

**THE STUDY OF KNEE PAIN MANAGEMENT IN PATIENTS
WITH OSTEOARTHRITIS OF KNEE**

The seal of Mahidol University is a circular emblem. It features a central blue circle containing a golden chedi (a traditional Thai Buddhist stupa). The chedi is topped with a flame-like finial and has intricate carvings. The blue circle is surrounded by a golden ring. Inside this ring, the Thai text "จุฬาลงกรณ์มหาวิทยาลัย" (Mahidol University) is written in a circular path. There are also four golden floral motifs positioned at the top, bottom, left, and right of the central blue circle.

PARICHAD JANSOONTRAPORN

**A THESIS SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR
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(ADULT NURSING)**

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Thesis
Entitled

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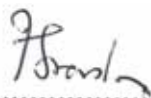
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THE STUDY OF KNEE PAIN MANAGEMENT IN PATIENTS WITH OSTEOARTHRITIS OF KNEE

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ABSTRACT

This research was descriptive research design. The objective was to study knee pain management in patients with osteoarthritis (OA) of knee by using the revised symptom management model of Dodd, et al. (2001) as a conceptual framework. The data were 100 patients with primary osteoarthritis of knee for more than 6 months who received medical treatment at orthopedic out patient unit of Siriraj Hospital, Phramongkutklao Hospital, and Bangkok Metropolitan Administration Medical College and Vajira Hospital. Data were collected by interview questionnaires on demographic data and knee pain management from April to June 2005. Data were analyzed by using percentage, mean, and standard deviation.

Results revealed that the incidence of OA knee was higher in female than male (87%:13%) with average age of 66.02 years. For symptom experience: perception, evaluation, and response, all patients perceived knee pain with various characteristics which most of them reported as lightning pain (60%). All patients had a limited range of knee motion and perceived varus deformity (72%). Most patients evaluated aging as cause of knee pain (94%), pain intensity as very much level (52%) and pain disturbed their activity in daily living (55%). Most common of aggravating factors to increase knee pain was too much knee utilization (86%). Patients had disability (62%), felt suffering (39%) and low self esteem (32%). All patients used combined strategies to manage knee pain. Rest and medication were two strategies used by all patients. Knee pain management outcome were moderate knee pain level and low functional status. The functional status depended on knee pain level. The first three activities which induced severe knee pain were sitting on the heels for a long time, sitting on the heels for a moment and squatting on the floor in a polite attitude, respectively.

The findings in this study were can be useful in development of proper and effective nursing practice guidelines to manage knee pain of patients with osteoarthritis and as a database for future research on other aspects.

KEY WORDS: SYMPTOM MANAGEMENT/ KNEE PAIN MANAGEMENT/
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การศึกษาการจัดการเกี่ยวกับอาการปวดเข่าในผู้ป่วยโรคข้อเข่าเสื่อม

THE STUDY OF KNEE PAIN MANAGEMENT IN PATIENTS WITH OSTEOARTHRITIS OF KNEE

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บทคัดย่อ

การวิจัยครั้งนี้เป็นการวิจัยเชิงบรรยาย เพื่อศึกษาการจัดการกับอาการปวดเข่าในผู้ป่วยโรคข้อเข่าเสื่อม โดยใช้รูปแบบจำลองวิธีการจัดการเกี่ยวกับอาการของคอคอด ปี2001เป็นกรอบแนวคิด กลุ่มตัวอย่างเป็นผู้ป่วยข้อเข่าเสื่อมปฐมภูมิจำนวน 100คนที่มีอาการปวดเข่ามากกว่า 6 เดือนและมารับการรักษาพยาบาลที่คลินิกผู้ป่วยนอก แผนกโรคกระดูกและข้อของโรงพยาบาลศิริราช โรงพยาบาลพระมงกุฎเกล้า และวิทยาลัยแพทยศาสตร์กรุงเทพมหานครและวชิรพยาบาล เครื่องมือที่ใช้ในการวิจัย คือ แบบสัมภาษณ์ข้อมูลทั่วไปและแบบสัมภาษณ์การจัดการกับอาการปวดเข่าในผู้ป่วยโรคข้อเข่าเสื่อม ระยะเวลาในการเก็บข้อมูลตั้งแต่เดือนเมษายนถึงเดือนมิถุนายน พ.ศ.2548 การวิเคราะห์ข้อมูลใช้ ร้อยละ ค่าเฉลี่ย และค่าเบี่ยงเบนมาตรฐาน

ผลการศึกษาในกลุ่มตัวอย่างผู้ป่วยจำนวน100 คน เพศหญิงมีอุบัติการณ์ในการเกิดข้อเข่าเสื่อมร้อยละ87 เพศชายร้อยละ13 อายุเฉลี่ยเท่ากับ 66ปี ประสบการณ์อาการปวดเข่าได้แก่ การรับรู้ การประเมิน และการตอบสนองต่ออาการ ผู้ป่วยทุกรายรับรู้ได้ว่ามีอาการปวดเข่าในหลายลักษณะ ผู้ป่วยร้อยละ60รู้สึกปวดแปลบ และทุกรายรับรู้ว่ามีอาการเคลื่อนไหวของข้อเข่าจำกัด ร้อยละ72รู้สึกว่ามีข้อเข่าโอง่ออกด้านนอก ร้อยละ90ประเมินว่าโรคข้อเข่าเสื่อมเกิดจากความเสื่อมตามวัย ร้อยละ52มีความปวดในระดับมาก และร้อยละ55ประเมินว่าอาการปวดที่เกิดขึ้นมีผลกระทบต่อการทำกิจวัตรประจำวัน ปัจจัยที่ทำให้เกิดอาการมากขึ้นสูงสุดคือการใช้งานมากเกินไป ร้อยละ86 ผู้ป่วยร้อยละ62มีการตอบสนองต่ออาการปวดโดยไม่สามารถทำกิจวัตรประจำวันได้ตามปกติ ร้อยละ39รู้สึกทุกข์ทรมาน และร้อยละ32รู้สึกคุณค่าในตัวเองลดลง สำหรับกลยุทธ์ในการจัดการกับอาการปวดเข่าผู้ป่วยทุกรายใช้หลายวิธีร่วมกันโดยทุกรายใช้วิธีการพักข้อร่วมกับการใช้ยา ผลลัพธ์ที่ได้จากการจัดการพบว่าผู้ป่วยมีระดับของความปวดปานกลางและมีความสามารถในการทำกิจกรรมได้ในระดับต่ำ พบว่าความสามารถในการทำกิจกรรมขึ้นอยู่กับระดับความปวดของข้อเข่า กิจกรรมที่ทำให้เกิดอาการปวดเข่ามากที่สุดสามลำดับแรกคือการนั่งของๆเป็นเวลานาน การนั่งของๆในช่วงสั้นๆ และการนั่งพับเพียบกับพื้น ตามลำดับ

ผลจากการศึกษาครั้งนี้สามารถนำไปใช้ในการพัฒนาแนวทางการปฏิบัติการพยาบาล ในการจัดการกับอาการปวดเข่าของผู้ป่วยข้อเข่าเสื่อมให้มีประสิทธิภาพและเหมาะสม นอกจากนี้เพื่อนำไปใช้เป็นแนวทางในการให้ข้อมูล ความรู้ และคำแนะนำแก่ผู้ป่วยที่มีอาการปวดเข่าจากโรคข้อเข่าเสื่อม และเป็นข้อมูลพื้นฐานเพื่อใช้ในการพัฒนางานวิจัยที่เกี่ยวข้องต่อไป

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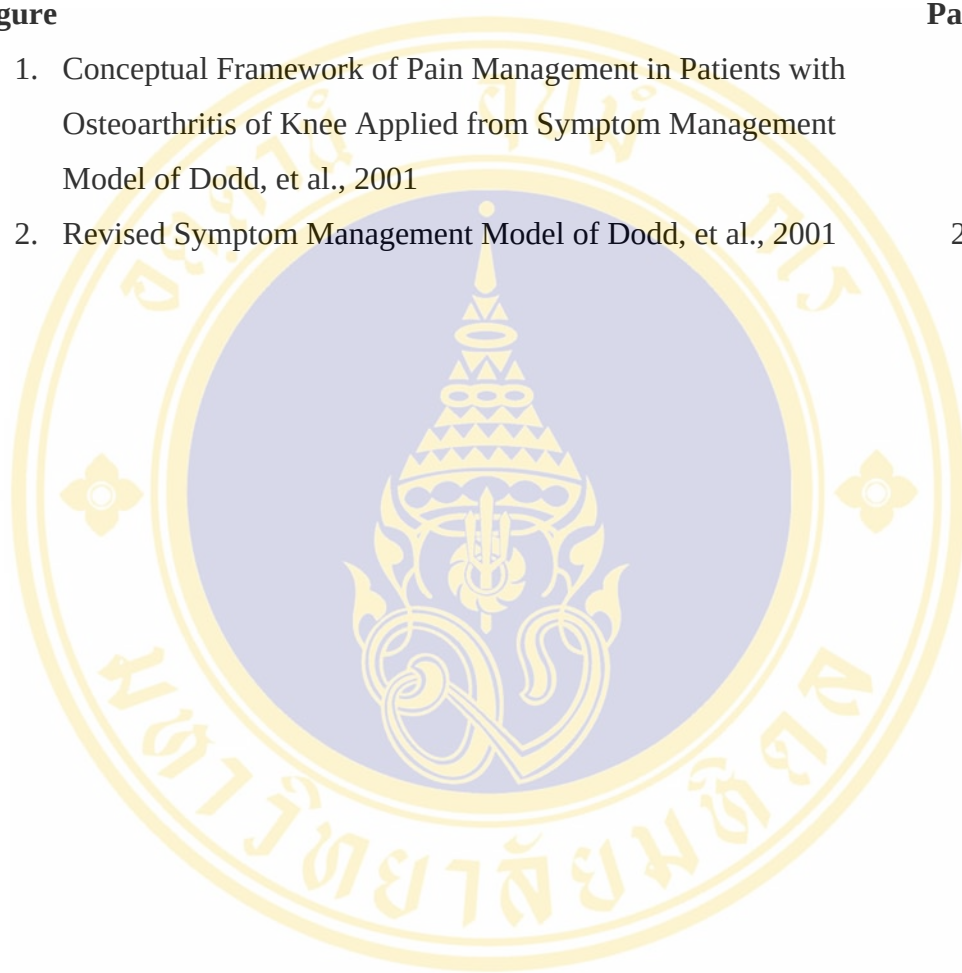
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CHAPTER I

INTRODUCTION

Background and Significance of Problem

According to rapid progress in medical science, personnel, environmental and technology development, health care system for Thai people has been developed as well. As a result, Thai population structure now enters into the elderly society structure. It is estimated that in the year 2006, there will be 6.9 million elders which are 10.7% of total population (National health development director committee, Issue 9, 2001). Non-infectious disease becomes the leading problem of this population group. World Health Organization stated that musculoskeletal disease is the fourth in the list of disease leading to disability. The cause is due to dysfunction of surrounding joint tissue (Paul & Kenneth, 2003).

In Thailand, a survey for incidence of OA of knee at Siriraj Hospital found that 46.5% of the elderly patients, with mean age of 70.07 ± 6.57 years, had OA of knee (Kuptniratsaikul, Leurcharusmee, & Nilganuwong, 2000). The later survey in the year 2002, in 392 patients found that the age of patients in community with OA of knee were 67.7 ± 6 years old (Kuptniratsaikul, Tosayanonda, Nilganuwong, & Thamalitikul, 2002). The incidence of OA of knee was also significant in United States where increasing proportion of elderly population to total population is obvious that elderly aged more than 65 years are the most susceptible group to have OA of knee. Among this incidence group, 80% were found change in knee pathophysiology and 5-10% expressing the clinical symptoms (Felson, et al., 2000; Clair, et al., 2002). From these data reveal that there will be 59 million elderly or more than 18% of elderly population will have OA of knee in United States of America (Jane, 2003).

OA is the most common cause of disability among the elderly. OA of knee in elderly are mostly primary which is a disease process present in individuals without history of joint injury, joint disease, or other systemic illness associated with OA. There

are a lot of personal factors affecting in the incidence of OA of knee such as gender, obesity, high Body Mass Index (BMI), occupation, knee posture in activity of daily living (ADL) such as kneeling and sitting squat on the floor in a polite attitude, and knee accident (Sharon & John, 1994; Delores, 2000; Carol, 2001; Dottie, 2002; Clair, et al., 2002; Jane, 2003; Paul & Kenneth, 2003). Incidence of OA of knee were found in female more than male which is presumably due to changing of estrogen hormone in female.

There are many pathological changes or symptoms in patients with OA of the knee, however, the most common symptom that leads the patient to visit physician is knee pain (Carol, 2001; Paul & Kenneth, 2003). It is thought that the pain and stiffness sensed by the patient in early OA are the result of the inflammatory changes in the synovium and surrounding joint capsule. In the early stage of OA of knee, pain and stiffness are relieved by rest and worsened by activity, or undue stress to the joint such as climbing up/down stairs or kneeling (Sharon & John, 1994). But if the pain sustains for a long time and become chronic, the intensity of pain is normally higher and may sustain even at rest or during the night which sometime disturb the sleeping patients and wake them up. Some patients can feel the pain radiate from knee upward to upper thigh or hip. In the late stage of OA of knee, the patients will have knee stiffness and limited range of motion, or decrease knee function until unable to do ADL. An important pathological change is the deformity of knee for example genu varus or giving way of knee joint and may have the abnormal gait (Sharon & John, 1994; Delores, 2000; Carol, 2001; Dottie, 2002; Clair, et al., 2002; Jane, 2003; Paul & Kenneth, 2003).

If chronic knee pain sustains for a long time, patient's life can be affected in every dimension. Besides great suffering, pain has been found to relate with impair of knee motion, activity intolerance and fatigue, as a result, patients and their family are forced to make adjustment and to decrease their role function in coping with these changes. Chronic-intense knee pain also causes a sleep pattern disturbance, eating disturbance which lead to have nutrition more than or less than body requirement, ADL disturbance, altered sexuality, alteration in self concept (Sharon & John, 1994; Dottie, 2002). Lack of exercise and decreasing of function can cause atrophy of thigh muscle and joint stiffness. Such symptoms have worse affect to ADL more and more. Patients

feel unsafe about fall or accident due to atrophy of leg muscle which threaten their lives (Flanagan, et al., 1995; Lipsutz, et al., 1994; Carol, 2001; Dottie, 2002). Chronic knee pain has physical, psychological, economic, emotional and social effect to quality of life of patients and their family. Patients may feel incompetent, valueless, loss of independence, and even burden to family and social.

Although total-knee replacement surgery is a modest choice of treatment, there are still a lot of patients who suffered from chronic knee pain during the conventional treatment. Patient usually seek for many healthcare methods either conventional or traditional treatment in order to ease their pain. The treatment may be medication, physical therapy, hot or cold compression, behavior adjustment, etc. The knee pain management is therefore the combination of various treatments, aimed to relieve the knee pain, maintain or manage the symptoms and to prevent further OA of the knee (Carol, 2001).

If the knee pain is severe and does not respond to the conservative treatment, knee surgery is necessary. However, surgery has a risk of complication and has a high cost. Expensive surgical cost is the other consideration that should not be overlooked. Many patients are not ready or have no chance to have the surgery treatment. The health care team is therefore responsible to manage the pain for the patient in order to relieve pain and to prevent the worse proceeding of symptom.

Management of knee pain and slow the progression OA of the knee are the main issues for patients and family. Patients can evaluate the pain and symptoms and then response to its impact by themselves either to symptom management or symptom management outcome. However, some questions are raised nowadays whether or not the patient's self-care practice for knee pain is correct and whether symptom self-management are appropriate (Larson, et al., 1994). Moreover, the healthcare team often found the difficulty in strategic development of symptom management which practically works for this group of patient. This difficulty arises out of pathological condition, environment, health status, cognitive experience, evaluation, symptom response, symptom self-management, and symptom self-management outcome (Dodd, et al., 2001) as this disease is mostly found in the elder which occur due to degenerative process of knee resulting in higher risk to have medication side effect or to have treatment complication (Paul & Kenneth, 2003).

The perspective of knee pain management for healthcare team is therefore not only providing information or suggestion to patient but also perform comprehensive and intensive study of knee pain experience, knee pain management strategy and knee pain management outcome, including study of patient's personal factor, environment and health status. The data and information of the study will be used to develop the nursing care practice guideline. The expected result of the study is to support the patient to adjust themselves to their ADL, to decrease the progression OA of knee, to decrease intensity of knee pain due to incorrect pain management at the early stage of OA of the knee, to promote patient's appropriate adjustment to family, social, and ADL to minimize dependency to others and finally to enhance patient's quality of life (Sharon & John, 1994; Clare, et al., 2002).

According to literature review, the study OA of knee in Thailand concerning knee pain experience, knee pain management strategy and knee pain management outcome are very few available. Researcher was interesting in studying knee pain management to provide basic information for healthcare personnel in Thailand to be used for designing a self care program or arranging nursing activity for self care development in patients with OA of knee in Thailand in order them to perform effective and appropriate self care.

Research Questions

1. What do patients with osteoarthritis of knee experience their pain?
2. How do patients with osteoarthritis of knee manage their pain?
3. What is the knee pain management outcome including knee pain and functional status of knee in patients with osteoarthritis of knee?

Research Objectives

1. To study knee pain experience in patients with osteoarthritis of knee.
2. To study pain management in patients with osteoarthritis of knee.
3. To study the knee pain management outcome including knee pain and functional status of knee in patients with osteoarthritis of knee.

Conceptual Framework

The Symptom Management Conceptual Model of Dodd, et al., (2001) was used in this study as a conceptual framework. This symptom management conceptual model comprises of three dimensions as follows;

1. Symptom experience which comprises of symptom perception, symptom evaluation and response to symptom.
2. Symptom management strategies
3. Management outcome which comprises of symptom status, self care ability, financial status, morbidity & co-morbidity, mortality, quality of life, health service utilization, emotional status, and functional status.

Symptom Experience is a dynamic process comprising of three components as follows;

- Symptom perception is the psychological interpretation of the physical change such as OA of knee
- Symptom evaluation about cause and severity of symptom. Patient evaluates the symptom from frequency and severity; in term of how much the symptom threaten to their life.
- Response to symptom by changing physical, psychological, emotion and behavior of patient based on perception, evaluation and interpretation of symptom. The response of symptoms are memorized as an experience to be take part in next perception, evaluation and decision process. For OA of knee, the first perception of symptom is the pain which has effect or disturb to ADL, the efficiency or effectiveness of patient's activity may be less. Patients then seek for pain management to relieve the pain.

Symptom Management Strategy is the constructive process carried out in order to control the symptom by using the specifications of what (the nature of the strategy), when, where, why, how much (intervention dose), to whom (recipient of intervention) and how (delivered). A number of questions about symptom management remain to be explored. For example, how is the issue of timeliness of patient-initiated strategies dealt with? How are appropriate strategies handled? Are the management strategies effective or ineffective? Are they health-damaging? Who determine the dose (intensity, duration, frequency) of the strategy?

Outcome of Symptom Management, the goal of symptom management is to avert or delay a negative outcome through biomedical, professional, and self-care strategies. Management begins with assessment of the symptom experience from a patient's perspective. Assessment is followed by identification of the focus for intervention, implementation of interventions, and evaluation of outcomes and the management process. Symptom management can include interventions aimed at one or more of the components in the symptom experience to influence one or more desired outcomes. Symptom management is a dynamic process, often requiring changes in strategies over time or in response to patient's acceptance or lack of acceptance of the strategy. Successful symptom management requires a patient-family-clinician partnership. Most symptom management will involve, at the very least, a patient, nurse, and physician. Such a relationship is one in which the work of the provider complements that of the patient and family, encouraging and assisting efforts to prevent or manage the symptom. The strategies may have been acquired from self learning or other source of information such as healthcare personnel, family, or other people.

Dodd, et al. (2001) demonstrated not only the relationship among all three dimensions: the symptom experience, symptom management strategies, and outcomes but also demonstrated the three domains of nursing science: personal, environmental, and health/illness status are contextual variables influencing all three dimensions of model. However, in this study, the three domains as mentioned above were evaluated only as qualitative data, did not study their relationship to the three dimensions. The studies of knee pain management in patients with OA of knee in this study were about their pain experience, the implemented knee pain management strategies and finally evaluated management outcome. The management outcome chosen in this study were knee pain and functional status because these outcomes remarkably affected ADL of the patient.

The conceptual framework of knee pain management in patient with OA of knee is shown in figure.1

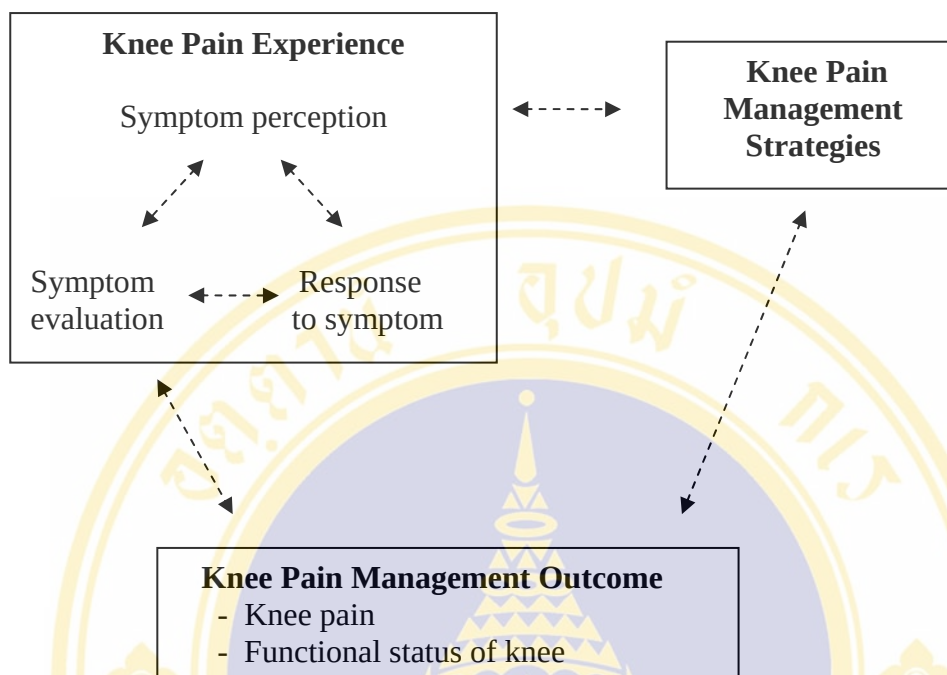


Figure 1. Conceptual Framework of Pain Management in Patients with Osteoarthritis of the Knee Applied from Symptom Management Model of Dodd, et al. (2001)

Scope of Research

This research is descriptive research design aimed to study knee pain management in patient with OA of knee. The conceptual model of Dodd, et al. (2001) was applied as a conceptual framework in this study. The participants in this study were the patients with OA of knee who received medical treatment at out patient clinic of orthopedic department of Siriraj hospital, Phramongkutklao Hospital, Bangkok Metropolitan administration medical college and Vajira hospital. The data collection period was during April to June, 2005

Research Benefit

1. To be a database in order to develop nursing practice guideline for knee pain management in patient with OA of the knee in order to provide more effective and appropriate health care.
2. To be a guideline for development of research concerning knee pain management in other aspect.

Definition of Terms

Experience of Knee Pain referred to the perception evaluation and response of knee pain in the past of patient with OA of knee. The evaluation can be done by using knee pain experience interview developed by researcher based on literature review.

Knee Pain Management Strategies referred to the all of the methods which the patients with OA of knee use in order to control knee pain. The evaluation of management strategies are done using pain management strategies interview tool developed by researcher based on literature review.

Knee Pain Management Outcome referred to the outcome emerges from symptom management strategies as well as from the symptom experience which comprise of perception, evaluation, and response to various ADL of patient with OA of knee. The outcome are conceptualized as symptom status, self care ability, financial status, morbidity & co-morbidity, mortality, quality of life, health service utilization, emotional status, and functional status. In this research there were two interesting outcomes that were evaluated, i.e., knee pain and functional status

Knee Pain referred to the intensity of knee pain which is perceived and suffered in physical and mental dimension by patient with OA of knee caused by tissue damage from OA.

Functional Status of Knee referred to the level of personal ability to cope with difficulty in functioning of the knee in ADL.

Evaluation of the above 2 outcomes based on the patient's perceptual opinion in performing ADL. Researcher used pain interview and functional status interview which is adapted from the interview tool proposed by Suwan (2000) applied from Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) – VA 3.0 by Bellamy, et al. (1988)

CHAPTER II

LITERATURE REVIEW

In this descriptive research, knee pain management in patients with osteoarthritis of knee was studied. Researcher had searched and reviewed related literature to be used as a guideline and resources in the study which are discussed in the following order;

1. Osteoarthritis of Knee
 - 1.1. Definition and Incidence
 - 1.2. Pathophysiology
 - 1.3. Knee Pain and Other Clinical Characteristics
 - 1.4. Factor Related to Osteoarthritis of Knee
2. Symptom Management Model (Advancing the science of symptom management: Dodd, et al., 2001)
3. Knee Pain Management in Patient with Osteoarthritis of Knee
 - 3.1. Experience of Knee Pain
 - 3.2. Knee Pain Management Strategies
 - 3.3. Knee Pain Management Outcomes, Concerning Knee Pain and Functional Status of Knee in Patient with Osteoarthritis of Knee.

1. Osteoarthritis of Knee

1.1 Definition and Incidence

Osteoarthritis(OA) is a common age-related condition of synovial joints and is a common disabling disease in the United State that is characterized pathologically by localized areas of loss of articular cartilage associated with overgrowth of bone at the joint margins (osteophyte), changing in the subchondral bone, fibrosis of the joint capsule, and mild synovitis (Paul & Kenneth, 2003). OA of knee is therefore has relationship with age. It is a localized disorder with no systemic effects. Frequently referred to as degenerative joint disease, OA is also synonymous with the terms osteoarthrosis, degenerative arthritis, senescent arthritis, and hypertrophic arthritis. It is

a chronic and slowly progressive disease (Sharon & John, 1994; Delores, 2000; Carol, 2001; Dottie, 2002; Clare, et al., 2002; Jane, 2003; Paul & Kenneth, 2003).

It principally affects the large weight-bearing joints of knees and hips; joints subject to the compressive and shearing forces of habitual activity (Sharon & John, 1994). Knee is the hinge joint and has multidimensional motion in combination with some degree of rotation inside the joint. Extremely bending of knee causes high compressive pressure on articular cartilage which can cause fibrillation, crack or fracture or enhances biochemical reaction with gradually damage articular cartilage. As a result, OA or inflammation of knee is easily occurred (Suthas Na Ayuthaya & Rujiwesponsathorn, 1996; Urwin, et al., 1998). OA of knees and hips is responsible for the majority of the burden (Felson, et al., 2000). OA is found mostly in both knees starting from one side then the other in the next 11 years (Spector, et al., 1992).

To date, there is no complete report of OA knee incidence which is caused by the problem of definition, diagnosis, disease code in recording. However OA of knee is the mostly found joint disease in all group of world population (Urwin, et al., 1998; Dias, et al., 2003; Mao-Hsiung, et al., 2003; Berman, et al., 1999; Delores, 2000; Clare, et al., 2002; Dottie, 2002). OA is rare before adulthood but become increasingly common with advancing age, mostly found in elders. More than 50% of people over the age of 65 years have radiographic evidence of OA and more than 10% have significant pain or disability associated with their joints damage (Felson, et al., 2000). From the clinical data, knee pain is found in 28.9% of 40-79 years old patients and the rate increases in proportional with age (O'Reilly, 1998). A survey in community-dwelling elders in central part of Thailand in the year 1999 revealed that more than 43.3% suffered from OA in various joints (Assantachai, et al., 1999) which corresponded to the clinical survey of Siriraj Hospital which revealed that 46.5% of the elderly patients with mean age 70.07 ± 6.57 years, had OA of knee (Kuptniratsaikul, Leurcharusmee, & Nilganuwong, 2000).

Type of OA of knee

1. Primary or idiopathic OA is a disease process present in individuals without history of joint injury, joint disease, or other systemic illness associated with OA. The exact cause is unknown but many factors were known as predisposing factors including genetic, weight, age, estrogen hormone, the activities of knee, etc.

2. Secondary OA may occur following trauma, other inflammatory joint disease, infection, avascular necrosis, and neuropathic disorders, occurs more often in men and can be found in every age. Pathological condition of secondary OA is the same as the primary OA but secondary OA can occur in younger age with leading causes.

1.2 Pathophysiology

Healthy articular cartilage is smooth, white, glistening connective tissue that covers synovial joint surfaces. The cartilage demonstrates extremely low friction when sliding across adjacent, congruent cartilage and excellent shock absorbing capacity related to its characteristic compressibility and viscoelasticity. The articular cartilage is composed of a large amount of ground substances or matrix and cells known as chondrocytes. The components of this matrix are type II collagen and proteoglycans, which are produced by the chondrocytes. The lesser amount of collagens are type I, IX, and XI. This combination allows for the unique mechanical properties of the articular cartilage. In addition, the proteoglycans are very hydrophilic, with water constituting approximately 70 % of the weight of cartilage matrix, adding to the ability to resist wear with heavy joint use. OA is considered a group of diseases characterized by degeneration, regeneration, and repair of structural changes. Pathologic characteristic results in change of articular cartilage, subchondral bone, synovial membrane and fibrous capsule. Change in the make up of the articular cartilage is the hallmark of OA. Early changes are marked by a decrease in proteoglycan content from the matrix, resulting in a softening and loss of normal elastic resilience. Despite compensatory mechanisms to increase the synthesis of proteoglycans and collagen by proliferating chondrocytes, progressive destruction by lysosomal enzymes out-weights production. The diminished proteoglycan content causes a loss of some of the support for the collagen fibrils, and the articular cartilage become more susceptible to joint friction. In addition to loss of proteoglycan content, some of the hydrophilic properties of proteoglycan are lost and the matrix becomes less permeable. Change in collagen synthesis also occurs, with a fibrous tissue replacing the typical type I collagen. Decreased cushioning results from this change in collagen, and the cartilage loss its ability to resist wear with heavy use.

With the loss of collagen support and changes in collagen structure, collagen fiber may rupture, causing fissuring, fibrillation, and erosion or thinning of the articular

cartilage. The joint surface, which is usually white, smooth, and glistening, becomes yellowish, granular, and dull. The softened, fibrillated cartilage is gradually abraded to subchondral bone in the center of joint surface. On the same time the inner side of subchondral bone will grow thicker which is the response to higher compression on this bone. The X-ray photography of knee in this stage can illustrate joint space narrowing and the heavier loaded area of subchondral bone are thicker and become sclerosis (eburnation). Moreover, a space within the subchondral bone may be found which is called subchondral bone cyst or pseudocyst. In the peripheral areas of joint, the body responses with a proliferation of fibroblasts and new bone formation that result in bony outgrowth and spur development at the joint margins or osteophytes. The loss of central cartilage and increase in peripheral cartilage create an incongruity in joint surface, changing the normal stress distribution across the joint and leading to motion restriction. Progressive roughening and fibrillation of the articular cartilage leads to increase mechanical wear in the joint and is accompanied by small portions of the articular cartilage shearing from the surface of the joint. The particles of cartilages thus liberates cause an inflammation of the joint, as the phagocytic or type A cells increase there metabolic activity in an attempt to clean the joint of loose debris. Cartilage debris and sulfate polysaccharides liberated from cartilage breakdown have been shown to be inflammatory in joints and to stimulate the release of proinflammatory cytokines, notably interleukin-1, interleukin-6, TNF α , and prostaglandins which stimulate synovial inflammation, afferent pain receptor (nociceptor), A-delta mechanoreceptors and the C-polymodal nerve ending in the synovium, subchondral bone, joint capsule, periosteum and periarticular ligaments (Dieppe & Lohmander, 2005; Pinals, 1996; Kean, et al., 2004; Grubb, 2004; Aaron, et al., 2004). Inflammatory mediators and procoagulants activate matrix metalloproteases, stimulating cartilage degradation and promoting a state of hypercoagulation, hypofibrinolysis, and microthrombosis in synovial and subchondral vessels which may contribute to venous outflow obstruction and intraosseous hypertension and may participate in generating inflammatory and degradative cytokines, thus contributing to synovitis and cartilage breakdown.

Inflammation of the synovium is accompanied by increased blood flow, which can be identified clinically as increased warmth about the joint. Chronic inflammation results in swelling or enlargement of the joint capsule and synovium. The inflammatory

response also leads to increase production of synovium fluid by the type B or secretory cell. This leads to further swelling in the joint, and fluid can be appreciated on ballottement or palpation of the joint. It is thought that the pain and stiffness in early OA are the result of the inflammatory changes in the synovium and the surrounding joint capsule. Understanding the pathology in bone and synovium is essential to understanding the clinical symptom of OA.

1.3 Knee Pain and Other Clinical Characteristic

Along with limitations of physical functioning, OA affects various aspects of daily life and create numerous sources of physical and emotional stress, which may include living with uncertainly, reduced energy, loss of functional ability, pain, motility problems, difficulties with self-care, threats to self esteem, socioeconomic burdens, diminished independence, and reduced involvement in family. The significance clinical symptoms of OA of knee are pain, joint stiffness, impairment and deformity which are serious problems for the elderly in doing their ADL.

1.3.1 Knee pain is the first symptom and the most important symptom leading the patient to visit health care personnel. Knee pain in early stage is not severe and is usually described as a localized, asymmetrical, deep aching in the joint that increases with joint use and is relieved by rest, particularly in the early stages of disease. Night pain or pain at rest may occur with disease progression. The pain does not directly come from articular cartilage as it lacks of nerve supply and the joint surface itself does not become painful until subchondral bone is exposed bone in later stages of the disease. The sources of pain in OA of knee are poorly understood, perhaps because the pathogenesis itself is poorly understood. However there are some sources or factors relate to pain in OA of knee such as inflammatory cytokine (IL-1,IL-6, TNF, prostaglandin), microfractures of the subchondral trabeculae, distension of the joint capsule by effusion, pressure increasing on periosteum from osteophyte, pressure increasing on subchondral bone, irritation of the peripheral nerve endings within the capsule by osteophytes, compromise of vascular flow to the bone, venous engorgement from raised intramedullary pressure, bone marrow edema, contracture of tendon and muscle around the joint, or muscle spasm including synovitis and capsulitis (Laulenu, 2003; Aaron, et al., 2004). Cartilage lacks of nerve supply and the joint surface themselves do not become painful until subchondral bone is exposed bone in later

stages of the disease. Intraosseous hypertension or raised pressure in subchondral bone can cause nocturnal pain (Pinals, 1996; Aaron, et al., 2004). Result of inflammation and nerve fiber stimulation can cause the lower pain threshold and can result in normal activities such as walking etc, causing pain or to have more intense of pain than normal (Grubb, 2004). In addition to the previous data, inflammation can stimulate angiogenesis, and angiogenesis can facilitate inflammation with sensitizes nerve, leading to increased pain. Innervation can also accompany vascularization of the articular cartilage, where compressive forces and hypoxia may stimulate these new nerves ,causing pain even after inflammation has subsided (Bonnet & Walsh, 2005). Many studies have shown that psychosocial factors influence the perception and expression of pain in OA.

The characteristic of pain is deep pain inside the knee which is relieved by rest and worsened by activity or undue stress on the joint. Some patient has a localized pain in specific area of knee. The patients with chronic of OA, pain intensity is more severe until having pain at rest or little movement or eventually during sleeping. Some patients have an experience of pain which extends to hip or thigh. There is no correlation between pain intensity and x-ray findings, but the patient with greater change of knee in x-ray photography is more susceptible to have more pain (Laohalanu, 2003). Knee pain is the better indicator of knee functional status and pathological status than x-ray photography evident (McAlindon, et al., 1993; Clare, et al., 2002; Pual & Kenneth, 2003).

1.3.2 Stiffness of knee is also often found. Many patients sense stiffness, particularly on the first arising from prolonged inactivity. This related to the local edema of the capsules tissues, which accrues from the inflammatory response in the absence of mechanical stresses on the capsule during rest. In early stage there are periodically occurrences of knee stiffness while the stiffness is relieved during mobility activities, but in later stage stiffness of knee is longer and more severe especially in the morning. However, the morning stiffness in patient with OA occurs less than 30-60 minutes while the stiffness of rheumatoid arthritis takes more than 1 hour (Laulenu, 2003). During the early stage of OA, many patients describe improved joint flexibility and decreased pain after the first few steps as the pericapsular edema is decreased by their activities. Stiffness after periods of rest or inactivity (articular gelling or gell

phenomenon) is also characteristic of OA but typically resolves within several minutes. The early pain and stiffness of OA stem not from the primary disease itself but from the secondary effects of synovitis, joint capsule distention, bony proliferation, and damage to adjacent articular structures.

1.3.3 Decreased joint motion or limited range of motion (ROM), continues to decrease with disease progression; may be due to damage or loss of articular cartilage causing incongruous joint surfaces, muscle spasms, shortening of ligaments, fibrosis of capsule or joint contracture and osteophytes. Loss of articular cartilage and subchondral bone can lead to joint subluxation and deformity.

1.3.4 Tenderness in the joint, in the early stages of OA, firm palpation can produce medial joint line tenderness in the knee because the weight bearing is on the medial side of knee joint that produce the OA more common on medial side than lateral side (Mcalindon, et al., 1993). There may also be bony swelling and deformity of the joint as genu varus or genu valgus, perhaps a sign of advanced OA.

1.3.5 Instability is a late sign due to the deformity of the joint and physiologic changes to the joint and periarticular structures with laxity of collateral ligaments as well as due to general muscle weakness. Instability or unstable gait can increase risk for falls or fear of falling (Laulenu, 2003). This fear can lead to marked restriction of activities. Crepitus occur as a coarse sound when the irregular joint surfaces move against each other. In the patient with inflammation (synovitis) of knee was presented with warmth, and joint effusion.

The study revealed that there were pathological changes in x-ray photography of knee in 30% of patients aged over than 65 years, and 40% of patients with existing OA of knee were found pathological change in x-ray photography (Mao-Hsiung, 2003). Late in OA, changes are easily observed on x-ray. The typical x-ray appearance of OA is characterized by a narrow joint space caused by erosion of cartilage, subchondral bone sclerosis and formation of osteophytes or bone spurs. The subchondral bone cyst can be found 15 % of cases.

Recently, American College of Rheumatology recommended diagnosis criteria of osteoarthritis of knee as follows;

1. Knee pain suffered almost everyday in the past 1 month , and
2. Osteophyte was found in knee x-ray photography , and

3. Age more than 50 years , or
4. Feel of crepitus when pressing or when move the knee , or
5. Knee stiffness less than 30 minutes in the morning.

The above diagnosis criteria have 91% sensitivity and 86% specificity (adapted from Altman R. cited in Laulenu, 2003).

1.4 Factor Related to Osteoarthritis of Knee

1.4.1 Age

According to epidemiology survey in 1998, age was the most important factor relate to OA of knee (Lawrence, et al., 1998). OA increases in incidence after the age of 50 years. The older articular cartilage contains proteoglycan with decreasing shorter and shorter glycosaminoglycan, increasing hyaluronic acid but have shorter length, the broken protein chain, thinner collagen fiber with change of elongation property. Coincidentally, the older people has less artery in subchondral bone, as a result, recovery of damaged connection area between articular cartilage and subchondral bone is reduced, which lead to more susceptible to OA of knee. In some case, the patients may have met knee accident when they were young but the symptom of OA start to exhibit in the older of age.

A lot of studies concluded that age is an important factor related to OA of knee. Felson reported the incidence of OA of knee in the aged of 65-74 years was 30 % and more than the aged of 75 years was more than 30% and found that the incidence was higher in female than male (Felson, et al., 1987). The latter study of Felson revealed that the incidence of OA of knee in the aged of younger than 30, 40 and older than 50 years was 1%, 10% and more than 50% respectively (Felson, et al., 1990).

According to study by National Health and Nutrition Examination Survey, the incidence was less than 0.1% in the aged of 25-34 years, and increased the incidence to 10-20% in the age of 65-74 years. American woman had double incidence compared with Caucasian woman (Davis, et al., 1991). Many studies reported the incidence of OA of knee in the elderly which the aged more than of 80 years almost 100% had some deterioration of articular cartilage, 80% had OA evidence illustrated by x-ray photography for at least 1 joint, 40% had experienced of joint pain, and 10% had restriction in joint motion due to pain (Loeser, 2000).

1.4.2 Gender

Before the age of 50, men are affected more often than women. Incidence of OA in person older than the age of 50, however, is twice as great in women (Kee, 2000). OA of knee is found more in female while OA of hip is more common in male. OA can occur in every part of knee which is found the irregularity at medial femorotibial 75%, lateral femorotibial 26%, and patellofemoral 48%, (McAlindon, et al., 1993). In female, the incidence of OA of knee is increased 20% per 5 year age increase (Hart & Spector, 1999). As age and gender have effect to OA incidence, estrogen hormone level may have important effect to incidence in female which is presumably due to decrease of estrogen hormone in menopause female which has effect in preventing deterioration of articular cartilage and the exhibited symptom is more severe (Sharon, 1994; Felson & Nevitt, 1998; Carol, 2001; Dottie, 2002; Jane, 2003). According to the collected data in epidemiologic study both feed forward and backward controlled by using symptoms or x-ray photographic evaluation in diagnosis, the female who received estrogen hormone had the lower incidence rate of OA of knee than the female who did not received additional estrogen (Felson & Nevitt, 1998).

1.4.3 Body weight or joint loading

The most important modifiable risk factor for developing OA is obesity (Messier, et al., 2005). The studies have shown that obesity contributes 21% to the risk of OA of knee. Normally, articular cartilage can withstand 200-800 pound force/square inch of compression pressure. If higher compressive pressure exert on articular cartilage, it can be damaged (Suthas Na Ayuthaya & Rujivetchpongsathorn, 1996). According to mechanical analysis of knee loading during normal walking, a force of about 3 times the body weight is transmitted through the knee. Force is unevenly distributed, with a large amount transmitted to medial side of the knee. Going up and down stairs increases the force transmitted through the knee to approximately 4-5 times body weight (Roberts & Lappe, 2001). Increase of 0.5 kilogram body weight can increase 1 to 1.5 kilograms force acting on knee. The force exerts on medial compartment is 2.5 times greater than the force exerts on lateral compartment of knee. As a result, OA usually starts more in medial compartment than in lateral compartment. From the above reasons, increase of body weight can increase the risk of OA of knee (Morrison, 1970). As the structure of knee is comprised of the end of three bones

wrapped with connective tissue, the instability of force balance and angular stress can easily occurs. The force acting on knee is comprised of three forces which are the force from body weight, force from contraction of knee surrounding muscle, and acceleration force due to knee motion such as walking or running. As a result, stability and strength of knee depends on strength of connective tissue, knee surrounding muscle and degree of external force acting on the knee.

Force from body weight exerts on the knee can be estimated from Body Mass Index (BMI) which can be calculated by body weight in kilogram divided by square of height in meter. The normal BMI range between 20-25 kg/m², if the calculated BMI is higher than 25 kg/m² such person is overweight and higher than 30 kg/m² is obese. Overweight has direct relationship to incidence of OA of knee (Felson, et al., 1997). Weight change significantly affected the risk for the development of OA of knee. For example, a decrease in BMI of 2 units or more (weight loss 5.1 kg) over the 10 years before the current examination decreased the odds for developing OA by over 50 %. Weight loss could prevent the onset of symptoms in those who already had radiographically confirmed disease, or it could prevent the codevelopment of radiographic changes and symptom (David, 1992; Felson, et al., 1992).

According to a study on overweight woman, mean age was 53.3±5.88 years, the risk of incident knee osteophytes increased by 30% per 5 kg increase in weight and overall risk of OA defined by osteophytes increased by 20% per 5 year age increase (Hart, et al., 1999). Chalamnuay (1998) reported incidence of OA of knee with BMI more than 25 (overweight) was 38.7% but BMI less than 25 the incidence was 23.8%. Supatrapan (1992) reported overweight increase the risk of incidence of OA especially in woman. The increasing weight can increase the force action on knee. Increasing in weight by 20 kilograms has the risk for OA of knee 3.5 times more than average. The more body weight of person, the more risk to have OA of knee (Felson, et al., 1988; Schouten, et al., 1992).

Consistent with previous reports, increased body weight was associated with radiographically defined incident knee OA in women, in whom the association was highly significant. The relationship between weight and OA is more clearly seen in woman rather than man, which used to presume that metabolism may take part in the mechanism of incidence. However the controlled study on the metabolism factor did not

affect the relationship between overweight and OA of knee. In patients with OA of knee, the bodyweight can increase which can be explained by the knee pain cause the patient more difficult to move then lead to body weight increase. Weight reduction can decrease the risk of OA, weight reduction of 5 kilograms or more can decrease the risk of OA of knee 50% (Felson, et al., 1992). Paul & Kenneth (2003) reported that incidence of OA decreased 25-50% by weight loss. The pathological condition of OA knee can be improved as a result of weight loss (William & Foulsham, 1981). Both the American College of Rheumatology and the European League Against Rheumatism recommend weight loss and exercise to reduce the painful and incapacitating symptoms of OA of knee. According to study from Wake Forest University found that an average weight loss of 5% in overweight and obese older patients brought an 18% gain in overall function and found a significant association between weight loss and reduction in compressive knee-joint loads. In fact, the force reduction was 4-times greater than the actual weight reduction. In other word, the finding indicated that, for every 1 pound of weight lost, there is 4-pound reduction in the load exerted on the knee for each step taken during ADL. The accumulated reduction in knee load for a 1-pound loss in weight would be more than 4,800 pounds per mile walked. For people losing 10 pounds, each knee would be subjected to 48,000 pounds less in compressive load per mile walked (Messier, et al., 2005).

1.4.4 Occupation and various motion activities, for example, walking up, down stairs, or sitting on the floor with bending knee, can cause the abrasion of articular cartilage easier leading to OA of knee (Suthas Na Ayuthaya & Rujivetchpongsathorn, 1996). Cooper et al. studied the relationship between occupation and the incidence of OA of knee in 2,101 patients with OA of knee who aged over 55 years old and found that the occupation which require the worker to sit on the floor with flexed knee or kneeling on the floor longer than 30 minutes per day, or walk up/ down stairs more than 10 steps per day were the important causes of OA of knee (Cooper, et al., 1994). Athlete or sportsmen have a higher risk to get OA of knee. According to the study of Kujala et al. (1994), comparison between athletes and non-athletes clearly showed that the athletic group had OA in the younger age than non-athletic group and 25-30% of them could be prevented if avoiding repetitive strong force exertion activities on the knee such as soccer, ice hockey, basketball, boxing, weightlifting (Paul & Kenneth,

2003). Incidence of OA of knee is found more in the athletes who play more severe impact to the knee such as football or rugby than the sport with less impact to the knee (Lane & Buckwalter, 1993). However some daily exercise such as jogging did not increase the risk to get OA (Lane, et al., 1993). Greater incidence of OA has been associated with strenuous, high intensity, repetitive exercise. For example, research has demonstrates an increased risk for development of OA following involvement in competitive athletics that expose joints to high levels of impact and torsional stress, such as running, soccer, and football (Kee, 2000)

1.4.5 Malalignment or deformity of knee

malalignment of knee can cause more force exert on the specific area than the others. As a result such area can be more deteriorated than the rest, for example, in case of genu varus or genu valgus.

Knee laxity is a condition of more free motion than normal in axial or rotation direction of tibia and femur. Knee laxity can be divided into 2 types, the laxity along frontal plane or varus-valgus laxity and laxity along sagittal plane or anterior posterior laxity (Sharma, et al., 1999). Varus-valgus laxity is increased with the older age and found more in female rather than male. According to a study of Sharma et al., increasing of varus-valgus laxity occur prior OA of knee and may be the leading cause of OA (Sharma, et al., 1999). Anterior posterior laxity often occurs subsequently to OA of knee, which accelerates the severity of OA (Wada, et al., 1996).

1.4.6 Muscle weakness

The weakness of quadriceps muscle is often found in patient with OA of knee. Muscle weakness may occur due to knee pain which cause the patients avoid moving. Low levels of physical activity caused by difficulties in performing ADL may cause a viscous circle leading to further decline in strength and worsening of disability. A study of relationship between quadriceps muscle weakness and OA, was carried by inject a medicine at femoral which cause temporary impairment of quadriceps muscle. During the impairment the force acting on knee during walking is 2 times more than the normal magnitude when quadriceps muscle remains intact. So quadriceps muscle plays an important role in supporting the force acting on the knee. In long term study in comparison the strength of quadriceps found that the group which later got OA had significantly weaker quadriceps muscle than the normal group but there had been no

relationship found between hamstring weaknesses and OA (Slemenda, et al., 1998). It was concluded that quadriceps weakness is a primary risk factor for knee pain and progression of joint damage among patients with OA of the knee. There is a strong, highly significant negative correlation between body weight and extensor strength that is, the more obese the subject, the greater the reduction of quadriceps strength.

1.4.7 Medical disease

Medical diseases include gout, rheumatoid arthritis, genetic disease such as acromegaly or the disease involving irregularity of metabolism such as diabetes or original impairment of knee can lead to OA of knee (Bullough & Cowston, 1994; Bancroft & Pigg, 1998).

1.4.8 Accident

Direct injury to the knee or heavy repetitive stress exert on the knee continuous for a long time has been known to induce OA. The consequence of knee injury is biomechanical change in knee, which leads to biochemical change in articular cartilage (Suthas Na Ayuthaya, 1996). According to the previous studies, tear of anterior cruciate ligament or meniscus subsequently lead to OA, even the articular cartilage has not been damaged due to the accident. This change causes laxity of knee and easily leads to instability of knee which causes irregularity in force support and distribution of knee and deterioration of articular cartilage (Laohlenn, 2003).

1.4.9 Bone density

Bone density in patient with OA of knee is higher than the normal people (Gevers, et al., 1989). Bone density relates to incidence of OA. High bone density can presumably increase the force exerts to articular cartilage (Felson & Nevitt, 1998). According to previous studies, the high bone density client has a significantly high risk and high incidence rate of OA in hip joint, finger joint, and knee joint. In osteoporotic fracture research, bone density is increased 8-12% in female with OA of hip compare with normal hip (Nevitt, et al., 1995). The study at Framingham found that female with OA has a higher bone density (Hannan, et al., 1993) and found that even though the evidence of higher bone density related to increase the risk of OA but once the OA occurred, high bone density can prevent further development of symptoms of OA (Zhang, et al., 2000). Moreover, the patients who loss bone density after getting OA can increase the progression of OA.

1.4.10 Nutrition

From the evident that nutrition oxidant can cause age related disease such as OA of knee. Moreover, articular cartilage cell can generate oxidant which can destroy collagen and hyaluronic acid in synovial fluid (Hentorin, et al., 1993). So many scientists suggest that the anti-oxidant nutrient, such as vitamin C and vitamin D, can prevent OA.

According to Framingham's study, the person who consume high amount of vitamin C can decrease risk of OA as high as 3 times compare with low amount of vitamin C consumption (Mc Alindon, et al., 1996). Patient with OA of knee has less knee pain experience in high amount of vitamin C consumption than in low amount of vitamin C consumption. However, there is no relationship between amount of vitamin C consumption and condition of OA evidence from x-ray photography.

Vitamin D is the other antioxidant which has effect to articular cartilage. In person with low content of vitamin D can have the higher incidence of OA of knee. According to Framingham's study, the increase risk of rapid development of OA of knee is 3 times for low vitamin D consumption patient than high vitamin D consumption (Mc Alindon, et al., 1996). However, there is no relationship between vitamin D consumption amount and the incidence rate of OA of knee. But from the study in OA fracture research (Lane, et al., 1999) revealed that the positive effect of high amount of vitamin D consumption dose not only prevent development of OA but also prevent the incidence of OA or fracture.

According to the previous studies, there are many factors related to OA both controllable and uncontrollable. As symptoms of OA often appear as chronic and suffering knee pain, appropriate and effective pain management is therefore necessary. In this study, symptom management model of Dodd (Dodd, et al., 2001) was selected as conceptual framework for developing knee pain management, which concerns three main factors; personal factor, environment factor, and health & illness status factors related knee pain management.

2. Symptom Management Model (Advancing the science of symptom management: Dodd, et al., 2001)

Dodd and college at University of California, San Francisco (UCSF) School of Nursing Centre for System Management have tested the original Symptom Management Model (Larson, et al., 1994) and developed the Revised Symptom Management Conceptual Model which describes the three dimensions of model (symptom experience, symptom management strategies and outcomes), the relationships among these dimensions and the related domains of nursing science (personal factor, environmental factor and health / illness status factor).

The experience of symptoms, minor to severe, prompts the patients to visit their healthcare providers. Symptoms not only create distress, but also disrupt social functioning. The management of symptoms and their resulting outcomes often becomes the responsibility of patient and his or her family members. Healthcare providers have difficulty developing symptom management strategies that can be applied across acute and home-care settings because few models of symptom management have been tested empirically.

To date, the majority of research on symptoms was directed toward studying a single symptom, such as pain or fatigue, or toward evaluating associated symptoms, such as depression and sleep disturbance. In order to gain better understanding in symptoms, UCSF therefore proposed symptom management model for specific clinical service using well organized research knowledge and information in connection with the symptom and also providing information collection format to be used in developing symptom management model.

A symptom is defined as a subjective experience reflecting changes in the biopsychosocial functioning, sensations, or cognition of an individual. In contrast, a sign is defined as any abnormality indicative of disease that is detectable by the individual or by others. In the UCSF model, signs are incorporated when they are needed to assess disease status and to evaluate and verify the effectiveness of management strategies. Both signs and symptoms are important cues that bring problems to the attention of patients and clinicians. Ideally, patients should be taught the importance of signs, which may have little relevance to the layperson until their meaning and relationship to an underlying cause is understood. The absence of signs or symptoms, however, does not necessarily imply the optimal health and well-being of an individual.

According to symptom management model of UCSF, the effective management of any given symptom or group of symptoms demands that all three dimensions (symptom experience, symptom management strategies, and outcomes) be considered. However, the interrelatedness of these three dimensions of symptom management is rarely taken into account in research, even though its importance is acknowledged.

The three dimensions in UCSF symptom management model are symptom experience, symptom management strategies, and outcomes. From the earlier symptom management model of Larson to the developed symptom management model of Dodd, et al. (2001) (Figure. 2), the interrelationship between 3 dimensions have been developed by evidence and knowledge collected from UCSF research.

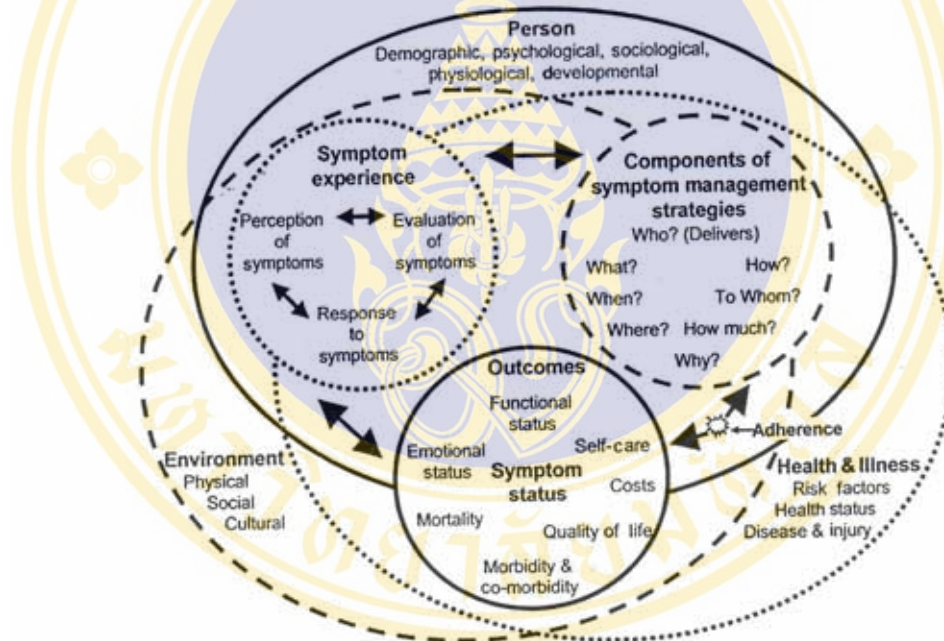


Figure 2 Revised Symptom Management Model of Dodd, et al. (2001)

Model Assumptions

The symptom management model is based on six assumptions:

1. That the gold standard for the study of symptoms is based on the perception of individual's experiencing the symptom, and his/her self-report.
2. That the symptom dose not have to be experienced by an individual to apply this model of symptom management. The individual may be at risk for the development of the symptom because of the influence (impact) of a context variable such as a work

hazard. Intervention strategies may be initiated before an individual experiences the symptom.

3. That nonverbal patients (infants, poststroke aphasic persons) may experience symptoms and the interpretation by the parent or caregiver is assumed to be accurate for purposes of intervening.

4. That all troublesome symptoms need to be managed.

5. That management strategy may be targeted at the individual, a group, a family, or the work environment.

6. That symptom management is a dynamic; that is, it is modified by individual outcomes and the influences of the nursing domains of person, health/illness, or environment.

The domains of nursing science as they relate to the model

In the revised model the recognized domains of nursing science comprise of personal, environmental and health/illness status domain

Personal domain:

- Personal variables are comprised of demographic, psychological, sociological and physiological which are intrinsic to the way an individual views and responds to the symptom experience.
- Developmental variables include the level of development or maturation of an individual.

When the model is used, person variables may be expanded or contracted depending on the symptom(s) and the population of interest.

Environmental domain: The environment refers to the aggregate of conditions or the context within which a symptom occurs; that is, it includes physical, social and cultural variables. The physical environment may encompass home, work, and hospital. The social environment includes one's social support network and interpersonal relationships. Cultural aspects of the environment are those beliefs, values and practices that are unique to one's identified ethnic, racial, or religious group. According to Dodd, et al. (2001), the setting where symptoms are experienced affected both selection of management strategies and outcomes. For example, being housed in a temporary shelter has a marked impact on the person's perception of fatigue, sleep and outcomes.

Health and illness domain: The domain of health and illness is comprised of variables unique to the health or illness state of individual and includes risk factors, injuries, or disabilities. According to Dodd, et al. (2001), variables included in the health and illness domain have direct and indirect effects on symptom experience, symptom management strategies and outcomes. For example, different types of pulmonary disease produce quantitatively and qualitative different experiences of dyspnea.

Individuals may be at risk for symptoms related to such environmental factors as occupational hazards, or from the side effects of treatment for a disease or condition, or as a result of symptom sequelae that are associated with the persistent primary symptoms of disease. These symptoms can be anticipated, prevented, or diminished through intervention. For example, many ergonomic hazards can be identified, measured and corrected to prevent musculoskeletal symptoms. In addition, the model allows for the assessment of factors that may influence the perception, evaluation and response of an individual at risk for potential symptoms.

In summary, in the revised model, the three domains of nursing science (person, environment and health / illness) affect and modify all three dimensions of the UCSF symptom management model.

The three dimensions of symptom management model

1. Symptom experience

The symptom experience includes an individual's perception of symptom, evaluation of symptom and response to symptom.

1.1 Perception of symptoms

Perception of symptoms refers to whether an individual notices a change from the way he or she usually feels or behaves. Perception is a conscious, cognitive interpretation of information gathered by the senses in the context of a particular environment or situation. Recent advances in brain imaging (i.e. positron emission tomography and functional magnetic resonance imaging) make it possible to 'image' pain sensations. However, the technology required to perform these diagnostic pain tests is cumbersome and not easily adaptable to inpatient or outpatient assessments.

For a valid self-report of symptoms, the person reporting must be responding to a perception of a symptom. Rating scales, often used for quantification or characterization of symptoms, are inherently limited by boundaries imposed by the instrument, its measurement characteristics and the capacity of the person to report. According to Dodd, et al.(2001), the symptom experience (perception, evaluation, and responses) can be modified or influenced by the condition of the person and/or the treatment. Such a modification could be negative as well as positive. For example, critically ill patients on mechanical ventilation who receive paralytic agents to control ventilation are no longer capable of demonstrating behavioral responses to pain, yet they can still perceive the sensation.

The source of the report of symptom perception becomes more complex when viewed in the context of multiple perceivers. When the perceptions are congruent, then the management approaches will not conflict, but if they are not, then problems arise in devising an appropriate management solution. In some instances, technology provides useful means to describe a symptom experience when perception is subconscious. For example, using wrist actigraphy to quantitatively measure sleep in addition to self reports on sleep quality by patients who have a 'problems sleeping'.

According to the previous studies, variables that influence a person's perception of symptoms reflect biopsychosocial factors in three categories personal, environmental, and health/illness variables. Personal variables exist before the symptom, influence perception of the symptom, and, in turn, may be influenced by the symptom. The personal variables include demographic, psychological, sociological, and physiological. The basic demographic variables are age, sex, ethnicity, marital status, and financial status. Psychological variables include personality traits, cognitive capacity, and motivation. Psychological variables have been shown to be strong predictors of functional impairment and pain in patients with OA of the knee. The sociological category incorporates the family unit, culture, and religion. Physiological variables are rest and activity patterns, and physical capacity. Environment is the aggregate of conditions or circumstances within which a symptom is perceived. Environment includes physical, social, ethnic, and cultural variables. The physical environment includes home, work, and play. The social environment is one's social support network. Cultural aspects of the environment are beliefs, values, and practices.

The health/illness category is comprised of the variables unique to the health or illness state of an individual including risk factors, health status, and disease or injury. Risk factors can be behavioral hereditary and/or behavioral, such as a history of cigarette smoking. Health status incorporates physiological rhythms, bodily structure, and function. Disease and injury reflect acute and chronic deviations due to pathology.

1.2 Evaluation of symptoms

People evaluate their symptoms by making judgements about the severity, cause, treatability and the effect of symptoms on their lives. Evaluation of symptoms reflects a complex set of factors that characterized the symptom experience, including its intensity, location, temporal nature, frequency, and the associated pattern of disability. It also includes an individual's evaluation of the threat posed by a symptom, such as its danger or disabilities effect. Symptom experience is a subjective experience which depends on largely on how long the person experienced the symptom. The long symptom experience person can learn to adjust himself so that symptom perception may be discrete, subtle but fuller & richer expectation for symptom perception.

1.3 Response to symptoms

A person's response to symptom or symptom cluster includes physiological, psychological, sociocultural, and behavioral components. One or more of any of these responses may be seen with a single symptom. Understanding the interaction of these components of symptom experience is essential if symptoms are to be effectively managed. Physiological responses are physical manifestations of symptoms, such as heart palpitations, changes in respiratory rate, menstrual cycle events, or fragmented sleep. Symptom experience may be changed with time. Detection of symptom may be complex as the physical reaction or response of a person can be either increase or decrease. In order to evaluate symptom in community or group or health risk effectively, such evaluation should take into account the risk of symptom development, value estimation, and social process of the risk group. Organizational factors have to be analyzed for example; available resource, preventive action policy, and intervention focus in order to relieve the symptoms. Psychological responses are reflected in cognitive or affective changes, such as mood changes, decreased ability to concentrate, or altered self esteem. Behavioral responses are the objective expressions of a symptom and include verbal or social communication such as crying, yelling and conflicts, or

alterations in personal function including social withdrawal, change in patterns of sleep, or change in the role performance. One or more of these responses may be seen with any single symptom.

There are bi-directional relationships among the components of the symptom experience dimension. For example, both evaluation and response can modify perception. If an individual believes that the symptom has ominous significance, the perception of intensity may well be heightened. In the revised model of Dodd (Figure. 2), these processes are conceived to be iterative and may occur simultaneously. In addition, tradition and culture, extrinsically to personal factors, is an important component in the model. So, the model should include the evaluation of this specific characteristic to be used in strategy building for symptom management intervention in community. Understanding the interaction of these components of the symptom experience is essential if symptoms are to be effectively managed.

2. Symptom management and strategies

A basic assumption in the model is that all troublesome symptoms are in need of management, and symptom management should influence or control the symptom experience, not just symptom outcomes. The goal of symptom management is to avert or delay a negative outcome through biomedical, professional and self care strategies. Management begins with assessment of the symptom experience from patient's perspective. Assessment is followed by identification of the focus for intervention, implementation of interventions, and evaluation of outcomes and management process. Symptom management can include interventions aimed at one or more of the components in the symptom experience to influence one or more desired outcomes.

Symptom management is a dynamic process, often requiring changes in strategies over time or in response to patient's acceptance or lack of acceptance of strategy. The modified symptom management model take into account the question about what (direction of intervention), where, when, why, how much (magnitude of treatment), to whom, by which intervention. Researcher and health care personnel ask these questions to get the development and strategy planning for symptom management. As a result, new symptom management model can assist the study of specifying the good intervention for specific symptom relieve. This revised model changes the focus from individual to family member and healthcare personnel.

Successful symptom management requires a patient-family-clinician partnership. It is important to note that although the model was developed by nurses, this does not preclude its use by others. Most symptom management will involve, at the very least, a patient, nurse, and physician. Such a relationship is one in which the work of the provider complements that of the patient and family, encouraging and assisting efforts to prevent or management the symptom.

In current health practice, many symptoms are treated by simply prescribing medications. While controlling or decreasing a symptom, such interventions may give rise to additional symptoms. Therefore, it is essential that symptom management include medications when appropriate but also other controls that fit within the context of the situation.

3. Outcomes of symptom management

Outcomes may be the result from symptom experience and/or symptom management strategies of the patient. In the revised symptom management model, outcome are conceptualized as multidimensional indicators including: symptom status, self-care ability, economic status, morbidity, mortality, quality of life, health service utilization, emotional status, functional status, financial status, and medical service fee as in the original model of Larson et al, but adding compensation for inability to work. Symptom status is central and the other dimensions are related. Symptom status may affect one's functional or emotional state, self-care ability, healthcare utilization, financial status or quality of life, and may result in increased morbidity or mortality. Financial status may affect the symptom outcome by the simple fact that an individual does not have the financial resources to pay for the most desirable symptom management approach. For example, a medication that effectively controls a symptom may be unrealistic for some patients because of its cost. If an individual does not have the money to pay for it and his or her healthcare insurance carrier will not cover such costs it may become necessary to rely on other treatment strategies instead. Maintenance of patient's functional status to a level where they can function independently is a desirable outcome. However, the realistic goal for many chronic debilitating symptoms will be to maintain the highest level of functioning possible. Quality of life for people experiencing symptoms is often variable. If a symptom is a minor problem for a patient, or the symptom is of short duration, the quality of life may

be unaffected. However, when a symptom is extremely problematic or prolonged, quality of life become a major concern.

In the revised model of Dodd, et al.(2001) there are no arrows indicating directionality between the multidimensional indicators and symptom status. Rather, all outcomes may be related to each other as well as to symptom status. The duration of symptom evaluation depends upon its persistence, need for continued intervention and response to treatment. When the symptom is successfully treated and completely resolved, the model is no longer relevant. But, if continued intervention is necessary to control recurring symptoms, then the model continues to be applicable and direct management and measurement of outcomes continues.

3. Knee Pain Management in Patients with Osteoarthritis of Knee

3.1 Experience of knee pain

The origin of knee pain is not from articular cartilage since there is no nerve fiber on it. The causes of knee pain are as follows;

1) Muscles, when knee received strong force, tissue and knee surrounding muscles are spasm for a longtime. Blood circulation in muscle is therefore inadequate resulting in retention of waste products and ischemia which activating pain receptor and increase reflex causing more muscle spasm. The muscles involved in knee pain are as follows;

- Hamstring muscles perform knee flexion function. When osteoarthritis occurs, hamstring work harder until having injury or inflammation. As a result, spasm of muscle occur and pain along the knee posterior muscle from lower thigh to upper calf area especially during sitting or standing (Tumaraswin, 1995; Guccione, et al., 1994)

- Quadriceps muscles perform knee extension function. When OA occurs, this muscle may have injury or inflammation. As a result pain and weakness can occur on the muscles which decrease knee extension ability especially during going up/down stairs. In addition, pain and inflammation cause the patient to avoid using quadriceps muscle, so muscle weakness is accelerated and finally the muscle become atrophy.

2) Higher pressure in subchondral bone area due to decreasing blood circulation (Bancroft & Pigg, 1998).

3) Tendon or fibrous capsule, as the deformity of knee occurs, tendon and capsule may be subjected to stronger force which resulting in pain (Bancroft & Pigg, 1998).

4) Cartilage debris floating in synovial fluid can activate synovitis and inflammatory substances which can activate pain

5) Osteophyte can irritate fibrous capsule and synovial membrane.

6) Articular cartilage cell destruction; when articular cartilage cell is destroyed, some enzymes are secreted which activates pain and inflammation (Bullough & Cowton, 1994).

According to the mentioned causes, knee pain is activated and caused difficulty in all knee motion activity.

Knee pain from OA can be also explained using gate control theory. After OA developed, knee function was changed as a result of injury or inflammation of the joint. These injuries or inflammations produce pain activating substances such as bradykinin, histamine, IL-1, IL-6 and prostaglandin. These substances then activate pain receptors at the nerve ending in knee surrounding muscle. The pain signal is then transmitted via nerve fiber both larger and smaller simultaneously to central nervous system in spinal cord. The pain signal was transmitted by smaller nerve fiber, A- delta, and C-fiber, simultaneously with pain inhibition signal transmitted by larger nerve fiber. The signals are transmitted to S.G. cell area which functioning like a key to open or shut the pain controlling gate in dorsal horn of spinal cord in order to adjust the magnitude of signals before transmit it to brain. If the magnitude of signal from larger nerve fiber is more than magnitude of signal from smaller nerve fiber, the signal which would be transmitted to T-cell was inhibited, so the pain is not perceived. On the other hand if the magnitude of signal from larger nerve fiber is less than that of smaller fiber, the signal is then transmitted to activate T-cell which relay the signal to brain and pain can be perceived (Lombardo & Wilson, 1997).

Physical response to pain of person depends on severity, memory, belief, and experience. Chronic knee pain from osteoarthritis is a pain that persists for at least 3 months. As the pain persists for a long time, response from autonomous nervous system

remarkably decreased or diminished, as a result in decreasing the pain threshold. This chronic pain directly affect limbic nervous system which regulate and motivate emotion, as a result, emotional stress induced physical symptom such as sleep disturbance, or paralyze, or mental symptom such as dizziness, decreasing of enthusiasm, anxiety or depression can be a consequence (Lodwing-Beymer & Huether, 1996; Lombardo & Wilson, 1997; Curtis, et al. 1998).

Factor related to perception and response to knee pain in OA knee patient

1. Gender

Gender related to knee pain incidence but the relationship is not straight forward. However, according to the study of prevalence of pain, knee pain is found increasing with age until 65 years old. In every age, female is found more prevalence of pain than male (Jaothakasetrin, 2004). Male is expected to be stronger and more tolerance than female so expression of pain in male may be less than female (Timby, 1995). Women have been shown to exhibit more pain behaviors than men and women use the coping strategy of catastrophizing more commonly. Women tend to use more emotion-focused coping strategies while men experience negative mood with increasing pain. Women will express more pain and functional impairment than men. Patients with stress or anxiety will express more pain and have disability perception than the normal group (Aaron, et al., 2004).

2. Age

Age related to pain perception. Older person has more deterioration of nervous system. So, pain may partly diminish at the older age (Jaothakasetrin, 2004). As a result, pain perception of the elder decrease, and also pain threshold increase due to longer experience. Elder may accept pain as normal situation, so, pain evaluation therefore lower than what it should be (Smeltzer & Bare, 1996). In addition, elder verbal expressions such as murmur or complain in lower level than the younger aged patient on the same intensity of pain. This may be due to confusion with pain, less attention on pain health problem, objection or hesitation to report the pain to other person as they are afraid of being burden to other (Puntillo, et al., 2003).

3. Physical condition

Fatigue from knee pain can cause muscle spasm which results in muscle fatigue. Pain can make a sleep-pattern disturbance that causes inadequate rest which subsequently decrease pain threshold (Puntillo & Tesler, 1993). There were many researches supported the relationship between pain, fatigue and sleep-patterns. For example, a study in patients with back pain reported the subsequent sleep-pattern disturbance and decreasing in pain threshold (Puntillo, et al., 2003).

4. Past history of pain experience

Any persons who suffer severe pain with inadequate intervention can have strong feeling and emotion to pain. When new pain is perceived the pain intensity is magnified and pain threshold is decreased (Davis & Sheely-Adolphson, 1997).

5. Beliefs

Person who believes in self-efficacy to control the pain and believes in pain intervention can control the pain intensity and increase his pain threshold (Wolff, et al., 1997). Sometime persons believe that every event relates to some supernatural being, for example, Buddhist believes in destiny, Christian believes in God, can increase their pain threshold and decrease their pain intensity. Self pain management mostly applies distraction technique, for example, audio listening relaxation, or imaginary technique. However these techniques are effective only with patients who fully believe that these techniques can decrease their pain intensity or believe that they are responsible for self-care to minimize their pain such as avoid sitting flat on the floor (Jaothakasetrin, 2004). The individuals with high in self- efficacy level have a higher threshold and tolerance for pain than the individuals with low in self-efficacy level.

6. Emotional status

Emotional status which is fear, anger, anxiety, depression, the persons who are in such negative emotional status can perceive more pain intensity than those who have not (Wolff, et al., 1997). On the contrary, pain may be activated from psychological dysfunction which is possible that patient may feel intense pain and perceive the injury, despite the fact whether tissues are damaged or not. Knee pain is therefore chronic symptom which corresponds to behavior, response and expression against the threaten incident rather than biological change of the body (Jaothakasetrin, 2004).

7. Social and cultural status

Different social and cultural status can have effect to different emotion, thinking and perception concerning pain (Puntillo, et al., 2003). For example, Thai culture is an oriental culture which has some different aspect to the other part of the world, for instance, female has inferior social status than male and though to be follower of male. This socio-cultural belief induced Thai female to express there though and action freely and independently. Thai female is more tolerance than male (Jaothakasetrin, 2004). In addition Poverty, inadequate education and uncomfortable living environment can make person more vulnerable to feel the pain, for example, coolies are more susceptible to have knee pain or back pain (Cunninghan & Kelsey., 1984 cited in Jaothakasetrin, 2004).

8. Climate variation

Change in temperature, atmospheric pressure, rain, humidity, storm, sunshine and pollens are sensitive to 80-90% OA patients however the descriptive study or predictive study can not clearly demonstrate their relationship. As well as the incidence rate of lumbar disc collapse which increase in winter and higher air humidity.

9. Behavior

Behavior relates to pain both in conscious and subconscious level. There are many ways to express the chronic pain including facial, gesture and motion expression depend on pain intensity. These responses to pain are varies, depend on behavior of each individual to perceive and ease their pain (Puntillo, et al., 2003).

3.2 Knee pain management strategies

Physical deterioration is a natural principle of human being, as well as most of OA of knee. In principle, most interventions of OA are focus on symptom treatment which can be divided to general treatment and localized treatment. The selection of treatment should be appropriate to the symptom of each individual patient. Although the treatment may not be able to inhibit the pathological condition but at least it can reduce the symptom. Most OA patients experience success with conservative disease management that includes physical therapy, pharmacological interventions, and self care modifications. Care is focused on helping the patient and family understanding the

disease process, the suggested treatments, and any necessary alternation in performance of ADL. The purpose of treatment in knee pain is as follows;

1. To educate the patient to understand the nature and extent of disease.
2. To enhance psychological condition of patient.
3. To relieve the patient's pain.
4. To relieve the joint inflammation.
5. To recover the joint to good condition and function.
6. To realign the deformity back to normal condition.
7. To improve the joint function.
8. To improve the patient's health status.
9. To train occupational therapy to the patient.

American College of Rheumatology (ACR) specified a guideline for OA therapy into 3 main methods as follows:

1. Non – pharmacologic therapy
2. Pharmacologic therapy
3. Surgery

1. Non – pharmacologic therapy

1.1 Educate the patient about disease/ lifestyle

Patients should understand that OA of the knee is an age-related disease which is a natural process of human being especially in the elderly. It is not severe and acute disease from sudden cause but gradually occurs due to long and heavy duty of knee. The explanation is given to patients that their knee will never be healed back to normal but the symptom, such as pain, can be managed. Education to patients, spouses and family can encourage all of them to find the best way to manage the pain. This education can be given by social support provider or telephone consultation. In order to control the pathological condition of OA, rest and exercise have to be done in appropriate proportion to yield better health condition. At the same time, the patient's mental health is also improved. Understanding the relationship between treatment methods, pain, and the most frequently performed activity, and the cyclic loads at the knee joint during walking are high. The factors related to worse the OA should be controlled and avoided such as going up/down stairs, overweight, kneeling or sit on the

floor. For the patients who have to stand or walk for a long time, periodically sitting for a rest is required (Paul & Kenneth, 2003). Fast and accurate self-care information transferred to patient is necessary. MacLean studied the result of education to patients with OA of the knee and reported that the patients have to be educated about the pathology of OA, concept of treatment, and self-care within 6 months after OA of the knee was diagnosis (MacLean, 2001).

1.2 Rehabilitation medicine treatment

Rehabilitation medicine treatment is the procedure comprising of physical therapy and occupational therapy. In principle, most of rehabilitation medicine comprises of the following interventions;

1.2.1 Rest; if patients have severe pain or inflammation, resting in bed may be required. However, some people need only a short period of rest. In such severe case, resting of the knee is necessary until the patients feel more comfortable. After the pain and inflammation was gone, the activity is then allowed. In chronic stage the pain comes and goes but not so severe at the early stage. In this stage, knee exercise is necessary to prevent muscle atrophy.

1.2.2 Therapeutic heat; the property of heat in relieving pain is that it increase metabolism which can change in autonomous nervous system response that can reduce the pain. In addition, as the heat cause vasodilatation, so more blood flow with carry nutrition, medicine and oxygen can reach the heated area. At the same time waste products from inflammation are released which can reduce nerve fiber irritation. As a result heat can directly and indirectly relieve the pain. Heat application can be divided into 2 types, shallow application; compressing with warm water, hydrocollator, and paraffin bath and deep application; using ultrasound, shortwave diathermy.

1.2.3 Immobilization using orthopedics apparatus; during severe OA, the patients often have severe pain and have to rest in the posture which can minimize their pain but often an incorrect posture. When patient have a rest in such posture for a long time until the inflammation has gone, the knee is stiff on such posture. For example if patient take a knee rest in flexion posture for a long time, the knee may be stiff in flexion posture. To prevent impairment and stiffness, the splint can be applied to adjust the knee to correct posture in combination with muscle exercise. The splint can be easily taken off after the pain is relieved.

Knee support is the other knee adjusting apparatus which can hold the knee in correct posture. There are many types of knee support such as knee elastic collar, knee support with/without lateral supporting rod. According to a study on effectiveness of knee support found that the patient with acute OA of the knee and wore knee support could go up/down stairs faster than controlled group, but after wearing knee support more than 8 weeks, both groups had equally better mobility of knee (Pajareya, et al., 2003).

1.2.4 Selecting appropriate shoes; Kerrigan, et al., studied wearing more than 5 cm. high heeled shoes (average 7 cm.) both needle heel and wide heel type. They reported walking wearing both type of high heeled shoes in comparison with bare foot walking and found that needle heeled (average 1.2 cm. heel width) or wide heel (average 4.5 heel width) walking can results in force acting on medial compartment and patellofemoral compartment in significantly higher magnitude including more quadriceps muscle spasm than walking with bare foot (Kerrigan, et al., 2001). In addition, a person wearing high heeled shoes has to be in knee and hip joint flexion position with bending vertebrate which increase stress and accelerate OA of the knee.

Lateral wedge insole made of sponge can be inserted in the shoes to adjust the force magnitude and direction acting on the knee especially the patient with OA of medial compartment of knee. In the year 2002, Kerrigan, et al., studied 15 samples who suffered knee pain due to OA on medial compartment of knee which at least level 3 of Kellgren & Lawrence's OA severity scale were evidenced in X-ray photography. They compared the outcome of wearing shoes without adjusting insole and with adjusting insole by lateral wedge insole with the inclination angle 5 and 10 degrees or with full plate insole thickness 1/8 and 1/4 inches. They reported significantly decrease of peak knee varus torque when inserting lateral wedge insole of the both degrees, however, velocity and step width of walking were indifferent among all type of insole (Kerrigan, et al., 2002).

In the year 2000, Toda, et al., performed an experiment by wearing a wedge insole with subtalar strapping in the figure of 8 to patients with OA and genu varus of knee for 8 weeks. They reported decreasing of tibiofemoral angle and also reduce the pain after wearing such wedge insole (Toda, et al., 2000).

In 2002, Toda and Segal studied in 88 female samples with OA of the knee by dividing into 2 groups; the first group wore lateral wedge insole with subtalar strapping, the other group wore lateral wedge insole with angle supporter. They reported the confirmation of previous study that wearing wedge insole can decrease peak knee varus torque so it can help reducing the pain intensity and slow down the deterioration of articular cartilage.

1.2.5 Physical modalities; Osiri, et al.(2000) reported significant pain relief from applying transcutaneous electrical nerve stimulation.

1.2.6 Therapeutic exercise; the important objective of OA treatment is pain control and deceleration of articular cartilage deterioration. Exercise was discovered to be a vital tool for OA of knee therapy. As therapeutic exercises strengthen the knee surrounding muscles which promote better knee function and also prevent knee stiffness. For the early stage OA of knee, isotonic exercise can promote better knee motion whilst isometric and resistive exercise can strengthen knee surrounding muscle. A study of therapeutics exercise outcome in patients with OA of knee totally 123 samples who regularly exercise the knee surrounding muscles in any type which are isokinetic, muscle-strengthening exercise, isotonic muscle-strengthening exercise, or isometric muscle-strengthening exercise with 1 year follow up period. They reported that pain reduction, increase of knee function measured by muscle strength measurement during knee flexion and extension and also increase walking endurance (Mao- Hsiung, et al., 2003).

According to systematic literature reviewed by Van Baar, et al. in 1999 upon the randomized controlled research work on the therapeutic exercise of 11 patients with OA of knee, the reduction of pain together with improving knee function was obvious in the patients performing aerobic exercise (Van Baar, et al., 1999).

Evcik & Sonel (2002) reported a comparison study between the group doing knee and muscle exercise at home, the group doing walking exercise 3 times / week, and a control group doing no exercise which each group contained 30 samples. After 3 months, knee pain significantly reduced in home exercise group and walking exercise group compare with controlled group. There was no significant difference between the home exercise group and walking exercise group. However the walking exercise group had significantly better score of Nottingham Health Profile Questionnaire (NHP) than

home exercise group. In summary, both home exercise and walking exercise were useful to OA of the knee patients (Ecvik & Sonel, 2002).

Fransen, et al. (2001) reported the exercise outcome of OA knee patients who did therapeutic exercise for 8 weeks. The sample can be divided into 3 groups, first group did exercise leaded by a physical therapist 1 hour/time, 2 times a week which comprising of thigh and calf muscle stretch, 20 minute static bicycling by maintaining heart rate at 50-60% of maximum heart rate and exercise quadriceps muscle. The second group did their home exercise by doing muscle stretch and walking or bicycling for 20 minute, 3 times a week. The third group was controlled group which were waiting to join the group exercise leaded by therapist. The results showed that exercise, no matter done in group or privately at home, can indeed reduce the pain, strengthen the muscle, and improve knee function and quality of life superior to the controlled group with no exercise and the good result sustained for at least 2 month after stopping exercise (Fransen, et al., 2001).

Kuptniratsaikul, et al. (2002) studied the outcome of OA of the knee patient's quadriceps exercise and good knee function care & practice education. The study revealed better muscle strength and ability to walk in longer distance of patients were achieved when patients participated in group exercises 2 times per week for two months. However, if the exercise was not maintained continuously for a long time, the muscle strength and function fell back (Kuptniratsaikul, et al., 2002).

1.2.7 Weight reduction

According to Chingford study, the female who had high BMI had higher risk of OA and had higher rate of OA of the knee evidence in X-ray photography for 8.57 times of normal and low BMI . Every 2 unit of increasing BMI (or increase 5 kg.) can find 1.36 time higher incidence risk of OA (Hart & Spector, 1993). When follow up this groups of patients, patients who had high BMI had a higher risk of getting OA on the other knee for 4.69 times than that of patients who had normal and low BMI (Spector, et al., 1994). These results were in consistent with Framingham Study on female OA of the patients which found weight reduction approximately 5.1 kg or at least 2 BMI units can reduce 50% of incidence risk of OA of the knee (Felson, et al., 1992). Weight reduction and diet control are therefore important for OA of the knee pain management. Weight change was correlated directly with the risk of OA.

1.2.8 Complementary and alternative care (Traditional medicine)

The patient can also learn to use nontraditional pain management strategies effectively; these strategies include relaxation techniques, guided imagery, therapeutic touch, self-hypnosis, and controlled rhythmic breathing. As OA of knee is a chronic disease, home care is predominated the total treatment time except for the case that disease become severe or some surgery is required where hospitalization care must be involved. Patient self care promotion for knee pain management providing many ways of self care is therefore favorable. The complementary and alternative care is a self care which recently more and more popular. As it causes less complication and less expense than conventional medicine treatment and also can be implemented in combination with conventional medicine to get better treatment outcome. The alternative cares which are relaxation technique, music therapy, acupuncture, and herbal use in various ways can be implemented in complementary care with conventional medicine, physical therapy, and good self care practice (Paul & Kenneth, 2003). In this complementary care, patients depend on themselves in providing symptom management and control. Medical expense can also be reduced since less hospitalization or hospital visit required. There have been many effective alternative cares for patients with OA of knee such as reflexology on foot which is applied for patient for 1 hour everyday had effect in knee pain reduction (Haera, 2003). Elderly patients with OA of knee who get knee pain can use acupuncture to reduce the pain, increase knee function, and increase feeling of happiness within the forth and eighth week with no report of any complication after twelfth week (Berman, et al., 1999). Warm compression or warm herbal compression can also reduce knee pain and knee stiffness in patients with OA of the knee. Warm herbal compression can yield better result in reducing pain than warm compression (Suwan, 2000).

Gail, et al.(2000) studied complementary care in 83 patients with OA of the knee by the complementation of manual physical therapy in knee, ankle and hips with exercise compare with the manipulated group who received ultrasonic massage on the knee at a subtherapeutic intensity for 2 times a week for 4 weeks. For the complementary care group, the ability to walk for 6 minutes increase for 12% after 4 weeks and 13% after 8 weeks with decreasing knee pain and stiffness and increasing function of knee compare with ultrasound manipulate group. According to WOMAC score, 55.8% increased compare with ultrasound manipulated group. After 1 year

WOMAC score of complementary care group was still higher than ultrasound manipulated group. More important, 5% of the patients who had complementary care received artificial knee replacement surgery, whilst 41% of ultrasound manipulated groups received artificial knee replacement surgery.

Ge Wu, et al., (2002) studied effect of Tai Chi exercise in elderly patient for 3 years. They reported increasing patients' muscle strength, extension ability, and ankle pivoting ability as a result of Tai Chi exercise.

Thai massage also has effect in decreasing knee pain in elderly patient with OA of the knee. According to a study, knee pain significantly reduced after Thai massaging treatment ($P < 0.05$), and the Thai massage treatment group has significantly reduction of knee pain in comparison with controlled group without Thai massage treatment ($P < 0.05$) (Karnrat, 2002). Massage does relax muscle groups and lower physiologic and psychological indicators of anxiety and depression (Hayes & Cox, 1999).

Treatment of knee pain is a chronic pain treatment which can not specify treatment procedure as of the other pain treatment. In present, there are a lots of pain reduction treatment method proposed such as medication, acupuncture, acupressure (Shiatsu), exercise, etc. (Gail, et al., 2002; Mao Hsiung, et al., 2003; Berman et al., 1999) since each patient and their pain are different in details. The purpose of these therapies is to reduce the pain. Sometimes these pain managements are not directly and promptly effective in the time required since it can not help the patients to do their required ADL. Acupuncture or acupressure reportedly may reduce pain by closing pain gates and by releasing endorphins. In contrast, personal belief, interpretation and expectation in pain relieving play more important role in pain management and can recover the patients until able to do their ADL and then able to earn and control their living. The first and foremost consideration in chronic knee pain management is to build an effective corporation and communication between patient and health care team (Jaothakasetrin, 2004). In addition, patients should understand and have some knowledge about medication treatment that if they receive non-medication treatment such as acupuncture, physical therapy, electro-activation therapy, or the other alternative medicine treatment, they should also know the reason of selecting such treatment. If one or many methods of the treatments are ineffective to manage the pain,

it doesn't mean that these methods cannot be used again. If there is any reason or indication in the future that such methods can be used in the future, it may be useful to use it again (Jaothakasetrin, 2004).

2. Pharmacologic therapy

Pharmacological therapy can be used for patients with OA of knee in a short period as analgesic and anti-inflammatory agents. The medicine used for knee pain management can be divided into 2 groups;

2.1 Simple analgesic agents ; usually used in patients with short period and low intensity of pain, such as patient with knee pain due to walking can recover after 2 day rest without walking. The analgesic drugs usually are Paracetamol 500 mg 1-2 tablet every 6 hours or Aspirin 1-2 tablet when having pain.

2.2 Anti-inflammatory medication; suitable for patient with severe inflammation and severe pain intensity or having fluid swell in the knee. The effective drugs are:

2.2.1 Non steroidal anti-inflammatory drug (NSAID) is a suitable drug for severe knee osteoarthritis with severe inflammation. The drug has good treatment effect and less gastric irritation than the abovementioned drug. The disadvantage of NSAID is its expensive selling price. Currently there are many NSAID commercially available. Selection of NSAID depends on convenience, economical consideration, and physician's treatment experience. Each patient may have difference response to one NSAID drug. It is recommended not to use two or more NSAID drug in co-medication since not only the treatment effect does not increase but also the increase of side effect and complication in GI tract including increasing rate of hospitalization and mortality (Gail, et al., 2000).

2.2.2 Steroid; can be injected directly to knee in case of very severe osteoarthritis and intolerable severe pain occurs. However the dosing quantity and frequency of steroid used should be cautiously controlled as it can damage articular cartilage.

3. Surgery

Surgical intervention is considered if the patient has unrelieved pain, especially pain that interferes with rest or nocturnal pain; diminished ability to perform ADL independently; and progressive loss of joint function despite maximal medical therapy.

Surgery depends on pathological condition and stage of disease. There are many method of knee surgery such as high tibial osteotomy, total knee replacement, and arthroscopic techniques. The average of patients having knee surgery is 65-84 years old, more in female than male. The cause of disease leading to knee surgery is degenerative OA for 90.9% and rheumatoid arthritis for 3% (Robert, 2002).

3.3 Knee pain management outcome concerning knee pain and functional status of knee in patient with OA of the knee.

According to revised symptom management concept of Dodd, et al. (2001), the outcomes of symptom management are conceptualized as 10 multidimensional indicators including: symptom status, self care ability, financial status, morbidity, comorbidity, mortality, quality of life, health service utilization, emotional status, and functional status.

In this study, researcher selected pain intensity and functional status of knee as outcome indicators. Pathological condition of OA started from deterioration of articular cartilage then it was broken into little pieces which cause rough surface of cartilage and narrowing joint space. As the osteophyte and fibrosis occurred, together with muscle spasm as a result of inflammation, knee pain and knee stiffness then takes place. Patient can hardly perform their daily living activity due to the enlargement of fibrous capsule which has an important function in knee mobility. As inflammation of knee spread, synovial fluid retained in knee joint cavity increase activates fibrous capsule to enlarge and growing thicker in order to maintain the knee range of motion. Subsequently, instability of knee and muscle contracture can take place which cause difficulty in ADL related to the knee.

Patients response to their stimulation based on their belief, and experience. For example, when patient starts moving their knee, they would get knee stiffness following with knee pain which suffer them both physically and psychologically. As a result, patients avoid moving their knee which decreasing knee motion activity. This behavior is called pain phobia. If such behavior persisted for a long time, fibrous capsule and tendon become atrophy and stiff, hamstring muscle spasm and quadriceps muscle weakness. The difficulty in doing knee related ADL was increased. In addition, the people surrounding patients such as family member, friend, and community neighbor

may ignore to correct such behavior or even believe that this is a correct behavior or even support this behavior by exclude the patients from social activities can cause lesser knee motion including no knee muscle exercise can deteriorate the knee function and cause more severe OA. Moreover, misunderstanding of surrounding people in patient's behavior can change the patients' role and status in family, community and social which can affect patient's psychological condition such as having depression or anxiety which worsen the OA of knee. The specific problem of patients with OA of knee comprises knee pain, knee stiffness, swelling, decreasing range of knee motion (Messier, et al., 1992; Clare, et al., 2002; Delores, 2000; Dottie, 2002; Jane, 2003), decreasing strength of surrounding knee muscle both hamstring and quadriceps (Nordejo, et al., 1983). The results of these symptoms are difficulty in doing ADL such as get up or sit on the floor, or walking up/down higher level (Mc Alindon, et al., 1993). These problems are significant and cause suffering to patient health both physically and psychologically. Finding appropriate symptom management strategies is therefore necessary before the OA is getting worse until the patients need total knee replacement surgery.

There are many pain management strategies which intend to relieve the pain and decelerate the development of OA of knee. These pain management strategy can results in increasing muscle strength and enhance knee functional ability in doing ADL. There was a study aimed to explain pain experience of patient with OA of knee during doing ADL of 70 male and 89 female with average aged 68 years old. The study found that ADL performance strongly relates to the following significant and vital variables; quadriceps muscle strength, knee pain, age, and the severity of OA of knee found in X-ray photography evidence (Mc Alindon, et al., 1993) which was in accordance with a study of Joneson, et al. (1996) who reported knee pain and age as the most significant variable relate to ADL performance. There are many researches reported the significant variable e.g. age, gender, BMI, and knee pain relates directly to knee-functional ability self evaluation score (Robert, et al., 2000). In addition, knee pain perception, knee stiffness, and strength of knee surrounding muscle are significantly strong predictors to functional ability of knee and specific motion ability such as walking whilst age and illness status are not a predictors of such relationship (Wolley, et al., 1998) According to study of predictive factor to the functional ability of knee in walking up/down higher level, get up/sit down higher seat; strength of quadriceps muscle, knee pain, body

weight, and acknowledgement of knee ability level were reported as a strong predictor to knee functionality in performing such four loading tasks (Robert, et al., 2000)

In patient with OA of knee, difficulty in doing ADL life is much more than normal people in terms of endurance and strength (Verbrugge, et al., 1991). The difficulty affected activity of patient with OA of knee is house working, shopping, doing hobby, travel to nearby place, social activity, interpersonal relationship in society, religion activity, occupation work, and recreational traveling, in addition, time consumed in doing house working, shopping and self cleaning significantly increased (Yelin, et al., 1992). This study reported similar result to the study in elderly patient with OA of knee that the elderly patients found difficulty in walking up/down stairs for 1 mile, house keeping, and lift a load (Guccione, et al., 1990) including getup/sit down a chair (Kee, 1998).

Nation Health and Nutrition Examination survey I (NHANES I, 1984, cited in Davis, et al., 1991) studied patient with OA of knee for total amount of 2,884 samples aged 45-74 years old divided into 45-54, 55-64, and 65-74 years old group, divided into male and female group, in comparison with non-disease group under the study period of 10 years. In studying relationship between OA and difficulty in ADL, female with OA were found having more difficulty in performing ADL than non-disease group in every range of age. Female were found having more difficulty in performing ADL than male. In studying relationship between OA and type of activities, long distance walking, short distance jogging, walking up/downstairs, get on/off a car, get up/down the bed, get up/sit down the chair, lift a weight, bend down and pick up a cloth from the floor were found difficult for both male and female patient with OA of knee.

Knee assessment in patient with OA of knee

Knee assessment is focus on measuring capability and difficulty of knee function in performing activity. In present, there is no standard measurement. However the knee functional can be assessed by;

1. Observing posture, flexibility and velocity in body motion, sitting, standing
2. Evaluate from physical capability e.g. maximum weight lifting, maximum number of stairs reached, and maximum distance of walking, by comparing with the

non-disease physical capability which can evaluate the patient's strength, endurance, and flexibility.

3. Measuring by instrument, e.g. measure range of knee motion by Goniometer.

4. Using self-assessment questionnaire; according to outcome measure in Rheumatoid Clinical Trail 3rd Conference (OMERACT III) in 1996, treatment outcome indicators in phase III clinical trail were prioritized. The selected indicators for OA of knee or hip were WOMAC or Lequesne Index (Belamy, et al., 1997) which assesses functional ability of individual patient. The information was acquired by verbal interview, written statement or answer the question in questionnaire which has been accepted as the most reliable tool. WOMAC is a specific tool for OA of knee or hip patient assessment which were developed by Bellamy (Bellamy, et al., 1988; 2002). In present, WOMAC is widely accepted in its reliability, accuracy, completeness, and sensitivity to change in assessing treatment outcome of clinical trail of OA. The questionnaire composed of 24 questions, 5 questions about pain (pain during walking, upstairs, sleeping in the night, sitting at rest, putting up weight), 2 questions about stiffness (morning and evening stiffness), 17 questions about physical activities (upstairs, downstairs, get up from chair, standing, bend down to the floor, walking of flat floor, get on/off a car, shopping, put on/off socks, get up bed, lie down bed, getting in/out bath tab, sit, sit down/get up toilet, house keeping) each question can be either VAS or Likert scale.

Summary: pain management in patient with OA of knee is studied in primary OA of knee patient which is natural process which no pre-evidence of knee irregularity or trauma. Factors related to OA of knee are genetic, increasing body weight, changes of hormone level in female and incorrect using of the knee. Knee pain is a leading symptom to visit physician incorporation with other symptom such as stiffness, contracture and swelling. In the early stage these symptoms have small effect to their ADL. However in the late stage it has more severe pain, and difficulty to perform ADL. Suitable pain management is therefore important and necessary in order to improve patient quality of life. Researcher hence studied pain management in patient with OA by adopting symptom management model developed by Dodd et al. as conceptual framework to study knee pain experience, knee pain management strategies, and knee

pain management outcome in terms of knee pain and functional status. As the studies of knee pain and functional status are rare in Thailand, the findings in this study were useful in developing the knowledge and information for; further nursing practice guideline development, future improvement of efficiency and capability of functional status in performing ADL, and for future research in OA of knee.



CHAPTER III

METHODOLOGY

This descriptive research was conducted to study knee pain management in patients with OA of knee by using the revised symptom management model of Dodd, et al. (2001) as a conceptual framework.

Population and Sample

The study population was both males and females patients with OA of knee visited orthopedic out-patient units of three hospitals, including Siriraj Hospital, Phramongkutklao Hospital, Bangkok Metropolitan Administration Medical College and Vajira Hospital. The study samples were recruited according to the following inclusion criteria.

1. Patients who were diagnosed as having one or both primary OA of knee by orthopedist.
2. Patients who experienced of knee pain more than 6 months
3. Patients never undergone knee surgery.
4. No symptoms that could have a communication barrier. Being able to hear, speak and understand Thai language
5. Patients who were willing to participate in the study.

Sample Size

The sample size was determined using the following formula.

$$n = (Z \alpha/2)^2 \sigma^2 / d^2 \text{ (Pocock, S.J., 1983 cited in Lerduktayamanee, et al., 2000)}$$

When n = required sample size.

σ = estimating value of standard deviation based

on literature review or pilot study done on the studied population.

d = allowable error of estimating different value between population mean and sample mean.

$Z_{\alpha/2}$ = standard score from standard normal distribution corresponding to reliability level.

A study done by Clair, et al.(2002) using of WOMAC SCORE to assess patients with OA of knee who never experienced knee surgery revealed that the mean of pain level among 2,876 samples was 6.57 (using visual analog scale), and standard deviation was 4.52.

For this study, the level of significant (α) was 0.05, the allowable error (d) was 0.9 and the standard deviation (σ) was 4.52.

$$n = \frac{(1.96)^2 (4.52)^2}{(0.9)^2}$$

$$n = 96.85$$

In this study recruited 100 patients, regarding the inclusion criteria to be a study sample.

Setting

The study settings were orthopedic out-patient units of three tertiary hospitals, Siriraj Hospital, Phramongkutklao Hospital, Bangkok Metropolitan Administration Medical College and Vajira Hospital. The criteria used to select the hospitals were;

- 1) Hospitals which were qualified with hospital accreditation standard,
- 2) Hospitals which had orthopedic specialists on duty to provide treatment to patients with OA of knee,
- 3) Hospitals which were approved as a qualified institute in orthopedic specialist training, and
- 4) The hospitals which provided care to at least 100 patients with OA of knee per week. The numbers of patients recruited from each hospital were as follows;

Siriraj Hospital	40 patients
Phramongkutklao Hospital	30 patients
Bangkok Metropolitan Administration Medical College and Vajira Hospital	30 patients

Research Instruments

The interview questionnaires used in this study were consisted of two parts (see detail in Appendix B).

Part 1: General information separated into three sections

Section 1: Demographic information including gender, age, body mass index, religion, marital status, education level, occupation, and income.

Section 2: Environmental factors including relationship with family members, neighbours, and colleagues.

Section 3: Health status and illness focusing on the history of knee injuries, duration of illness and continuity of receiving treatment concerning osteoarthritis of knee, and other life threatening diseases.

Part 2: Knee pain management of patients with osteoarthritis of knee separated into three sections

Section 1: Knee pain experiences of the patients developed by the researcher based on literature. It consisted of three main aspects.

1. Perception of knee pain consisted of four items; item 1st- 4th
2. Evaluation of knee pain, consisted of seven items; item 1st- 7th
3. Response to knee pain, which included physical, psychological, and social responses, consisted of 15 items; physical item 1st- 5th, psychological item 6st-11th, social responses item 12st-15th. The patients were asked to indicate the frequency of their responses to knee pain. The frequency was ranked in four levels;

	Response to knee pain	Score
Never	refers to patients had never responded to the knee pain	1
Occasionally	refers to patients were responded to the knee pain 1-3 times/week	2
Often	refers to patients were responded to the knee pain more than 3-5 times/week	3
Regularly	refers to patients were responded to the knee pain more than 5 times/week	4

The total score of response to knee pain was calculated by summing the score of patient's response in each item in this aspect. The potential range of score was from a

low of 15 to a maximum of 60. The mean score of response to knee pain could be interpreted as follows:

Mean	Interpreted of response to knee pain
1.00 - 1.75	None/least
1.76 - 2.50	Moderate
2.51 - 3.25	Severe
3.26 - 4.00	Very severe

Section 2: Knee pain management strategies of the patients developed by the researcher based on literature, including the interview questions concerning knee pain management strategies, frequency, and supportive persons, duration of practices. Frequency of pain management strategies were asked in this part. The meanings were as follow;

Never	refers to patients had never performed it before.
Occasional	refers to using that kind of management strategies to eliminate knee pain 1-3 times/week.
Often	refers to using that kind of management strategies to eliminate knee pain more than 3-5 times/week.
Regular	refers to using that kind of management strategies to eliminate knee pain more than 5 times/week.

Section 3: The outcome of knee pain management; the interview questions were applied from patients with osteoarthritis of knee evaluation by Suwan. (2000) which was developed based on Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC)-VA 3.0 of Bellamy, et al. (1988). In this study, the researcher adopted two main aspects of the instrument which were the questions relating knee pain, and functional status of knee. The researcher also modified the measuring scale from visual analog scale to numerical rating scale. Finally, this section consisted of 2 mains aspects as follow.

1. Knee pain level while performing various activities, consisted of 13 items.
2. Functional status of knee while performing various activities, consisted of 22 items.

The reliability levels of knee pain evaluation scale and knee functional status scale in patients with OA of knee by Suwan was 0.79, and 0.91 respectively.

In this study, the patients were asked to mark X to rate their level of pain on the scale (numerical rating scale, NRS), in the form of straight line 10 centimeters long. The zero (0) on the left end was referred to “no pain”. The higher the numbers were the severer the pain was. Therefore, the 10 on the right end was referred to “the severest level of pain”. The NRS was approved as one of the best pain measuring scales appropriate to use in adult and older adult patients (Mary & Camencita, 2004). In addition, it was granted as a reliable and practical instrument (Joathakasattrin, 2004) in the time of this research done. For functional status of knee was interpreted by using the score of difficulty in performing activities with the lowest score (0) was represented the highest or extremely high functional status of knee and highest score (10) was represented no or least functional status of knee.

Mean score interpretation

Aspect 1: Knee pain level while performing various activities

Mean	Interpretation of knee pain level
0.00 - 2.00	no pain, or pain at lowest level
2.01 - 4.00	mild pain
4.01 - 6.00	moderate pain
6.01 - 8.00	severe pain
8.01 -10.00	excruciating pain

Aspect 2: Functional status of knee while performing various activities

Mean	Interpretation of difficulty in performing activity
0.00 - 2.00	extremely high functional status of knee
2.01 - 4.00	high functional status of knee
4.01 - 6.00	moderate functional status of knee
6.01 - 8.00	low functional status of knee
8.01 -10.00	least functional status of knee

Instrument Quality Testing

The validity and reliability of the instrument implemented for collecting the study data were evaluated as follows;

Content validity

All parts of interview questionnaire including patients' general information, experience of pain management of the patients, and outcome of knee pain management of the patients were approved by six experts (see detail in appendix A). The six experts checked for the appropriateness and simplicity of the language used, as well as the completeness of interview content. The six experts consisted of 2 orthopedists, 1 physical-medical and rehabilitation expert (PM&R), 2 orthopedic nurse lecturers, 1 orthopedic nurse specialist. The researcher then improved the questionnaire according to expert's advices.

Reliability

After modifying the instruments as expert's advices, the pilot test of 30 patients who had the same inclusion criteria as the sample were carried out to evaluate the reliability of instrument. The data collection was performed at Siriraj hospital. The Cronbach's Alpha Coefficient was employed to determine the instrument reliability. The formula is as follow

$$\alpha = \frac{n}{n-1} \left[1 - \frac{\sum Si^2}{St^2} \right]$$

α = coefficient value

n = numbers of interview questions

$\sum Si^2$ = the sum of variance of the score in each question

St^2 = the variance of total score

In conclusion, the reliability of the questionnaire part;

Response to knee pain = 0.91

Outcome of knee pain management of both aspects were;

Knee pain level = 0.89

The knee functional ability of the patients = 0.78

Protection of Human Rights

Ethical issues were taken into account by the researcher to carrying out the study. The researcher was fully aware of the patient's rights as well as the potential

effects of the study on the samples. Therefore, when the process of data collection commenced, the research objectives and the application of data gained were explained to the samples. The researcher also informed the samples that the participation in the study was completely voluntary. Patients' agreement or disagreement to participation in the study would not have any effects on their treatment and care service quality. The information given was confidential, and was only be used for this study. The samples were informed that they had all the rights to ask any questions concerning the study. Informed consent was obtained from each sample once he/she had agreed to become a study sample.

Data Collection

The researcher solely collected the study data once the permission to enter the study settings and to carry out the study were achieved. The process of obtaining permission and collecting study data was illustrated as follows;

1. Researcher sent an introducing letter issued by graduate school of Mahidol university to the director of Phramonkutklao Hospital, to the dean of medical school of Siriraj Hospital and to the director of Bangkok Metropolitan Administration Medical College and Vajira Hospital.
2. Researcher submitted a letter to Ethics Committee of each hospital to ask for the permission to collecting data. (Ethics Committee of each hospital see detail in Appendix C.)
3. Researcher personally introduced self (researcher) and the study to the head of orthopedic units.
4. Researcher studied the profiles and history of patients with osteoarthritis of knee who reached the study inclusion criteria.
5. Researcher personally introduced self and the study objectives to the patients while they were waiting for receiving care at orthopedic units or after they came out from treatment room, asking the patients for their willingness to become a study sample, as well as informing them about their rights if they agreed to participate in the study regarding the consent form.
6. Researcher interviewed the samples once they signed the consent form; the researcher interviewed the samples at a private and quiet place where there was no

obstacles to stop the interviews with the aim to enhance the concentration of the samples on answering the interview questions.

7. Researcher provided the chances to the samples to ask any questions concerning the interview questions and the study during the interview process; the researcher informed the samples once it was their turn to see doctor (the researcher obtained the samples' queue information prior to interviewing them); this was done to eliminate the patients' worriness. The duration of each interview was approximately 25-30 minutes. However, if the samples wished to terminate the interview they could freely inform the researcher.

8. Researcher edited each answered interviewed questionnaire for its completeness; the data then was analysed according to statistic approaches.

Data Analysis

The data were analyzed by using a statistical analysis program following the steps indicated below.

1. The general information (demographic, environmental factors, and health status and illness) were analyzed by using frequencies and percentages.
2. The patients' experiences of knee pain were analyzed by using frequencies and percentages.
3. The knee pain management strategies were analyzed by using frequencies and percentages.
4. The outcome of patients' knee pain management; knee pain and knee functional status were analyzed by using means and standard deviation according to each interview question aspect and items.

CHAPTER IV

RESULTS

This study is descriptive research design. The objective was to study knee pain management in 100 patients with OA of knee who received medical treatment at orthopedics department of Siriraj Hospital, Phramongkutkhlaio Hospital, Bangkok Metropolitan medical college and Vajira Hospital from April to June, 2005. Researcher presents the results in table with explanation as follows.

Section 1: Demographic data (Table 1-3)

Section 2: Knee pain management in patient with OA of knee (Table 4-12)

2.1 Knee pain experience (Table 4-7)

2.2 Knee pain management strategies (Table 8-10)

2.3 Outcome of knee pain management (Table 11-12)

Section 1 Demographic Data

Table 1: Number and percentage of patients classified by personal domain
(N = 100)

Personal domain	Frequency	Percentage
Gender		
Female	87	87
Male	13	13
Age (years old)		
≤ 50	1	1
51-60	7	7
61-70	75	75
71-80	16	16
> 80	1	1
(min = 49, max = 81, $\bar{X}$ = 66.02, S.D. = 5.18)		
Weight (Kilograms)		
(min = 47, max = 81, $\bar{X}$ = 61.75, S.D. = 6.08)		
Height (Centimeter)		
(min = 150, max = 170, $\bar{X}$ = 156.95, S.D. = 4.65)		
Body mass index, BMI		
Underweight (< 20)	1	1
Normal weight (20 to 25)	36	36
Overweight (>25 to 30)	60	60
Obese (>30 to 35)	3	3
Very obese (> 35)	0	0
(min = 19.28, max = 30.76, $\bar{X}$ = 25.07, S.D. = 2.09)		
Religion		
Buddhist	91	91
Christian	8	8
Muslim	1	1

Table 1: Number and percentage of samples classified by personal domain
(N = 100) (continued)

Personal domain	Frequency	Percentage
Marital status		
Married	51	51
Widow/ separate/ other	38	38
Single	11	11
Education		
Not educated	2	2
Primary	77	77
Secondary	11	11
Diploma or equivalent	7	7
Bachelor or equivalent	3	3
Occupation		
Business owner	34	34
Employee	29	29
Agriculture	24	24
Government officer	10	10
No occupation	3	3
Source of income		
Son/ daughter/ relative	59	59
Saving money/ pension	20	20
Occupation	19	19
Spouse	2	2
Source of medical expense		
Reimburesement /social security	65	65
Universal coverage (30 baht program)	30	30
Son/ daughter/ relative	5	5

Table 1 showed demographic data in personal domain, revealed that most of patients were female (87%) and age more than 60 years old (92%). Most of patients (63%) had overweight. Most of them had low level of education (primary level) (77%) and Buddhist (91%). The study group had variation in occupation. Source of current income of samples was from descendant (59%) and from saving money (20%). Source of medical expense payment of samples was reimbursement from Social security (65%) followed by universal coverage (30%).



Table 2: Number and percentage of patients classified by environmental domain (N = 100)

Environmental domain	Frequency	Percentage
Live with		
Family (spouse/ descendant)	73	73
Relative	17	17
Alone	7	7
Friend	3	3
Relationship with family		
Good and strong relationship	92	92
Poor Relationship	8	8
Relationship with neighbors/ colleague		
Good and strong relationship	87	87
Poor relationship	13	13
Social support		
Yes	100	100
No	0	0
Source of social support*		
Family members	90	90
Nurse	84	84
Doctor	58	58
Friend	55	55
Relatives	15	15
Aspect of social support*		
Economic & resources aspect	74	74
Information aspects	73	73
Emotional aspects	64	64
Others	22	22

* One patient may have more than one answer

Table 2 showed demographic data in environmental domain, revealed that most of patients lived with family (spouse/ descendant) (73%) and had a good/strong relationship with family and also with neighbor and colleague 92%, 87% respectively. All of samples received social support, about economic& resources aspect, information aspect, information aspect, and emotional aspect 74%, 73%, and 64% respectively. There were many sources of social support, family member was the most common source of social support (90%) and nurses (84%).



Table 3: Number and percentage of patients classified by health and illness status domain (N = 100)

Health and illness status domain	Frequency	Percentage
Affected knee joint(s)		
Bilateral	88	88
Unilateral	12	12
Duration of OA of knee		
< 1 year	11	11
1-5 years	65	65
> 5 years	24	24
Continuous medical treatment		
Yes	85	85
No	15	15
Coincident disease*		
No	15	15
Yes	85	85
Hypertension	65	65
Hyperlipidemia	35	35
Heart disease	32	32
Diabetes Millitus	24	24
Gastritis	14	14
Chronic Obstructive Pulmonary Disease	3	3
Thyroid disease	2	2
Migraine	1	1

* One patient may have more than one answer

Table 3 showed demographic data in health and illness status domain revealed that most of patients had bilateral OA of knees (88%). Most duration of OA knee was less than 5 years (76%). Most of patients had continued medical treatment (85%). Most of patients had more than one of coincident disease (85%), with the most three common

coincident diseases were hypertension, hyperlipidemia and heart disease 65%, 35% and 32% respectively. Clinically, as demonstrated by the high degree of concurrent medical diseases in our samples, these medical conditions are likely to be coexistent.



Section 2 Knee Pain Management in Patients with Osteoarthritis of knee

2.1 Knee Pain Experience

Table 4: Number and percentage of patients classified by knee pain perception

Symptom perception	Frequency	Percentage
Pain perception		
Yes	100	100
No	0	0
Characteristics of knee pain*		
Lightning pain	60	60
Muscle pain	52	52
Throbbing pain	46	46
Dull aching pain	45	45
Sharp Aching pain	41	41
Burning pain	23	23
Other	22	22
Sign and symptom participated in OA of knee*		
No	0	0
Yes	100	100
Limited range of knee motion	100	100
Crepitus	62	62
Knee contracture	49	49
Muscle weakness	45	45
Swelling of knee	36	36
Referred pain to hip & thigh	20	20
Noticeable knee change*		
No	8	8
Yes	92	92
Genu varus	72	72
Shortening leg	42	42
Genu valgus	20	20

Table 4: Number and percentage of patients classified by knee pain perception (N = 100) (continued)

Symptom perception	Frequency	Percentage
The meaning of OA knee pain		
Degenerative process due to aging	36	36
Unrecoverable or chronic and severe	32	32
Unrecoverable or chronic and not severe	21	21
Recoverable disease and not severe	10	10
Life threatening disease	1	1

* One patient may have more than one answer

Table 4 showed that all of patients perceived their knee pain in various characteristics. Most of them suffered from lightning pain (60%). All of them had limited range of motion and also had deformities of knee such as genu varus (72%).

Table 5: Number and percentage of patients according to knee pain evaluation (N = 100)

Evaluation of knee pain	Frequency	Percentage
Cause of knee pain*		
Aging	94	94
Hard working	89	89
Overweight	75	75
Inappropriate activities	67	67
Genetic	25	25
Previous accident	23	23
Other	20	20
Severity of knee pain		
Much	52	52
Moderate	31	31
Very much	8	8
A little	5	5
Not at all	4	4
Aggravating factors increasing knee pain*		
Too much knee utilization	86	86
Lack of exercise	62	62
Stress	49	49
Incorrect body motion/posture	45	45
Cool weather	32	32
Unknown	21	21
Lack of continuous treatment	18	18
Food	16	16

Table 5: Number and percentage of patients according to knee pain evaluation (N = 100) (continued)

Evaluation of knee pain	Frequency	Percentage
Frequency of knee pain		
Regularly or chronic	79	79
Frequently	13	13
Occasionally	8	8
Duration of knee pain		
Less than 30 minutes	68	68
More than 30 minutes	17	17
Not exactly	15	15
Level of threatening or affecting ADL from knee pain		
Much	68	68
Moderate	17	17
Very much	7	7
Little	5	5
No	3	3
Outcome of threatening or affecting to ADL from knee pain		
Disturb to ADL	55	55
Need help from other in ADL	24	24
Can do normal ADL	15	15
Can not do ADL at all	6	6

* One patient may have more than one answer

Table 5 showed that most of patients had more than one cause of knee pain, aging as cause of knee pain (94%), followed by hard work (89%), and overweight (75%). More than half of patients had much pain. There were many aggravating factors increasing knee pain. Most of them were too much knee utilization (86%), followed by lacked of exercise (62%) and stress (49%). Most of patients had a regular or chronic

knee pain (79%) and also had knee pain less than 30 min (68%). The pain affected patient's ADL for 55%.

Table 6: Percentage of patients according to frequency of response to knee pain with physical, psychological and social domain (n=100)

Response to knee pain	Never (%)	Occasionally (%)	Often (%)	Regularly (%)
Physical				
Disability	0	2	36	62
Fatigue	6	56	33	5
Worse gaiting & balance	0	23	47	30
Change of sleeping pattern	16	53	23	8
Sexual activity disturbance	70	21	9	0
Psychological				
Bad mood, frustration, annoying	7	58	26	9
Decrease in tolerance, easily boring	28	53	15	4
Stress	19	62	16	3
Regret, hopelessness	23	63	11	3
Suffering	0	18	43	39
Guilt by fateful consequence	0	13	49	38
Social				
Depend on other's help	3	32	40	25
Decrease in role playing in family and society	24	63	12	1
Lower self-esteem	3	25	40	32
Hesitate to participate social activity due to image change	23	59	14	4

Table 7: Mean and standard deviation of response to knee pain of patients in total and per item of physical, psychological and social domain (N = 100)

Response to knee pain	Mean	S.D.	Interpretation
Physical			
Disability	3.60	0.53	very severe
Worse gaiting & balance	3.07	0.73	severe
Fatigue	2.37	0.68	moderate
Change of sleeping pattern	2.23	0.81	moderate
Sexual activity disturbance	1.39	0.65	none / least
Psychological			
Guilt by fateful consequence	3.25	0.67	severe
Suffering	3.21	0.73	severe
Bad mood, frustration, annoying	2.37	0.75	moderate
Stress	2.03	0.69	moderate
Decrease in tolerance, easily boring	1.95	0.77	moderate
Regret, hopelessness	1.94	0.68	moderate
Social			
Lower self-esteem	3.01	0.83	severe
Depend on other's help	2.87	0.82	severe
Hesitate to participate	1.99	0.73	moderate
Social activity due to image change			
Decrease in role playing in family and society	1.90	0.63	moderate
Total	2.48	0.71	moderate

Table 7 showed that patients responded to knee pain in total was moderate level. When consider in detail of each domain found that the physical response to knee pain as very severe level was disability, the psychological response to knee pain as

severe were guilt by fateful consequence and suffering, and the social response to knee pain as severe were lower self-esteem and depend on other's help.



Section 2.2 Knee Pain Management Strategies

Table 8: Percentage of patients according to knee pain management strategies (n=100)

Knee pain management strategies *	Occasional (%)	Often (%)	Regular (%)	Total
Rest	12	64	24	100
Medication	0	22	78	100
Massage	10	66	10	86
Knee supporting apparatus	0	6	60	66
Hot compression	2	3	59	64
Exercise	15	25	20	60
Cold compression	9	4	2	15
Herbal compression	4	1	8	13
Acupuncture	6	0	0	6
Meditation	0	4	0	4
Knocking with wooden stick	0	4	0	4
Acupressure	4	0	0	4
Relaxation technique	0	2	0	2
Tai Chi exercise	0	2	0	2

* One patient may have more than one answer

Table 8 showed that all of patients used combined strategies. Rest and medication were two strategies used by all patients. The most common pain management strategies which regular used were medication, knee supporting apparatus and hot compression 78%, 60%, and 59% respectively. The most common pain management strategies, which often used were massage, rest and exercise in 66%, 64%, and 25% respectively.

Table 9: Number and percentage of patients according to knee pain management / assistant personnel (N = 100)

Knee pain management / assistant personnel	Frequency	Percentage
Patient's self	100	100
Family member	85	85
Physician	64	64
Traditional practitioner	48	48
Other	15	15

* One patient may have more than one answer

Table 9 showed that all of patients managed knee pain by their self, followed by the other assistant personnel; family member, physician and traditional practitioner in 85%, 64%, and 48% respectively.

Table 10: Number and percentage of patients according to knee pain management / time for pain relief (N = 100)

Knee pain management / time for pain relief	Frequency	Percentage
15-30 minutes	64	64
31-60 minutes	16	16
More than 60 minutes	11	11
Less than 15 minutes	9	9

Table 10 showed that most of patients (64%) used 15 – 30 minutes to manage their knee pain. The minority of patients (9%) used less than 15 minutes to manage it.

Section 2.3 Outcome of Knee Pain Management

Table 11: Outcome of knee pain management as knee pain level on various activities (N = 100)

Activities lead to knee pain	Mean	S.D.	Intensity of knee pain level
Sit on the heels for a long time	9.33	0.95	excruciating
Sit on the heels for a moment	8.62	1.53	excruciating
Sit squat on the floor in a polite attitude	8.37	1.35	excruciating
Going upstairs	5.78	1.55	moderate
Stand up from sitting on a floor	5.56	2.09	moderate
Going down stairs	5.53	1.55	moderate
Going up slope	5.22	1.47	moderate
Bending to pick thing up from floor	5.04	2.04	moderate
Going down slope	4.98	1.43	moderate
Stand up from a chair	4.47	1.65	moderate
Walking on flat	3.90	1.69	mild
Sleeping at night	3.38	2.04	mild
Standing	3.10	1.89	mild
Total	5.64	1.63	moderate

Table11 showed that the total intensity of knee pain from various activities was moderate level. The first three activities which produced the excruciating pain were sitting on the heels for a long time followed by sitting on the heels for a moment and sitting squat on the floor with a polite attitude.

Table 12: Outcome of knee pain management as functional status of knee on various activities (N = 100)

Difficulty to perform activity	Mean	S.D.	Functional status of knee
Sit on the heels for a long time	9.37	1.03	least
Sit squat on the floor in a polite attitude	9.16	1.20	least
Sit on the heels for a moment	8.50	1.26	least
Cut toe nail plate	8.25	1.47	least
Heavy domestic duties	7.99	1.18	low
Bending to put on shoes /socks	6.91	1.97	low
Put on / off paints or skirt	6.77	1.54	low
Getting in/ out the car	6.71	1.41	low
Light domestic duties	6.16	1.41	low
Going up stairs	6.02	1.38	low
Walking with carrying thing	5.93	1.35	moderate
Bending to pick thing up from floor	5.85	1.42	moderate
Going down stairs	5.75	1.19	moderate
Stand up from sitting on floor	5.70	1.78	moderate
Going down slope	5.56	1.45	moderate
Going up slope	5.44	1.66	moderate
Lying supine on floor	4.98	1.39	moderate
Getting up from bed	4.97	1.81	moderate
Stand up from a chair	4.59	1.32	moderate
Walking on flat	3.97	1.37	high
Shower	3.57	1.43	high
Standing	3.40	1.52	high
Total	6.16	1.43	low

Table 12 showed that the functional status of knee in total was low. The first three of activities which caused most difficulty for patients to do or had least functional status were sitting on the heels for a long time, followed by sitting squat on the floor in a polite attitude, and sitting on the heels for a moment.



CHAPTER V

DISCUSSION

The results in this study were discussed according to the purposes of this study by using the symptom management model of Dodd, et al. (2001) as a conceptual framework as follows:

Section 1: Demographic data

Demographic data of the sample are classified in term of personal, environmental, health and illness status domains as follows:

Personal Domain, the researcher found that most of patients were female (87%), overweight (60%) and average age was 66 years old which was corroborated with the previous studies (Karnjanavorawong, 1996; Kuptniratsaikul, et al., 2000; Kuptniratsaikul, et al., 2002; Taecharatanamane, 2004). These factors were related to the OA of knee, particularly the obesity which was the most important modifiable risk factor in OA of knee (Merrier, 2005). Most of patients were Buddhist (91%) and had the ADL with knee in flexion position such as kneeling, sitting on the heels, and crawling. In addition, most of patient had education only Prathom 4 level (77%) and may be correlated with the poor understanding about the disease and management the symptoms. Most common occupations were trader, employee, and agriculturist 34%, 29%, and 24% respectively which were corroborated with the previous studies (Karnjanavorawong, 1996; Suwan, 2000; Taecharatanamane, 2004). These occupations could cause OA of knee, as these occupations required carrying heavy load associated with walking or standing for a long time. In this study found that all of factors as mentioned above had created a high compressive force on the knee joint which caused OA knee pain and was corroborated with the study of Karnjanavorawong (1996) which reported that the personal domain; marital status, educational level, and income, positive correlation to quality of life in patient with OA of knee. In contrast, age had negative correlation to quality of life in patient with OA of knee.

Environmental Domain, found that most of patients lived with family (73%) and most of them got their social support from family member (94%) and had good interpersonal relationship within family (92%) and to neighbor and colleague (87%). The most received social support was resource & expense (78%), information (73%), and emotion (64%). The person who received less social support tends to have higher rate of illness and mortality but person with high social support has better disease prevention and health promotion behavior such as regular exercise. The result of this study reflected the positive correlation between Thai social & cultural structure, and knee pain experience by providing interpersonal support sufficiently in resource, expense, information, and emotional support.

Health Status and Illness Domain, the result of this study showed that most of patients (88%) had bilateral OA of the knee which was corroborated with the previous studies (Taecharatanamane, 2004; Spector, et al., 1992). Most of patients (85%) had more than one concurrent medical disease which the most three common diseases were hypertension, hyperlipidemia, and heart disease in 65%, 35%, and 32% respectively. The result of this study revealed that the patients with bilateral OA of knee have more severity of pain and less to do activities than the patients with unilateral OA of knee. In addition, the patients who had multiple concurrent medical diseases can do activities less than the patients with one or less concurrent medical diseases which was corroborated with the previous studies (Dodd, et al., 2001). So, the health status and illness can affect to the knee pain experience by increase the knee pain perception and decrease their activity. The more concurrent diseases, the more increase in knee pain perception but the less in the activity.

Section 2: Knee Pain Management in Patient with Osteoarthritis of Knee

According to the symptom management model of Dodd, knee pain management comprises of knee pain experience, knee pain management strategy, and outcome of knee pain management with details as follows:

1. Knee Pain Experience

knee pain experience is comprised of the followings:

1.1 Perception of Knee Pain, pain perception dimension was the memory of pain which comprising of pain component, pain characteristics, intensity level, and ongoing of pain. Knee pain was individual experience which differed from one to

another due to complexity of nervous system mechanism relating to perception process. The result in this study showed that all of patients perceived their knee pain in various characteristics by most of them suffered from lightning pain (60%). According to the previous studies, OA of the knee normally occurs gradually as the age increase and its various signs and symptoms were associated with the pathological change and progression of disease. In the early stage, pain may either dull aching or throbbing pain. In the later stage, pain was more severe until intolerable or even during rest.

1.2 Evaluation of Knee Pain, most of patients had more than one cause of knee pain, the three most common causes of knee pain were aging (94%), followed by hard work (89%), and overweight (75%). From the person domain in this study found that most of patients had overweight, elderly and most common occupations requires carrying heavy load associated with walking or standing for a long time which created a high compressive force on the knee joint and produced the knee pain. More than half of patients evaluated their knee pain as much pain and could evaluate many knee pain aggravating factors. Most of these factors were too much knee utilization (86%), followed by lacked of exercise (62%) and stress (49%) which corresponded to the person domain mentioned earlier. Most of patients had a regular or chronic knee pain (79%) and also had knee pain less than 30 min (68%). In addition, the patients also evaluated that knee pain threatening their life in high level (68%) which disturbed ADL (55%) and need assistance from other person for ADL (24%) which corresponded to the environmental domain in this study that most of patients got the assistance or social support from their family member.

1.3 Response to Knee Pain, pain could affect to physical, psychological, and social domain. The patients responded to knee pain in summary of physical, psychological, and social domains was in moderate level. Physical response to knee pain as very severe level was disability, the psychological response to knee pain as severe were guilt by fateful consequence and suffering, and the social response to knee pain as severe were lower self-esteem and depend on other's help. There were relationship among pain, psychological or emotion and behavior response which effect to quality of life. The emotional expression of pain was mostly negative such as depression which would increase the severity to pain and disturb their quality of life as a vicious cycle which corresponded to study of Karnjanavorawong. (1966) which showed that knee pain have effect to quality of life.

2. Knee Pain Management Strategies are used to relief and to reduce negative outcome using multidiscipline biomedical professional strategies and self care. In this study, all patients used multiple strategies to control pain such as rest, medication, herbal compression, hot compression, cold compression, Thai traditional massage, acupuncture, meditation and Taichi. In order to get satisfactory result, the symptom management should be adjusted or modified dynamically in order to get the best possible outcome. The patient therefore uses multiple strategies which may be required from self learning or from other source of information such as health care personnel, family member, or other. The result of this study revealed that the persons assisting pain management were themselves (100%), family member (85%), conventional medicine physician (64%), and traditional medicine practitioner (48%). The result was corroborated with the previous studies (Ramsey S.D., 2001; Taecharatanamane, 2004) which revealed that 47% of patients utilized the combination Thai traditional therapy or alternative medicine. In addition, this study found that the pain management strategies used by all patients were rest and medication which was corroborated with the study of Suwanarach. (2001) which found that patient with OA of knee managed their pain by going to the hospital and rest their knee.

When considering frequency of knee pain management strategies, the first most frequency used strategy (78%) to reduce knee pain was medication because the patient believed that medication was necessary and could cure their pain but in fact the medication just temporarily relief the pain. Most of medications are effective with single pain manage the chronic pain (Jaothakasetrin, et al., 2004). The second most frequency used strategy (60%) to reduce knee pain was using knee supporter which was corroborated with the study of Pajaree (2003) which found that the patient with knee supporter could move only slightly faster than the controlled group. Reduction of force acting on knee was the other strategies to manage knee pain such as weight reduction and knee rest. Knee rest can reduce compression force acting on knee. During inflammation, patients should rest in the posture that relaxes fibrous capsule and connective tissue in order to minimize the force acting on articular cartilage (Dolores, 2000). The third most frequency used strategy to reduce knee pain was hot compression (59%) which was corroborated with the study of Suwan (2000) which

reported that the patients with OA of knee who used hot/herbal compression evaluated less intensity level of pain and difficulty level in activities than non user. Heat from hot compression could relax connective tissue around the knee which could reduce knee stiffness, decrease muscle spasm, decrease pain and inflammation and increase blood circulation.

3. Outcome of Knee Pain Management: Knee pain level and Functional status of knee

3.1 Knee pain level : In this study found that the first three of activities which produced most intensity of knee pain were sitting on the heels for a long time followed by sitting on the heels for a moment and sitting squat on the floor with a polite attitude that can be explained by those activities create the most compressive force on articular cartilage, which can damage the articular cartilage and release inflammatory mediators and increase intraosseous pressure which both stimulate synovial inflammation and pain receptors. These activities are associated with the person domain of these patients which found that most of patients in this study were Buddhist and had culture in performing ADL with knee in flexion position such as sitting on the heels, kneeling and crawling which aggravated both knee pain and the progression of disease.

For the patient's group with moderate intensity of knee pain found that the top five activities were going up stair, stand up from sit on floor, going down stair, going up slope, and going down slope which corroborated with previous reports (Morrison, 1970; Messier, et al., 2005) which can be explained by going up stairs can produce 4-5 times body weight compressive force on the knee, and going down slope produce 3 times body weight compressive force on the knee. This finding was associated with the patients in this study that most of them were overweight and had occupation that need to walk for along time or must going up/down stair for working.

Two activities with lowest intensity of pain were standing and sleeping at night because standing and supine produce the little compressive force on the knee and express with a low intensity of pain. Although in this study found that supine had intensity of pain just more than standing because of during sleeping the knee might be flexed or twisted and increased in subchondral pressure (Pinals, 1996).

The results of this study revealed that the activities which create the higher compressive force on the articular cartilage will produce the more intensity of pain. In fact, the more compressive force on knee joint, the more intensity of knee pain.

3.2 Functional Status of Knee: The results of this study revealed that the functional status of knee (as outcome of knee pain management) in various activities depended on knee pain level by the more knee pain on activities, the less functional status of knee which was corresponded to previous studies (Rejeski, 1998; O'Reill, 1999; Van Barr, 1998). The most three difficult activities to do by the patients were sitting on the heels for a long time, sitting squat on the floor in a polite attitude, and sitting on the heels for a moment respectively. For the activities which caused the patients to have a low functional ability include heavy loaded house keeping, bending for put on the shoe, put on/off pants, get on/off the car and going up stairs respectively, because these activities could be done by flexed knee so it had a high compressive force on the knee and stimulate pain which corroborated with the study of Erden Z who reported that the high pain intensity was found in knee flexion at 60 degrees and 90 degrees (Erden, 2003). In addition to knee pain, the patients in this study was elderly and may have difficulty to perform going up stairs and put the pants on due to the muscle wasting, muscle atrophy, and deformity which corresponded to the previous studies (Hurley, 1998; Robert, 2000; Woolley, 1998). For the activities which caused the patients to have moderate functional status were going down stairs, going down slope, and going up slope respectively and activities which could do it easy were walking on the flat, shower and standing respectively. Because there was a low level of knee pain during those activities so the functional status was high.

Conclusion: The results of this study revealed that the knee pain management outcome including intensity of knee pain and functional status to perform activities depend on the experience of knee pain and the management strategies used to control pain. Understanding all of the components of the knee pain experience and outcome help the patients and health care personnel to select the proper management strategies to reduce or control the pain and increase the functional status of patients by teaching them to avoid the activities that will aggravate knee pain and progression of disease such as sitting on heels, sitting squat on the floor in a polite attitude or going up stairs and use combine both conventional and traditional medicine such as rest and use

medication during inflammation and also advice them to reduce weight and exercise the quadriceps muscle which can be done by themselves at home.



CHAPTER VI

CONCLUSION

Summary of the Study

This descriptive research was conducted to study knee pain management in patients with osteoarthritis of knee (OA) by using the revised symptom management model of Dodd, et al. (2001) as a conceptual framework. Population in this study were patients with OA of knee receiving medical care at orthopedic out patient unit of three hospitals; including Siriraj Hospital, Phramongkutklao Hospital and Bangkok Metropolitan Administration Medical College and Vajira Hospital. The samples of 100 patients were recruited regarding to the inclusion criteria. The research instruments were interview questionnaires for demographic data and knee pain management which had reliability of the questionnaire for response to knee pain = 0.91, knee pain level = 0.89, and knee functional ability = 0.78. Data were analyzed by using a statistical analysis program for percentage, mean, and standard deviation.

The results reveal that most of patients have the intensity of knee pain in much level and all patients use combined both conventional and traditional medicine strategies simultaneously to manage pain, by rest and using medication which are appropriated to the much level of pain. In addition, they also use knee supporting apparatus, hot compression, massage, and exercise to reduce knee pain. In this study demonstrate that the patients will have the most excruciating pain when they sit on the heels for a long time which represent that the functional status to perform activities relates to pain experience or pain level. The findings in this study support the symptom management conceptual model of Dodd, et al. (2001) that there are relationship among the component of symptom experience, symptom management strategies, and outcome.

Recommendations

1. Recommendations for Nursing Practice

1.1 About Knee Pain Experience

1.1.1 Most of patients with OA of knee suffer a lot of pain and believe that the OA occurred from destiny; inherent natural response to one's past action. Health care personnel should inform patient's family member and relative to encourage patient to practice their self-care, e.g., exercise, weight control, also provide emotional support such as respectfulness, love, and care. Family member should also provide assistance in activity of daily living but should limit to unavoidable assistance in order to enhance the patient's self-esteem in doing their own activity of daily living as much as possible, family member should take care of accident prevention in case of patients have limited range of motion or problem in gaiting & balance. Family member's care and emotional support can encourage elderly patient to do their self-care which can lead to better quality of life.

1.1.2 Patients with OA of knee perceive their illness as a chronic pain with many characteristic of pain such as throbbing pain, burning pain, muscle pain, or severe pain. The patients evaluate many factors increasing intensity of pain, such as stress, too much knee utilization, and wrong posture. Health care personnel therefore should understand the nature of disease and should believe the patient's statement in describing their symptom and take parts in assisting and advising the patients appropriately for each individual patient. There are many knee pain management strategies which can be chosen appropriately for each patient whether from alternative medicine, traditional medicine, or conventional medicine. Health care personnel should continually educate and train themselves to be update for latest developed pain management strategy and the corresponding outcome, advantage and disadvantage in order to give correct and appropriate advice to each individual patient.

1.1.3 The patient suffering knee pain can have response in physical dimension to do the activities used to do such as gaiting & balance, psychological dimension such as suffering or guilt from fateful consequence, and social dimension such as self-esteem or feel of worthless. The correct information of osteoarthritis of knee and its pain should be publicly communicated including cause factors, sign and

symptoms by broadcasting in radio, television and brochure containing osteoarthritis and self-care practice information in order to promote health care promotion and prevention for OA, especially in elderly people. In addition, community nurse should be communicated in order to promote the OA care information during house visit in community.

1.2 About Knee Pain Management Strategies

1.2.1 According to study, muscle exercise among the patient with OA of knee was inadequate. Health promotion should cover exercise benefit communication in enhancing muscle tone and strength including developing exercise program especially designed for elderly self-care. In hospital, nurse should motivate patient to exercise their knee, for example, arrange musical rhythmic knee exercise before of after medical examination approximately 10-15 minutes and suggest the patient to do knee pain exercise any time they wish to avoid boring. Knee pain exercise is a long term prevention strategy to control the severity of OA. Beside, patients with OA of knee should be organized in group to share their experience.

1.2.2 All patients use rest and medication as pain management strategies. Obviously, the average age of patients is 66.02 years and most of them had life threatening disease e.g. heart disease, diabetes, hypertension, and gastric ulcer. It is therefore necessary for health care personnel to interview the patients' illness and medical record in detail as well as having sound pharmacological knowledge about pharmacology mechanism side effect and unwanted effect of each medicine in order to make effect and appropriate usage and suggestion.

1.2.3 Obesity is the most important modifiable risk factor to develop OA of knee and from this study found that most of patients are overweight and obese. We recommend the patient to lose their weight to reduce the symptoms, slow the progression of disease and to gain the better function in ADL.

2. Recommendations for Further Studies

2.1 Study the relationship among various factors affecting knee pain management in patient with OA of knee in personnel domain, environmental domains, health status and illness domain, management strategies and outcome of knee pain management.

2.2 Qualitative research approach was applied to study the detail of knee pain management strategies, e.g. traditional medicine strategies, conventional medicine strategies, response to knee pain in physical, psychological, and social dimension.

2.3 Comparative study the outcome of knee pain management, e.g. intensity of pain, functional status of knee using various strategies in different levels of pain intensity.

2.4 Comparative study the cost of each pain management strategies.



BIBLIOGRAPHY

- Aaron, Roy, K., Ciombor, & Deborah, M. (2004). Pain in osteoarthritis. *Medium and Health Rhode Island, Jul.*
- American College of Rheumatology Subcommittee on Osteoarthritis Guidelines (2000). Recommendations for the medical management of osteoarthritis of the hip and knee. *Arthritis Rheum*, 43(9), 1905-15.
- Assantachai, P., & Maranetra, N. (2003). Nation Wide Survey of the Health Status and Quality of Life of Elderly Thais Attending Clubs for the Elderly. *J Med Assoc Thai*, 86 (10), 938-946.
- Bancroft, D.A., & Pigg, J.S. (1998). Alterations in skeletal function: Rheumatic disorder. In C.M. Porth (Ed.). *Pathophysiology* (5th ed., pp.1121-1146). Philadelphia: Lippincott.
- Bellamy, N. (2002) WOMAC: A 20 years experimental review of a patient-centered self-reported health status questionnaire (editorial). *J Rheumatol*, 29, 2473-6.
- Bellamy, N., Kirwan, J., & Boers, M. (1997). Recommendations for a core set of outcome measures for future phase III clinical trials in knee, hip and hand osteoarthritis. Consensus development at OMERACT III. *J Rheumatol*, 24, 799-802.
- Berman, B.M., Singh, B.B, Lao, L., Langenberg, P., Li, H., Hadhazy, V., Bareta, J., et al. (1999). A randomized trial of acupuncture as an adjunctive therapy in osteoarthritis of the knee. *Rheumatology*, 38, 346-354.
- Bonnet, C.S., & Walsh, D.A. (2005). Osteoarthritis, angiogenesis and inflammation. *Rheumatology (Oxford) Jan*; 44(1), 7-16.
- Bullough, P., & Cowston, T. (1994). Pathology and biochemistry of osteoarthritis. In M. Doherty (Ed.). *Color atlas and text of osteoarthritis* (pp.29-60). London: Wolfe.
- Carol, L.B. (2001). First-line Treatment for Osteoarthritis. Part 1: Pathophysiology, Assessment, and Pharmacologic Interventions. *Orthopaedic Nursing*, 20(5), 17-24.

- Carol, L.B. (2001). First-line Treatment for Osteoarthritis. Part 2: Nonpharmacologic Interventions and Evaluation. *Orthopaedic Nursing*, 20(6), 13-18.
- Clare, J., Kelvin, J., & Peter, C. (2002). Measuring the population impact of knee pain and disability with the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC). *Pain*, 100, 55-64.
- Cooper, C., Mc Alindon, T., Coggon, D., Egger, P., & Dieppe, P. (1994). Occupational Activity and Osteoarthritis of knee. *Annual of the Rheumatologic Disease*. 53(2), 90-93
- Cutis, S. M., & Cutis, R.L. (1998). Somatosensation Function and Pain. In C.M.Porth (Eds.). *Pathophysiology: Concept of altered health states* (5th ed., pp. 838-872). Philadelphia: Lippincott.
- Davis, M.A., Ettinger, W.H., Neuhaus, J.M., & Mallon, K.P. (1991). Knee osteoarthritis and functioning: Evidence from the NHANES I: Epidemiologic follow up study. *The Journal of Rheumatology*, 18, 591-589.
- Davis, S.T., & Sheely-Adolphson, P. (1997). Psychosocial intervention nursing. *Nursing Clinic of North America*, 32, 331-341.
- Deborah, J.H., David, V.D., & Tim, D.S. (1999). Incidence and risk factors for radiographic knee osteoarthritis in middle-aged woman. *Arthritis & Rheumatism*, 42(1), 17-24.
- Delores, C.S. (2000). Arthritis., *Adult Orthopaedic Nursing*. (pp. 55-61). Lippincott: Philadelphia.
- Dias, R.C., Dias, J.M., & Ramos, L.R. (2003). Impact of an exercise and walking protocol on quality of life for elderly people with OA of the knee. *Physiother Res Int*, 8(3), 121-30.
- Dieppe, P.A., & Lohmander, L.S. (2005) Pathogenesis and management of pain in osteoarthritis. *The Lancet*, Mar; 365 (9463), 965-73.
- Dodd, M., Janson, S., Facione, N., Faucett, J., Froelicher, E.S., Humphreys, J., et al. (2001). Advancing the science of symptom management. *Journal of Advanced Nursing*, 33(5), 668-76.
- Dottie, R. (2002). Degenerative Disorders. In Ann B. Maher, Susan W. Salmond & Teresa A. Pellino.(Eds.), *Orthopaedic Nursing*. (3rd ed., pp. 468-513). Philadelphia: Pennsylvania.

- Dottie, R. (2003). Alternative Therapies for Arthritis Treatment Part 1. *Orthopaedic Nursing*, 22(5), 335-342.
- Dottie, R. (2003). Alternative Therapies for Arthritis Treatment Part 2. *Orthopaedic Nursing*, 22(6), 412-418.
- Ecvik, D., Sonel, B. (2002). Effectiveness of a home- based exercise therapy and walking program on osteoarthritis of the knee. *Rheumatol Int*, 22, 103-6.
- Erden, Z., & Otman, S. (2003). Relationship between pain intensity and knee joint position sense in patients with severe osteoarthritis. *The Pain Clinic*, Sept,15(3), 293-297.
- Felson, D.T. (1990). The epidemiology of osteoarthritis. Results from the Framingham Osteoarthritis Study. *Semin Arthritis Rheum*, 20(Supp 1), 42-50.
- Felson D, Lawrence R, Dieppe P. (2000). Osteoarthritis: new sights, part 1 the disease and its risk factors. *Ann intern Med*, 133, 635-46.
- Felson, D.T., & Nevitt, M.C. (1998). The effects of estrogen in osteoarthritis. *Curr Opin Rheumatol*, 10, 269-72.
- Felson, D.T., Anderson, JJ., & Naimark, A.(1988). Obesity and knee osteoarthritis. The Framingham Osteoarthritis Study. *Ann Intern Med*, 109, 18-24.
- Felson, D.T., Naimark, A., Anderson, J., Kazis, L., Castelli, W., & Meenan, R.F. (1987). The prevalence of the knee osteoarthritis in the elderly. The Framingham Osteoarthritis Study. *Arthritis Rheum*, 30, 914-8.
- Felson, D.T., Zhang, Y., & Antony, J.M. (1992). Weight loss reduces the risk for symptomatic knee osteoarthritis in the women. The Framingham Osteoarthritis Study. *Ann Intern Med*, 116, 535-9.
- Felson, D.T., Zhang, Y., & Hannan, M.T. (1997). Risk factors for incident radiographic knee osteoarthritis in the elderly: The Framingham Study. *Arthritis Rheum*, 40, 728-33.
- Flanagan, Steven R., Ragnarsson, Kristjan T., Ross, Marc K., & Wong Dennis K. (1995). Rehabilitation of the Geriatric Orthopaedic Patient. *Clinical Orthopaedics and Related Research*, July, 80-92.
- Fransen, M., Crosbie, J., & Edmonds, J.(2001). Physical therapy is effective for patients with osteoarthritis of the knee: a randomized controlled clinical trial. *J Rheumatol*, 28, 156-64.

- Gail, D.D., Nancy, E.H., Robert, L.M., Michael, G.R., Matthew, B.G., & Stephen, C.A. (2000). Effectiveness of Manual Physical Therapy and Exercise in Osteoarthritis of the Knee. *Annals of Internal Medicine*, 132(3), 173-181.
- Ge, W., Fang, Z., Xinglong, Z., & Liu, W. (2002). Improvement of Isokinetic Knee Extensor Strength and Reduction of Postural Sway in the Elderly from long-term Tai Chi exercise. *Arch Phys Med Rehabil*, 83, 1364 -1369.
- Gevers, F., Dequeker, J., Geeusens P., et al. (1989). Physical and histomorphological characteristics of iliac crest bone differ according to the grade of osteoarthritis of the hand. *Bone*, 10, 173-7.
- Grubb, B.D. (2004) Activation of sensory neurons in the arthritic joint. *Novartis Found Symp*; 260:28-36; discussion 36-48,100-4, 277-9.
- Guccione A.A., David T. Felson, & Jennifer J. Anderson. (1990). Defining Arthritis and Measuring Functional Status in Elders: Methodology Issues in the Study of Disease and Physical Disability. *American Journal of Public Health*, 80(8), 945-949.
- Guccione, A.A., Felson, D.T., Anderson, J.J., Anthony, J.M., Zhang, Y., & Wilson, P.W. (1994). The effects of specific medical condition on the functional limitations of elders in the Framingham Study. *American Journal of Public Health*, 84, 351-358.
- Haera, S.(2003). *Effect of reflexology on joint pain in knee osteoarthritis patients*. Unpublished master's thesis, Mahidol University, Bangkok, Thailand.
- Hannan, MT., Anderson, J.J., & Zhang, Y. (1993). Bone mineral density and knee osteoarthritis in elderly men and women. The Framingham study. *Arthritis Rheum*, 36(12), 1671-80.
- Hart, D.J, Doyle D.V., & Spector, T.D. (1999). Incidence and risk factors for radiographic knee osteoarthritis in middle- aged woman: The Chingford Study. *Arthritis Rheum*, 42(1), 17-24.
- Hart, D.J., & Spector, T.D. (1993). The relationship of obesity, fat distribution and osteoarthritis in the women in the general population: The Chingford study. *J Rheumatol*, 20, 331-5.
- Henrotin, Y., Deby-Dupont, G., & Deby, C.(1993). Production of active oxygen species by isolated human chondrocyte. *Br J Rheumatol*, 32, 562-7.

- Heyes, J., & Cox, C. (1999). Immediate effects of a five minutes foot massage on patients in critical care. *Intensive and Critical Care Nursing*, 15(2), 77-82.
- Jane, F. M. (2003). Degenerative Disorders. In Wilma J. Phipps, Frances D Monahan, Judith K. Sands, Jane F. Marek., & Marianne (Eds.), *Medical- Surgical Nursing Health and Illness Perspectives*. (pp. 1521-1256). St. Louis: Saunders.
- Kean, W.F., Kean, R.7., & Buchanan, WW. (2004). Osteoarthritis : symptoms , sign and source of pain . *Inflamopharmacology* 12(1), 3-31.
- Kee, C.C. (1998). Living with osteoarthritis: Insider views. *Applied Nursing Research*, 11, 19-26.
- Kee, C.C. (2000). Osteoarthritis: Manageable scourge of aging. *Nursing Clinics of North America*, 35, 199-207.
- Kerrigan, D.C., Lelas, J.L., & Karvosky, M.E. (2001). Women's shoes and knee osteoarthritis. *Lancet*, 357, 1097-8.
- Kerrigan, DC., Lelas, J.L., & Goggins, J.(2002). Effectiveness of a lateral-wedge insole on knee varus torque in patients with knee osteoarthritis. *Arch Phys Med Rehabil*, 83, 889-93.
- Kujala, Urho, M., Kaprio, Jaakka, & Sarna, S.(1994). Osteoarthritis of weight bearing joints of lower limbs in former elite male athletes. *British Medical Journal*. 308, 231-234.
- Kuptniratsaikul, V., Leurcharusmee, A., & Nilganuwong, V. (2000). The study of attitude and health behavior in osteoarthritic elderly . *J Thai Rehabil*, 9(3), 90-46.
- Kuptniratsaikul, V., Tosayanonda, O., Nilganuwong, S., & Thamalikitul. (2002). The efficacy of a muscle exercise program to improve functional performance of the knee in the patients with osteoarthritis. *J Med Assoc Thai*, 85(1), 33-40.
- Lane, N.E, Michel, B., & Bjorkenggren, A. (1993). The risk of osteoarthritis with running and aging: a 5 years longitudinal study. *J Rheumatol*, 20, 461-8.
- Lane, N.E., & Buckwalter, JA. (1993). Exercise: a cause of osteoarthritis? *Rheum Dis Clin North Am*, 9, 17-33.
- Lane, N.E., Gore, L.R., & Cumming, S.R. (1999). Serum vitamin D levels and incident changes of radiographic hip osteoarthritis: a longitudinal study. Study of Osteoporotic Fractures Research Group. *Arthritis Rheum*, 42, 854 -60.

- Larson, P.J., Carrieri-Kohlman V., Dodd M.J., Douglas M., Faucett J., Froelicher E., et al. (1994). A Model for Symptom Management. The University of California, San Francisco School of Nursing Symptom Management Faculty Group. *IMAGE: Journal of Nursing Scholarship*, 26(4), 272-276.
- Lawrence, R.C., Helmick, C.G, & Arnett, F.C. (1998). Estimates of prevalence of arthritis and selected musculoskeletal disorders in the United States. *Arthritis Rheum*, 41(5), 778-99.
- Lipsutz, L.A., Nakajima, I., Gagnon, M., Hirayama, T., Connelly, C. M, & Izumoh, H. (1994). Muscle Strength And Fall Rates Among Residents of Japanese and American Nursing Home: An international Cross-Cultural Study. *Journal of the American Geriatrics Society*, 42, 953-959.
- Loeser, R.F. (2000). Aging and the etiopathogenesis and treatment of osteoarthritis. (2000). *Rheum Dis Clin North Am*, 26, 547-67.
- Lodwig-Beymer, P., & Huether, S. E. (1996). Pain, Temperature, sleep, & Sensory function. In S.E. Huether & K.L.McCane (Eds.). *Understanding pathophysiology*. (pp.320-328). St. Louis: Mosby.
- Lombardo, M. C., & Wilson, L.M. (1997). Pain in Price, S.A.& Wilson L.M.(Eds.). *Pathophysiology: Clinical concept of disease process* (5th ed., pp. 818-848). St. Louis: Mosby.
- MacLean, C.H. (2001). Quality indicators for the management of osteoarthritis in vulnerable elders. *Ann Intern Med*, 35, 711-21.
- Mao-Hsiung, H., Yueh-Shuang, L., Rei-Cheng, Y., & Chia-Ling, Lee. (2003). A Comparison of Various Therapeutic Exercise on the Functional Status of Patients with Knee Osteoarthritis. *Seminars in Arthritis and Rheumatism*, 32(6), 398-406.
- Mary, E., Carmencita M. P.(2004) in Lewis S.M., Margaret, Mac. Lean., Shannon R vol 1, *Medical- Surgical Nursing Assessment and management*. St. Louis, Missouri.
- McAlindon, T.E., Cooper, C., Kirwan, J.R., & Dieppe, P.A. (1993). Determinants of disability in osteoarthritis of the knee. *Annals of the Rheumatic Diseases*, 52, 258-262.

- McAlindon, T.E., Felson., D.T, & Zhang, Y. (1996). Relation of dietary intake and serum levels of vitamin D to progression of osteoarthritis of the knee among participants in the Framingham study. *Ann Intern Med*, 125, 353-9.
- McAlindon, T.E., Jacques, P., & Zhang, Y. (1996). Do antioxidant micronutrients protect against the development and progression of knee osteoarthritis ? *Arthritis Rheum*, 39, 648-56.
- Messier , S.P. (2005). Weight Loss Reduces Knee Joint Loads in Over weight and Obese Older Adults With Knee Osteoarthritis. *Arthritis & Rheumatism*, July, 52(7), 2026-2032.
- Messier, S., Loeser, R., Hoover, J., Semble, E., & Wise, C. (1992). Osteoarthritis of the knee: Effects on gait, strength, and flexibility. *Archives of Physical Medical Rehabilitation*, 73, 29-36.
- Morrison, J.B. (1970). The mechanics of the knee joint in relation to normal walking. *J Biomech*, 3, 51-61.
- Moskowitz, R.W., Kelly, M.A., & Lewallen, D.G. (2004). Understanding osteoarthritis of the knee – cause and effects. *Am J Orthop. Feb* ; 33(2) suppl, 5-9.
- Nevitt, M.C., Lane, N.E., & Scott, J.C. (1995). Radiographic osteoarthritis of the hip and bone mineral density. The study of osteoporotic fracture group. *Arthritis Rheum*, 38, 907-16.
- NIH conference. (2000). Osteoarthritis : new sights. *Ann Intern Med*, 133, 635-46.
- Nordejo, L.O., Nordgren, B., Wigren, A., & Kolstad, K. (1983). Isometric strength and endurance in patients with severe rheumatoid arthritis or osteoarthritis in the knee joints. *Scandinavian Journal of Rheumatology*, 12, 152-156.
- O'Reilly, S.C., Muir, K.R., & Doherty, M. (1998). Knee pain and disability in the Nottingham community: Association with poor health status and psychological distress. *Br. J. Rheumatol*, 37(8), 870-3.
- Osiri M, Welch V, Brosseau, et al. Transcutaneous electrical nerve stimulation for knee osteoarthritis. *Cochrane Database Syst Rev* 2000; (4): CD 002823.
- Pajareya. K., Chadchavalpanichaya, N., & Tindang, S. (2003). Effectiveness of an Elastic Knee Sleeve for Patients with Knee Osteoarthritis: A Randomized Single-Blinded Controlled Trial. *J Med Assoc Thai*, 86(10), 535-542.

- Paul, D., & Kenneth, D.B. (2003). What is important in treating osteoarthritis? Whom should we treat and how should we treat them? *Rheumatic Disease Clinics of North American*, 29, 687-716.
- Pinals, R.S. (1996). Mechanisms of joint destruction, pain and disability in osteoarthritis. *Drugs*; 52 suppl 3, 14-20.
- Puntillo, K. A., Miaskowski, C., & Summer, G. (2003). Pain. In V. Carrieri- Kohlman, A. M. Lindsey & C. M. West (Eds.), *Pathophysiological Phenomena in Nursing: Human Response to Illness* (3rd ed., pp. 235 -254). St. Louis: Saunders.
- Puntillo, K.A., & Tester, M. D. (1993). Pain. In V.C. Kohlman, A. M. Lindsey, & C.M. West (Eds.). *Pathophysiology phenomena in nursing* (pp. 303-339). Philadelphia: W.B. Saunders.
- Roberts, D., & Lappe, J. (2001). Management of clients with musculoskeletal disorders. In J. Black, J. H. Hawks, & A. Kneene (Eds.), *Medical-surgical nursing: A psychophysiologic approach* (6th ed., pp.551-586). Philadelphia: WB Saunders.
- Robert, J. K. (2002). Total knee replacement. In Water R Frontua (Eds.). *Essentials of physical Medical and Rehabilitation*. (pp. 383-390).
- Robert, T., Sandra, W., Sadik, K., Joseph, H., & Andrea, B. (2000). Predictors of Four Functional Tasks in Patients with Osteoarthritis of the Knee. *Orthopaedic Nursing*, 19(5), 49-58.
- Schouten, JS., Van, D., Quweland, F.A., & Valkenburg, H.A. (1992). A 12 years follow up study in the general population on prognostic factors of cartilage loss in osteoarthritis of the knee. *Ann Rheum Dis*, 51, 932-7.
- Sharma, L., Hayes, K.W., & Felson, D.T. (1999). Does laxity alter the relationship between strength and physical function in knee osteoarthritis? *Arthritis Rheum*, 42(1), 25-32.
- Sharma, L., Lou. C., & Felson, D.T. (1999). Laxity in healthy and osteoarthritic knees. *Arthritis Rheum*, 42(5), 861-70.
- Sharon, J.G., & John, M.C. (1994). Degenerative Disorders. In Ann B. Maher, Susan W. Salmond & Teresa A. Pellino.(Eds.), *Orthopaedic Nursing*. (3rd ed., pp.468-513). Philadelphia: Pennsylvania.

- Slemenda, C., Heilman, D.K., & Brandt, K.D. (1998). Reduced quadriceps strength relative to body weight: a risk factor for knee osteoarthritis in woman? *Arthritis Rheum*, 41, 1951-9.
- Smeltzer, S.C., & Bare, B.G. (1996). *Brunner and Suddart's textbook of medical-surgical nursing* (8th ed.). Philadelphia: Lippincott.
- Spector, T.D., Dacre, J.E., & Harris, P.A. (1992). Radiographical progression of osteoarthritis: 11years follow up study of the knee. *Ann Rhum Dis*, 51, 1107-10.
- Spector, T.D., Hart, D.J., & Doyle, D.V. (1994). Incidence and progression of osteoarthritis in women with unilateral knee disease in the general population: the effect of obesity. *Ann Rheum Dis*, 53, 565-8.
- Timby, B.K. (1995). *Medical-surgical nursing* (6th ed.). Philadelphia: J. B. Lippincott.
- Toda, Y., Kato, A., & Miwa, T. (2000). The effect of insole with figure-of-eight elastic strapping band for patients with osteoarthritis of the knee [in Japanese]. *Orthop Surg*, 51, 1603-7.
- Urwin, M., Symmons, D., Allison, T., Brammah, T., Busby, H., Roxby, M., Simmons, A., & Williams, G. (1998). Estimating the burden of musculoskeletal disorders in the community: the comparative prevalence of symptoms at different anatomical sites and the relation to social deprivation (see comments). *Ann Rheum Dis*, 57(11), 649-655.
- Van Baar, ME., Assendelft, W.J., & Dekker, J. (1999). Effectiveness of exercise therapy in patients with osteoarthritis of the hip or knee: a systematic review of randomized clinical trial. *Arthritis Rheum*, 42(7): 1361-9.
- Verbrugge, L.M., Lepkowski, J.M., & Konkol, L.L. (1991). Levels of ability among U.S. adult with arthritis. *The Journal of Gerontology*, 46, S71-83.
- Wada, M., & Imura, S.B. (1996). Knee laxity in patients with osteoarthritis and rheumatoid arthritis. *Br J Rheumatol*, 35, 460-3.
- Williams, R.A., & Fpulsham, B.M. (1981). Weight reduction in the osteoarthritis using phenermine. *Practitioner*, 225, 231-2.
- Wolff, M., Wittink, H., & Michel, T.H. (1997). Chronic pain concept and definitions. In H. Wittink, & T. H. Michel (Eds.). *Chronic pain management for physical therapists*. (pp. 1-26). Boston: Butterworth- Heinemann.
- Wolley, S.M., Topp, R.V., Khuder, S.A., Kahaleh, M.B. & Commager, J.A. (1998). Which factors predict ability in OA patients ? *Biomechanics/ Geriatrics*, 6-17.

Yelin, E. (1992). Arthritis: The cumulative impact of a common chronic condition. *Arthritis and Rheumatism*, 35, 489-497.

Zhang, Y., Hannan, M.T., & Chaisson, C.E. (2000). Bone mineral density and risk of incident and progressive radiographic knee osteoarthritis in women: the Framingham study. *J Rheumatol*, 27, 1032-7.

คณะกรรมการอำนวยการจัดทำแผนพัฒนาสุขภาพแห่งชาติ ฉบับที่ 9. (2544). (National health development director committee, Issue 9, 2001) แผนพัฒนาสุขภาพแห่งชาติ ในช่วงแผนพัฒนากรุงเทพมหานคร: โรงพิมพ์องค์การรับส่งสินค้าและพัสดุภัณฑ์ เศรษฐกิจและสังคมแห่งชาติ ฉบับที่ 9.

จริยา เลิศอรรมณมณีและคณะ. (2543). (Lerdutkayamanee, J., et al., 2000) งานวิจัยทางคลินิก กรุงเทพฯ: ไพศาลศิลป์การพิมพ์.

จิตเวทย์ ตุมราศวิน. (2538). (Tumaraswin, T., 1995) โรคข้อเสื่อม. ในสุรวุฒิ ปรีชานันท์และสุรศักดิ์ นิลกานวงศ์ (บรรณาธิการ). ตำราโรคข้อ. กรุงเทพฯ: โรงพิมพ์เรือนแก้วการพิมพ์.

ทวีพร เตชะรัตนมณี. (2547). (Taecharatanamane, T., 2003) ความสามารถในการดูแลตนเองและการรับรู้สุขภาพของผู้สูงอายุข้อเข่าเสื่อมในจังหวัดภูเก็ต. วิทยานิพนธ์พยาบาลศาสตรมหาบัณฑิต, สาขาวิชาการพยาบาลผู้ใหญ่, มหาวิทยาลัยสงขลานครินทร์.

ประเสริฐ อัสตันดชัย, ปรียานุช เข้มวงษ์, สมทรง เละกุล. (2542). (Assantachai, P., et al., 1999) การสำรวจภาวะโภชนาการในผู้สูงอายุในชุมชนภาคกลาง. โครงการศึกษาวิจัยครบวงจรเรื่องผู้สูงอายุในประเทศไทย มหาวิทยาลัยมหิดล กองบริหารงานวิจัย. กรุงเทพฯ: ศูนย์วิชาการพิมพ์.

ปราณี กาญจนวรวงศ์.(2539). (Karnjanavorawong, P., 1996) คุณภาพชีวิตของผู้สูงอายุโรคข้อเข่าเสื่อม. วิทยานิพนธ์พยาบาลศาสตรมหาบัณฑิต, สาขาการพยาบาลผู้ใหญ่, บัณฑิตวิทยาลัย มหาวิทยาลัยมหิดล.

ผกากรอง ตั้งสุขล.(2545). ประสพการณ์ของผู้สูงอายุในการบำบัดอาการปวดข้อเข่าเสื่อมด้วยภูมิปัญญาชาวบ้าน. วิทยานิพนธ์พยาบาลศาสตรมหาบัณฑิต, สาขาการพยาบาลผู้ใหญ่, บัณฑิตวิทยาลัย มหาวิทยาลัยสงขลานครินทร์, สงขลา.

พงศ์การดี เจาทะเกษตรินและคณะ. (2547). (Jaothakasetrin, P., et al., 2004) ความปวด Pain ชุดตำราพื้นฐานความปวดเล่มที่ 1 กรุงเทพฯ: บริษัท เมดิมิเดีย.

พยอม สุวรรณ. (2543). (Suwan, P., 2000) ผลของการประคบร้อนด้วยสมุนไพรต่ออาการปวดข้อข้อฝืด และ ความลำบากในการทำกิจกรรม ในผู้ป่วยโรคข้อเข่าเสื่อม. วิทยานิพนธ์พยาบาลศาสตรมหาบัณฑิต, สาขาวิชาการพยาบาลอายุรศาสตร์และศัลยศาสตร์, บัณฑิตวิทยาลัย มหาวิทยาลัยเชียงใหม่.

- มารีสา สุวรรณราช.(2544). (Suwanarach, M., 2001) ความปวด การจัดการกับความปวด และภาวะสุขภาพในข้อเข่าเสื่อม. วิทยานิพนธ์พยาบาลศาสตรมหาบัณฑิต, สาขาการพยาบาลผู้ใหญ่, บัณฑิตวิทยาลัย มหาวิทยาลัยมหิดล, กรุงเทพมหานคร.
- วรวิทย์ เล่าห์เรณู. (2546). (Laolenu, W., 2003) โรคข้อเสื่อม. หน่วยโรคข้อและรูมาติซึม ภาควิชาอายุรศาสตร์ คณะแพทยศาสตร์ มหาวิทยาลัยเชียงใหม่ ชนบรรณาธิการพิมพ์.
- สุธี สุทัศน์ ณ อยุธยา และ วีระะ รุจิเวชพงศธร. (2539). (Suthas Na Ayuthaya. S., & Rujiwesongsathorn, V., 1996) โรคเสื่อมและการใช้เกิน. ใน วิรุพห์ เหล่าภัทรเกษม. (บรรณาธิการ). ตำราออร์โธปิดิกส์. กรุงเทพฯ: สมาคมออร์โธปิดิกส์แห่งประเทศไทย โรงพิมพ์ ศิริภัณฑ์ออฟเซ็ท.
- อรสา กาพันธ์ (2545). (Karnrat, O., 2002). ผลของการนวดแผนไทยต่อการปวดข้อในผู้สูงอายุโรคข้อเข่าเสื่อม. วิทยานิพนธ์พยาบาลศาสตรมหาบัณฑิต, สาขาวิชาการพยาบาลผู้สูงอายุ, บัณฑิตวิทยาลัย มหาวิทยาลัยเชียงใหม่.



APPENDIX A

รายนามผู้ทรงคุณวุฒิ

1. นางเพ็ญศรี เลาสวัสดิ์ชัยกุล
หัวหน้าหอผู้ป่วยแผนกออร์โธปิดิกส์ คณะแพทยศาสตร์ โรงพยาบาลรามธิบดี
2. ผู้ช่วยศาสตราจารย์ปองจิตร ภัทรนาวิก
อาจารย์ประจำ ภาควิชาศัลยศาสตร์ คณะพยาบาลศาสตร์ มหาวิทยาลัยมหิดล
3. ผู้ช่วยศาสตราจารย์ทรงสุข หงส์รพีพัฒน์
หัวหน้าภาควิชาอายุรศาสตร์ ศัลยศาสตร์ วิทยาลัยพยาบาลเกื้อการุณย์
4. นายแพทย์สุกิจ หาญพานิชกิจการ
หัวหน้าภาควิชาศัลยศาสตร์ออร์โธปิดิกส์ วิทยาลัยแพทยศาสตร์กรุงเทพมหานครและวชิรพยาบาล
5. พันเอกพิเศษ ผู้ช่วยศาสตราจารย์คุษฎี ทัดตานนท์
หัวหน้าภาควิชาศัลยศาสตร์ออร์โธปิดิกส์ วิทยาลัยแพทยศาสตร์โรงพยาบาลพระมงกุฎเกล้า
6. รองศาสตราจารย์แพทย์หญิงวิไล คุปต์นิรัติศัยกุล
อาจารย์ประจำ ภาควิชาเวชศาสตร์ฟื้นฟู คณะแพทยศาสตร์ ศิริราชพยาบาล

APPENDIX B

แบบสัมภาษณ์ประกอบการวิจัย

เรื่องการศึกษาการจัดการเกี่ยวกับอาการปวดเข้าในผู้ป่วยโรคข้อเข่าเสื่อม

คำชี้แจง

แบบสัมภาษณ์ชุดนี้ผู้วิจัยจัดทำขึ้นโดยมีวัตถุประสงค์เพื่อศึกษาการจัดการเกี่ยวกับอาการปวดเข้าในผู้ป่วยโรคข้อเข่าเสื่อม ทั้งนี้เพื่อเป็นข้อมูลในการหาแนวทางให้การพยาบาล ส่งเสริมให้ผู้ป่วยเข้าใจถึงสาเหตุของอาการ และวิธีการจัดการกับอาการปวดเข้า ได้อย่างเหมาะสมขึ้น

ในการนี้ผู้วิจัยใคร่ขอความร่วมมือจากท่านในการตอบแบบสัมภาษณ์ตามความเป็นจริง เมื่อผู้วิจัยรวบรวมและนำข้อมูลทั้งหมดมาวิเคราะห์ จะนำเสนอผลการวิเคราะห์ในภาพรวม ซึ่งจะเป็นประโยชน์ในการพัฒนาแนวทางการดูแลผู้ป่วยโรคข้อเข่าเสื่อม ขณะที่ท่านตอบแบบสัมภาษณ์ ท่านมีสิทธิที่จะขอหยุดได้เมื่อท่านต้องการ ซึ่งคำตอบจากการตอบแบบสัมภาษณ์ของท่านทุกข้อ ผู้วิจัยจะเก็บข้อมูลไว้เป็นความลับ และเมื่อท่านมีข้อสงสัยเกี่ยวกับการวิจัย ท่านสามารถสอบถามผู้วิจัยได้ทันที

แบบสัมภาษณ์ทั้งหมดประกอบด้วย 2 ส่วนคือ

ส่วนที่ 1 แบบสัมภาษณ์ข้อมูลทั่วไป

ส่วนที่ 2 แบบสัมภาษณ์การจัดการกับอาการปวดเข้าในผู้ป่วยโรคข้อเข่าเสื่อม

ผู้วิจัยใคร่ขอความร่วมมือจากท่านในการตอบแบบสัมภาษณ์ให้ครบทุกข้อ และท้ายที่สุดนี้ ผู้วิจัยขอขอบพระคุณทุกท่านที่กรุณาให้ความร่วมมือในการตอบแบบสัมภาษณ์ครั้งนี้เป็นอย่างดี

นางปาริชาติ จันทร์สุนทรภาพร

นักศึกษาปริญญาโท สาขาการพยาบาลผู้ใหญ่

คณะพยาบาลศาสตร์ มหาวิทยาลัยมหิดล

ส่วนที่ 1 แบบสัมภาษณ์ข้อมูลทั่วไป

คำชี้แจง ให้ผู้วิจัยสัมภาษณ์กลุ่มตัวอย่างแล้วบันทึกข้อมูล โดยทำเครื่องหมาย ✓ ลงใน ()

หน้าข้อความที่ตรงกับคำตอบของกลุ่มตัวอย่างหรือเติมข้อความ ลงในช่องว่างที่กำหนด

ตอนที่ 1 แบบสัมภาษณ์ปัจจัยด้านบุคคล

1. เพศ () ชาย () หญิง
2. อายุ ปี
3. น้ำหนัก กิโลกรัม ส่วนสูง.....เซนติเมตร ดัชนีมวลกาย.....kg/m²
.
.

ตอนที่ 2 แบบสัมภาษณ์ปัจจัยด้านสิ่งแวดล้อม

1. ปัจจุบันท่านอาศัยอยู่ร่วมกับ
() อยู่คนเดียว () อยู่กับครอบครัว (สามี / ภรรยา / บุตร)
() อยู่กับญาติ () อยู่กับเพื่อน
() อื่นๆ ระบุ
2. สัมพันธภาพครอบครัว
() ต่างคนต่างอยู่ () รักใคร่ให้การช่วยเหลือกันดี () อื่นๆระบุ....
.
.

ตอนที่ 3 แบบสัมภาษณ์ปัจจัยด้านภาวะสุขภาพและการเจ็บป่วย

1. ท่านเคยได้รับอุบัติเหตุที่เกี่ยวกับข้อเข่ามาก่อนหรือไม่
() ไม่เคย () เคย โปรดระบุ.....
2. ระยะเวลาที่มีอาการปวดเข่าจนถึงปัจจุบัน
() น้อยกว่า 1 ปี () ตั้งแต่ 1-5 ปี () มากกว่า 5 ปี
.
.

ส่วนที่ 2 แบบสัมภาษณ์การจัดการกับอาการปวดเข้าในผู้ป่วยโรคข้อเข่าเสื่อม

คำชี้แจง ให้ผู้วิจัยสัมภาษณ์กลุ่มตัวอย่างแล้วบันทึกข้อมูลโดยทำเครื่องหมาย ✓ ลงใน ()

หน้าข้อความที่ตรงกับคำตอบของกลุ่มตัวอย่างหรือเติมข้อความ ลงในช่องว่างที่กำหนด

ตอนที่ 1 แบบสัมภาษณ์ประสบการณ์อาการปวดเข้าในผู้ป่วยโรคข้อเข่าเสื่อม

ด้านที่ 1 การรับรู้อาการปวดเข้า

1. อาการปวดเข้า ที่เกิดขึ้นกับท่านมีลักษณะเป็นแบบใด

- | | |
|--------------|----------------------|
| () ปวดตื้อๆ | () ปวดระบม |
| () ปวดแปลบ | () ปวดเส็บปวดรื้อน |
| () ปวดเสียว | () อื่นๆ ระบุ |

·
·

ด้านที่ 1.2 การประเมินอาการปวดเข้า

1. ท่านคิดว่า อาการปวดเข้าเกิดขึ้นจากสาเหตุอะไร (ตอบได้มากกว่า 1 ข้อ)

- | | |
|--------------------------|---------------------------------------|
| () ความเสื่อมของร่างกาย | () น้ำหนักตัวมาก |
| () ทำงานหนัก | () ปฏิบัติตัวไม่ถูกต้อง |
| () กรรมพันธุ์ | () อุบัติเหตุที่เกิดกับข้อเข่ามาก่อน |
| () อื่นๆ ระบุ | |

2. อาการปวดเข้าของท่านมีความรุนแรงอยู่ในระดับใด

- | | | | | |
|---------------|--------------|-------------|---------|---------------|
| () ไม่รุนแรง | () เล็กน้อย | () ปานกลาง | () มาก | () มากที่สุด |
|---------------|--------------|-------------|---------|---------------|
- ·

ด้านที่ 1.3 การตอบสนองต่ออาการปวดเข้า

คำชี้แจง ให้ผู้วิจัยสัมภาษณ์กลุ่มตัวอย่างแล้วบันทึกข้อมูลโดยทำเครื่องหมาย ✓ ลงใน ช่องว่างที่ตรงกับพฤติกรรมเหล่านี้กับผู้ป่วยมากที่สุด

ไม่เคย หมายถึง ท่านไม่มีการตอบสนองต่ออาการปวดเข้าในเรื่องนั้นๆ มาก่อนเลย

นานๆ ครั้ง หมายถึง ท่านมีการตอบสนองต่ออาการปวดเข้าในเรื่องนั้นๆ 1-3 ครั้ง/สัปดาห์

บ่อยครั้ง หมายถึง ท่านมีการตอบสนองต่ออาการปวดเข้าในเรื่องนั้นๆ มากกว่า 3-5 ครั้ง/สัปดาห์

เป็นประจำ หมายถึง ท่านมีการตอบสนองต่ออาการปวดเข้าในเรื่องนั้นๆ มากกว่า 5 ครั้ง/สัปดาห์

ข้อ	การตอบสนองต่อการปวดเข้า	ความถี่ในการเกิด / สัปดาห์			
		ไม่เคย	นานๆ ครั้ง	บ่อยครั้ง	เป็น ประจำ
	ด้านร่างกาย				
1	ไม่สามารถปฏิบัติกิจกรรมที่เคยทำได้ เช่น นั่ง พับเพียบ เดินขึ้น-ลงบันได นั่งฟังเทศน์				
2	ร่างกายอ่อนล้า				
3	.....				
4	.....				
5	.....				
6	.....				
	ด้านจิตใจ				
1	อารมณ์ไม่ดี หงุดหงิด รำคาญ				
2	ความอดทนต่อสิ่งต่างๆ ลดลง เบื่อง่าย				
3	.....				
4	.....				
5	.....				
6	.....				
7	.....				
	ด้านสังคม				
1	เป็นภาระต้องพึ่งพาผู้อื่น				
2	การแสดงบทบาทในครอบครัวและสังคมลดลง				
3	.....				
4	.....				
5	.....				

ตอนที่ 2 แบบสัมภาษณ์วิธีการจัดการเกี่ยวกับอาการปวดเข้าในผู้ป่วยโรคข้อเข่าเสื่อม

1. ท่านมีวิธีการจัดการกับอาการปวดเข้าอย่างไร

คำชี้แจง ให้ผู้วิจัยสัมภาษณ์กลุ่มตัวอย่างแล้วบันทึกข้อมูลโดยทำเครื่องหมาย ✓ ลงในช่องว่างที่กลุ่มตัวอย่างตอบ

ความถี่ในการปฏิบัติ

ไม่เคย	หมายถึง ท่านไม่เคยปฏิบัติกิจกรรมหรือวิธีการนั้นๆ มาก่อนเลยเมื่อมีอาการปวดเข้า
นานๆครั้ง	หมายถึง ท่านเคยปฏิบัติกิจกรรมหรือวิธีการนั้นๆ มาก่อน โดยเฉลี่ย 1-3 ครั้ง / สัปดาห์เมื่อมีอาการปวดเข้า
บ่อยครั้ง	หมายถึง ท่านเคยปฏิบัติกิจกรรมหรือวิธีการนั้นๆ มาก่อน โดยเฉลี่ยมากกว่า 3- 5 ครั้ง / สัปดาห์เมื่อมีอาการปวดเข้า
เป็นประจำ	หมายถึง ท่านเคยปฏิบัติกิจกรรมหรือวิธีการนั้นๆ มาก่อน โดยเฉลี่ยมากกว่า 5 ครั้ง / สัปดาห์ เมื่อมีอาการปวดเข้า

ข้อ	การปฏิบัติ	ความถี่ในการปฏิบัติ			
		ไม่เคย	นานๆครั้ง	บ่อยครั้ง	เป็นประจำ
1	การพักผ่อน				
2	การใช้ยา				
					

ตอนที่ 3 แบบสัมภาษณ์ผลลัพธ์การจัดการกับอาการปวดเข้าในผู้ป่วยข้อเข่าเสื่อม

คำชี้แจง

แบบสัมภาษณ์ผลลัพธ์ของการจัดการกับอาการปวดเข้าในผู้ป่วยข้อเข่าเสื่อม มีคำถาม 2 ด้านดังนี้

ด้านที่ 1 แบบสัมภาษณ์อาการปวดเข้าในกิจกรรมและสถานการณ์ต่างๆ

มีคำถาม 13 ข้อ

ด้านที่ 2 แบบสัมภาษณ์ความสามารถในการทำหน้าที่ของข้อเข่าในกิจกรรมและสถานการณ์ต่างๆ

มีคำถาม 22 ข้อ

ลักษณะคำถามเป็นมาตราส่วนประมาณค่า โดยการเปรียบเทียบตามแนวเส้นตรง ซึ่งมีความยาว

10 เซนติเมตร

การตอบแบบสัมภาษณ์

ในแต่ละข้อคำถามให้ผู้สัมภาษณ์ ทำเครื่องหมาย X บนมาตรวัดที่ใช้ตัวเลขสื่อระดับของความรู้สึกตามระดับคะแนนที่ได้จากการสัมภาษณ์กลุ่มตัวอย่างบนเส้นตรงที่กำหนดให้ โดยมีระดับคะแนนตั้งแต่ 0 -10 ซ้ายสุดซึ่งตรงกับหมายเลข 0 หมายถึง ไม่มีความรู้สึกนั้นๆ และจะเพิ่มขึ้นเมื่อเลื่อนไปทางขวามือ หรือ หมายเลขเพิ่มขึ้น โดยตำแหน่งปลายสุดทางขวามือ ซึ่งตรงกับหมายเลข 10 หมายถึง มีความรู้สึกนั้นๆ มากที่สุดในการทำกิจกรรม

ตัวอย่าง
คำถาม ท่านมีอาการปวดข้อเข่าอยู่ในระดับใด เมื่อทำกิจกรรมดังต่อไปนี้

1. เดินบนพื้นราบ



แสดงว่าท่านมีระดับความปวดเท่ากับ 5



๒ ถนนพราหมณ์ บางกอกน้อย กรุงเทพฯ ๑๐๓๐๐

โทร. (๖๖-๒) ๔๑๑-๑๔๒๕, ๔๑๑-๓๒๕๓

โทรสาร. (๖๖-๒) ๔๑๒-๑๓๗๑



2 PRANNOK Rd. BANGKOKNOI, BANGKOK 10700

TEL. (66-2) 411-1429, 411-3263

FAX : (66-2) 412-1371

Certificate of Approval

from

Ethics Committee Faculty of Medicine Siriraj Hospital, Mahidol University

SIEC COA No. 079/2005

Protocol Title	The study of knee pain management in patients with osteoarthritis of knee
Principal Investigator/ Affiliation	Mrs. Parichad Jansoontraporn / Faculty of Nursing, Mahidol University
SiEc Protocol Number	074/2548
Research site	Siriraj Hospital
Document Approved	- Protocol - Participant information sheet - Informed consent form
Date of Approve	1 April, 2005
Date of Expiration	31 March, 2006

The aforementioned documents have been reviewed and approved by Ethics Committee, Faculty of Medicine Siriraj Hospital, Mahidol University, based on the Declaration of Helsinki.

Signature of Chairman



.....

(Prof. Sumalee Nimmannit)

Signature of Dean



.....

(Clin. Prof. Piyasakol Sakolsatayadorn)

Version 3 Effective date Dec 01, 2004



คณะกรรมการพิจารณาโครงการวิจัยกรมแพทยทหารบก

Q021q/48

ชั้น 5 อาคารพระมงกุฎเกล้าเวชวิทยา โรงพยาบาลพระมงกุฎเกล้าและโรงพยาบาลพระมงกุฎเกล้า
315 ถนน ราชวิถี เขต ราชเทวี กรุงเทพฯ 10400 โทรศัพท์ (662) 354-7600-28 ต่อ 93681

ที่ 402/2548

วันที่ ๙ พฤษภาคม 2548

เรื่อง แจ้งผลการพิจารณาโครงการวิจัย

เรียน นางปาริชาติ จันทร์สุนทราพร สาขาวิชาการพยาบาลผู้ใหญ่ คณะพยาบาลศาสตร์
มหาวิทยาลัยมหิดล

สิ่งที่ส่งมาด้วย - แบบรายงานสรุปผลการวิจัย

ตามที่ท่านได้ส่งโครงการวิจัย เรื่อง "การศึกษาการจัดการเกี่ยวกับอาการปวดเข่าในผู้ป่วยโรคข้อเข่าเสื่อม" [The Study of Knee Pain Management in Patients with Osteoarthritis of Knee.] เพื่อพิจารณา
ระเบียบวิธีวิจัย และจริยธรรมจากคณะกรรมการพิจารณาโครงการวิจัยกรมแพทยทหารบกเพื่อประกอบการ
พิจารณาสนับสนุนการเก็บข้อมูล นั้น คณะกรรมการพิจารณาโครงการวิจัย กรมแพทยทหารบก อนุมัติผ่านเมื่อ
วันที่ 6 พฤษภาคม 2548 เมื่อท่านได้ทำวิทยานิพนธ์เสร็จสิ้นส่งโครงงานส่งวิทยานิพนธ์ และรายงานสรุปผลการวิจัย
ของท่าน มายังคณะกรรมการฯ 1 ชุด

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

พันเอกหญิง

(ชาภรณ์ภิรมย์ เกตุปัญญา)

ประธานคณะกรรมการพิจารณาโครงการวิจัย

กรมแพทยทหารบก



No. ๙๙

Ethics Committee

For

Researches Involving Human Subjects, the Bangkok Metropolitan Administration

Title of Project : Pain Management in Gonarthrosis Patients

Registered Number : 0049.48

Principal Investigator : Mrs. Parichad Jansoontraporn

Name of Institution : The Bangkok Metropolitan Administration
Medical College and Vajira Hospital

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

 Chairman

(Mr. Pitinan Natrujirote)

Deputy Permanent Secretary for BMA

DATE OF APPROVAL 10 MAY 2005

วิชาเอกพยาบาลศึกษาระดับบัณฑิตศึกษา
 เลขที่: 74/9
 วันที่: 21 ก.ย. 2548
 หน้า:



บันทึกข้อความ

ส่วนราชการ กองวิชาการ (ฝ่ายพัฒนามนุษยศาสตร์ โทร. 0 2224 9710 โทรสาร 0 2221 6029)

ที่ กท 0602.4/วค. 352 **วันที่** 20 กันยายน 2548

เรื่อง รับทราบการขอเปลี่ยนแปลงชื่อโครงการวิจัย

เรียน ผู้อำนวยการวิทยาลัยแพทยศาสตร์กรุงเทพมหานครและวชิรพยาบาล

ตามบันทึกที่ กท.0604/8176 ลงวันที่ 1 กันยายน 2548 เรื่อง ขอเปลี่ยนแปลงชื่อโครงการวิจัย ซึ่งผู้วิจัย นางปาริชาติ จันทร์สุนทรพร โครงการวิจัย "การจัดการเกี่ยวกับอาการปวดเข่าในผู้ป่วยโรคข้อเข่าเสื่อม" ได้ขอเปลี่ยนแปลงชื่อโครงการวิจัยภาษาอังกฤษ จาก "Pain Management in Gonarthrosispatients" เป็น "The Study of Knee Pain Management in Patients with Osteoarthritis of Knee" นั้น

บัดนี้ คณะกรรมการพิจารณาและควบคุมการวิจัยในคนของกรุงเทพมหานคร ได้รับทราบการขอเปลี่ยนชื่อเรื่องโครงการวิจัยดังกล่าวแล้ว ในคราวประชุมครั้งที่ 15/2547 เมื่อวันที่ 12 กันยายน 2548

จึงเรียนมาเพื่อโปรดทราบ และแจ้งผู้เกี่ยวข้องทราบต่อไป


 (นางสาวเปรมวดี คฤหเดช)
 กรรมการและเลขานุการ
 คณะกรรมการพิจารณาและควบคุมการวิจัยในคน
 ของกรุงเทพมหานคร

ขอ.วพป.

☐ เพื่อโปรดทราบ

☐ เพื่อโปรดพิจารณา

☒ เพื่อให้ทราบข้อเท็จจริง


 (นางนภาพร สาทิพย์)
 หัวหน้ากองบริหารงานทั่วไป
 วิทยาลัยแพทยศาสตร์กรุงเทพมหานครและวชิรพยาบาล
 21 ก.ย. 2548

ขอ.ค.ค.


 (นายอิทธิเดช โทษทอง)
 นายแพทย์ 9 วร. (ต้นแบบการ)
 ผู้อำนวยการวิทยาลัย (บริหารงานและพัฒน)
 วิทยาลัยแพทยศาสตร์กรุงเทพมหานครและวชิรพยาบาล
 22 ก.ย. 2548

เอกสารหมายเลข 3 ก

เอกสารชี้แจงผู้เข้าร่วมการวิจัย
(Participant Information Sheet)

ในเอกสารนี้อาจมีข้อความที่ท่านอ่านแล้วยังไม่เข้าใจ โปรดสอบถามหัวหน้าโครงการวิจัย หรือผู้แทนให้ช่วยเหลือจนกว่าจะเข้าใจดี ท่านอาจจะขอเอกสารนี้กลับไปอ่านที่บ้านเพื่อปรึกษาหารือกับญาติพี่น้อง เพื่อนสนิท แพทย์ประจำตัวของท่าน หรือแพทย์ท่านอื่น เพื่อช่วยในการตัดสินใจเข้าร่วมการวิจัย

ชื่อโครงการ (ภาษาไทย) การศึกษาการจัดการเกี่ยวกับอาการปวดเข่าในผู้ป่วยโรคข้อเข่าเสื่อม
ชื่อผู้วิจัย นางปาริชาติ จันทร์สุนทรพรา
สถานที่วิจัย แผนกผู้ป่วยนอก (ห้องตรวจ 118) หรือ
แผนกผู้ป่วยนอก อาคารสยามินทร์ (ห้องตรวจ 104)
ผู้ให้ทุน ไม่มี

โครงการวิจัยนี้ทำขึ้นเพื่อ ศึกษาเกี่ยวกับประสบการณ์อาการปวดเข่า วิธีการจัดการกับอาการ และผลที่เกิดขึ้นภายหลังจากการจัดการกับอาการปวดเข่า ท่านอาจไม่ได้รับประโยชน์ โดยตรงในการเข้าร่วมการวิจัยครั้งนี้ แต่คาดว่าจะมีประโยชน์คือเพื่อให้เป็นข้อมูลเบื้องต้นในการพัฒนาแนวทางการปฏิบัติการพยาบาล ในการดูแลผู้ป่วยที่มีอาการปวดเข่าจากโรคข้อเข่าเสื่อมให้มีประสิทธิภาพและเหมาะสมยิ่งขึ้นรวมทั้งเพื่อใช้เป็นแนวทางในการพัฒนางานวิจัยที่เกี่ยวข้องกับผู้ป่วยโรคข้อเข่าเสื่อมต่อไป

ท่านได้รับเชิญให้เข้าร่วมการวิจัยเพราะท่านเป็นผู้หนึ่งที่มีคุณสมบัติเหมาะสมตามเกณฑ์การคัดเลือกประชากรเข้าเป็นกลุ่มตัวอย่างในครั้งนี้คือท่านมีอาการปวดเข่ามากกว่า 6 เดือน ได้รับการวินิจฉัยจากแพทย์ผู้เชี่ยวชาญด้านโรคกระดูกและข้อว่าเป็นโรคข้อเข่าเสื่อมและ ไม่เคยได้รับการผ่าตัดเพื่อการรักษาโรคข้อเข่าเสื่อมมาก่อน รวมทั้งไม่มีปัญหาทางการสื่อสาร

จะมีผู้เข้าร่วมการวิจัยทั้งสิ้นประมาณ 100 คน ระยะเวลาที่จะทำวิจัยทั้งสิ้น 12 เดือน

เมื่อท่านเข้าร่วมการวิจัยแล้ว ไม่มีสิ่งใดที่ท่านจะต้องปฏิบัติเป็นพิเศษในขั้นตอนที่เป็นการรักษาพยาบาลตามปกติร่วมด้วย นอกจากการตอบแบบสัมภาษณ์ทั้งหมด 2 ส่วน คือ
ส่วนที่ 1 แบบสัมภาษณ์ข้อมูลทั่วไป ได้แก่ ปัจจัยด้านบุคคล สิ่งแวดล้อม ภาวะสุขภาพและการเจ็บป่วย รวม 20 ข้อ

ส่วนที่ 2 แบบสัมภาษณ์การจัดการเกี่ยวกับอาการปวดเข่าในผู้ป่วยโรคข้อเข่าเสื่อม รวม 65 ข้อ

และเนื่องจากผู้วิจัยเก็บข้อมูลโดยใช้แบบสัมภาษณ์ จึงไม่มีความเสี่ยงหรือผลข้างเคียงที่อาจเกิดขึ้นเมื่อเข้าร่วมการวิจัย แต่ทั้งนี้ท่านอาจจะเสียเวลาในการตอบแบบสัมภาษณ์ประมาณ 30 นาทีหรืออาจจะมีความกังวลซึ่งทำให้ท่านไม่สบายใจที่จะตอบ ท่านสามารถไม่ตอบคำถามในข้อนั้นได้

	รับรองโดยคณะกรรมการจริยธรรมการวิจัยในคน
	คณะแพทยศาสตร์ศิริราชพยาบาล
	วันที่รับรอง <u> - 1 เม.ย. 2548</u>

หากท่านไม่เข้าร่วมในโครงการวิจัยครั้งนี้ ท่านก็จะได้รับการตรวจเพื่อการวินิจฉัย และรักษาโรคของท่านตามวิธีการที่เป็นมาตรฐาน

หากมีข้อสงสัยหรือข้อข้องใจที่จะสอบถามเกี่ยวกับการวิจัย ท่านสามารถติดต่อได้กับผู้วิจัยโดยตรงที่ นางปาริชาติ จันทร์สุนทราพร โทรศัพท์ 0-1702-6509

การเข้าร่วมการวิจัยครั้งนี้จะไม่มีค่าตอบแทนใดๆ ที่ท่านจะได้รับหรือค่าใช้จ่ายที่ท่านจะต้องรับผิดชอบจ่ายเอง

หากมีข้อมูลเพิ่มเติมทั้งด้านประโยชน์และโทษที่เกี่ยวข้องกับการวิจัยนี้ ผู้วิจัยจะแจ้งให้ทราบโดยรวดเร็วไม่ปิดบัง

ข้อมูลส่วนตัวของผู้เข้าร่วมการวิจัยจะถูกเก็บรักษาไว้ ไม่เปิดเผยต่อสาธารณะเป็นรายบุคคล แต่จะรายงานผลการวิจัยเป็นข้อมูลส่วนรวม ข้อมูลของผู้เข้าร่วมการวิจัยเป็นรายบุคคลอาจมีคณะบุคคลบางกลุ่มเข้ามาตรวจสอบได้ เช่น สถาบัน หรือ องค์การของรัฐที่มีหน้าที่ตรวจสอบ, คณะกรรมการจริยธรรมฯ เป็นต้น

ผู้เข้าร่วมการวิจัยมีสิทธิ์ถอนตัวออกจากโครงการวิจัยเมื่อใดก็ได้ โดยไม่ต้องแจ้งให้ทราบล่วงหน้า และการไม่เข้าร่วมการวิจัยหรือถอนตัวออกจากโครงการวิจัยนี้จะไม่มีผลกระทบต่อการบริการและการรักษาที่สมควรได้รับแต่ประการใด

หากท่านได้รับการปฏิบัติที่ไม่ตรงตามที่ได้ระบุไว้ในเอกสารชี้แจงนี้ ท่านจะสามารถแจ้งให้ประธานคณะกรรมการจริยธรรมฯ ทราบได้ที่ สำนักงานคณะกรรมการจริยธรรมการวิจัยในคน ตึกอศุขยเดชวิกรม ชั้น 5 ร.พ.ศิริราช เบอร์โทร. (02)419-7000 ต่อ 6405

ข้าพเจ้าได้อ่านรายละเอียดในเอกสารนี้ครบถ้วนแล้ว

ลงชื่อ.....วันที่.....
(.....)

หมายเหตุ : หากผู้เข้าร่วมวิจัยเป็นผู้เยาว์ (อายุต่ำกว่า 18 ปี บริบูรณ์) และเอกสารชี้แจงนี้ทำให้ผู้ปกครอง/ผู้แทนโดยชอบธรรมเป็นผู้อ่าน ให้เปลี่ยนสรรพนาม " ท่าน " เป็น " เด็กในปกครองของท่าน " ตามตำแหน่งที่เหมาะสม



เอกสารหมายเลข 3 ข

หนังสือแสดงเจตนายินยอมเข้าร่วมการวิจัย

ข้าพเจ้า วันที่..... เดือน..... พ.ศ.....
 อายุ..... ปี อาศัยอยู่บ้านเลขที่.....
 ถนน..... ตำบล..... อำเภอ.....
 จังหวัด..... รหัสไปรษณีย์..... โทรศัพท์.....
 ขอแสดงเจตนายินยอมเข้าร่วมโครงการวิจัย⁽¹⁾ เรื่อง การศึกษาการจัดการเกี่ยวกับอาหารปวดแสบในผู้ป่วยโรคข้อ
 เชื้อรา

โดยข้าพเจ้าได้รับทราบรายละเอียดเกี่ยวกับที่มาและจุดมุ่งหมายในการทำวิจัยรายละเอียดขั้นตอนต่างๆ ที่จะต้อง
 ปฏิบัติหรือได้รับการปฏิบัติ ประโยชน์ที่คาดว่าจะได้รับของการวิจัยและความเสี่ยงที่จะเกิดขึ้นจากการเข้าร่วมการวิจัย
 รวมทั้งแนวทางป้องกันและแก้ไขหากเกิดอันตรายขึ้น ค่าตอบแทนที่จะได้รับ ค่าใช้จ่ายที่ข้าพเจ้าจะต้องรับผิดชอบจ่ายเอง โดยได้
 ยืนยันข้อความที่มีรายละเอียดอยู่ในเอกสารซึ่งแจ้งผู้เข้าร่วมการวิจัยโดยตลอด อีกทั้งยังได้รับคำอธิบายและตอบข้อสงสัยจากหัวหน้า
 โครงการวิจัยเป็นที่เรียบร้อยแล้ว

ข้าพเจ้าจึงสมัครใจเข้าร่วมในโครงการวิจัยนี้

หากข้าพเจ้ามีข้อข้องใจเกี่ยวกับขั้นตอนของการวิจัย หรือหากเกิดผลข้างเคียงที่ไม่พึงประสงค์จากการวิจัยขึ้นกับ
 ข้าพเจ้า ข้าพเจ้าจะสามารถติดต่อกับ นางปาริชาติ จันทร์สุนทรพร ที่ 0-1702-6509 ได้ตลอด 24 ชม.
 หากข้าพเจ้าได้รับการปฏิบัติไม่ตรงตามที่ระบุไว้ในเอกสารซึ่งแจ้งผู้เข้าร่วมการวิจัย ข้าพเจ้าจะสามารถติดต่อกับ
 ประธานคณะกรรมการจริยธรรมการวิจัยในคน หรือผู้แทน ได้ที่ สำนักงานคณะกรรมการจริยธรรมการวิจัยในคน ดิโกดูลยเดชวิกรม
 ชั้น 5 ร.พ.ศิริราช โทร (02) 419-7000 ต่อ 6405

ข้าพเจ้าได้ทราบถึงสิทธิที่ข้าพเจ้าจะได้รับข้อมูลเพิ่มเติมทั้งทางด้านประโยชน์และโทษจากการเข้าร่วมการวิจัย และ
 สามารถถอนตัวหรือจะเข้าร่วมการวิจัยได้ทุกเมื่อ โดยจะไม่มีการกระทบต่อการบริการและการรักษาพยาบาลที่ข้าพเจ้าจะได้รับ
 ต่อไปในอนาคตและยินยอมให้ผู้อื่นใช้ข้อมูลส่วนตัวของข้าพเจ้าที่ได้รับจากการวิจัย แต่จะไม่เผยแพร่ต่อสาธารณะเป็นรายบุคคล
 โดยจะนำเสนอเป็นข้อมูลโดยรวมจากการวิจัยเท่านั้น

ข้าพเจ้าได้เข้าใจข้อความในเอกสารซึ่งแจ้งผู้เข้าร่วมการวิจัย และหนังสือแสดงเจตนายินยอมนี้โดยตลอดแล้ว จึงลง
 ลายมือชื่อไว้

ลงชื่อ..... ผู้เข้าร่วมการวิจัยผู้แทนโดยชอบธรรม / วันที่.....
 (.....)
 ลงชื่อ..... ผู้ให้ข้อมูลและขอความยินยอมหัวหน้าโครงการวิจัยวันที่.....
 (.....)

ในกรณีผู้เข้าร่วมการวิจัยอ่านหนังสือไม่ออก ผู้ที่อ่านข้อความทั้งหมดแทนผู้เข้าร่วมการวิจัยคือ.....
 จึงได้ลงลายมือชื่อไว้เป็นพยาน

ลงชื่อ..... พยาน วันที่.....
 (.....)

หมายเหตุ : หากผู้เข้าร่วมการวิจัยเป็นผู้เยาว์ (อายุต่ำกว่า 18 ปี บริบูรณ์) ให้เปลี่ยนข้อความตรงที่ตำแหน่ง 1,2 และสรรพนาม
 ข้าพเจ้าตรง

เครื่องหมาย * ดังนี้

- (1) ขอแสดงเจตนายินยอมให้เด็กในปกครองของข้าพเจ้าเข้าร่วมโครงการวิจัย
- (2) ข้าพเจ้าจึงสมัครใจให้เด็กในปกครองของข้าพเจ้าเข้าร่วมโครงการวิจัยนี้

- เด็กในปกครองของข้าพเจ้า



BIOGRAPHY

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