization _____ Award date _____

JCQ usage fees are due and payable to the JCQ Center the beginning of the award of project funding. New project funding requests require new permissions.

Agreement for JCQ, by Robert Karasek Robert Karasek Date 1/14/09

Agreement by Study Director Wasana_Ravin Date 12-01-2009

Title The Prevalence and work-Related Factor Neck and shoulder pain Among Critical care Nursing Personnel in Ramathibodi Hospital .

BIOGRAPHY

NAME	Miss Wasana Ravin
DATE OF BIRTH	17 April 1978
PLACE OF BIRTH	Phitsanulok, Thailand
INSTITUTIONS ATTENDED	Mahidol University,2001: Faculty of Medicine Ramathibodi Bachelor of Nursing Science Mahidol University, 2009: Master of Science Industrial Hygiene and Safety 2003 - Present
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