ผลของการสนับสนุนการจัดการตนเองของหญิงวัยกลางคนที่มีภาวะข้อเข่าเสื่อมต่อหน้าที่การ

ทำงานของข้อเข่าและคุณภาพชีวิต: การทดลองแบบสุ่มและมีกลุ่มควบคุม

EFFECTIVENESS OF A SELF-MANAGEMENT SUPPORT INTERVENTION ON KNEE FUNCTIONAL STATUS AND HEALTH-RELATED QUALITY OF LIFE AMONG MIDDLE-AGED WOMEN WITH KNEE OSTEOARTHRITIS: A RANDOMIZED CONTROLLED TRIAL

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Burapha University

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ผลของการสนับสนุนการจัดการตนเองของหญิงวัยกลางคนที่มีภาวะข้อเข่าเสื่อมต่อหน้าที่การทำงานของข้อเข่าและคุณภาพชีวิต: การทดลองแบบสุ่มและมีกลุ่มควบคุม

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Knee osteoarthritis [OA] is a chronic disease characterized by joint narrowing leading to joint pain, stiffness and swelling. It influences a person's ability to perform activities of daily living. For women, the prevalence rate of knee OA rises dramatically post-menopause due to lower estrogen levels. This randomized controlled trial study aimed to determine the effectiveness of a self-management support intervention on knee functional status and Health-Related Quality of Life [HRQOL]. The participants were 40 middle-aged women who had been clinically diagnosed with knee OA at least three months before.

They were randomly assigned into intervention and control groups, with 20 participants per group. After IRB approval (code 02-05-2562) was obtained, data collection was carried out from July to November 2019. The Modified Thai version of WOMAC and the SF-36 were used to measure knee functional status and HRQOL at pre-intervention, post-intervention and follow-up. Participants in the intervention group received a self-management support program developed by the researcher based on the Individual and Family Self-Management Theory. The implementation consisted of eight sessions over four weeks. Descriptive statistics, independent t-tests and two-way repeated measure ANOVA were used to analyze the data.

The results revealed that participants in the intervention group had better knee functional status and HRQOL than those in the control group at follow-up ($F_{1, 34}$ = 19.28, $p < 0.05$, $F_{1, 34}$ = 90.86, $p < 0.05$, respectively). In addition, within the intervention group, both knee functional status and HRQOL significantly improved from pre-to post-intervention. Thus the findings indicate this self-management

support intervention is effective. Policy makers and health care providers who are responsible for the health of middle-aged women could obtain and promote this intervention as part of standard practice. This should lead to improved knee functional status and HRQOL among middle-aged women.

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CHAPTER 1
INTRODUCTION

Statements and significance of the problems

Osteoarthritis [OA] is the most common form of arthritis and a leading cause of disability worldwide (Madry, Luyten, & Facchini, 2012). It is also estimated to be the fourth leading cause of disability. The knee is one of the largest bones that bear the body's weight. As a result, the knee is the first joint that suffers this consequence and could have impaired function. Accordingly, this disability burden is attributable to the involvement of knee OA. In terms of disability, lower extremity dysfunction is common in patients with knee OA (Fransen et al., 2011). Knee OA is a chronic disease characterized by joint narrowing and bone spur formation leading to joint pain, stiffness and swelling (Lane, Shidara & Wise, 2017). Knee OA patients have common deficits in quadriceps muscle strength which can occur as a consequence of OA. The quadriceps femoris provides dynamic joint stability. Thus, it seems likely that the loss of strength associated with OA may also be associated with loss of muscle function (Bennell et al., 2014). In particular, knee OA pain reduces function and has impact on a person's ability to perform the activities of daily living [ADL]. In addition, knee OA often causes interference with work productivity, diminishes the ability to walk with the addition of a particularly unsteady gait, and eventually results in knee disability (Musumeci et al., 2015). Ultimately, disability leads to difficult mobility, social isolation and loss of work opportunities (Bhatia, Bejarano, & Novo, 2013). It also induces anxiety, depression and distress (Cross et al., 2014).

Knee OA is a major public health problem with a prevalence of 10-15 percent in adults (Zhang & Niu, 2016). By 2040, an estimated 26 percent of all adults, or over 78 million people, will have arthritis (CDC, 2016). It has been shown that OA is a growing public health problem in Southeast Asia. A survey study among elderly community Thais aged > 50 years with a history of knee pain, and use of conventional radiography found that the prevalence of knee OA ranged from 34.5 percent to 45.6 percent (Kuptniratsaikul & Rattanachaiyanont, 2007). The prevalence of OA varies not only according to advanced age, but also according to the exposures to religious

activities (praying and other sitting religious worships or ritess) squatting duration of heavy physical activity; sitting on the floor, obesity, and sedentary behavior. Thai people also seem to be prone to these associated risk factors (Roopsawang & Aree-Ue, 2015). In Thailand, the prevalence of knee OA is 11.3 percent of all adults, which is the highest rate in Asia (Louthrenoo, 2015). Furthermore, the incidence and prevalence of knee OA are rising (Neogi & Zhang, 2013). Unfortunately, effective interventions for people with severe OA involving the knees are inaccessible to most people in these regions (Fransen et al., 2011). Consequent to an increase in incidence is the rise in the number of patients with knee OA who are prone to further knee degeneration.

Recently, several studies have confirmed an increased risk for symptomatic knee OA associated with age, female gender, physical activity, occupation and obesity (Litwic, Edwards, Dennison, & Cooper, 2013). The interactions of these risk factors are both varied and complex (Johnson & Hunter, 2014). Physical activity and repetitive joint use have been associated with an increased risk for OA (Fransen et al., 2011). A recent meta-analysis noted 1.6-times greater risk for knee OA related to occupational activities requiring heavy physical labor, squatting, kneeling, climbing and duration of heavy activity. Occupations associated with the greatest risk include farming, construction work (especially brick-laying and flooring installation), and health care work (McWilliams, Leeb, Muthuri, Doherty, & Zhang, 2011). In addition, obesity is widely acknowledged as a risk factor for both the incidence and progression of osteoarthritis with an added a negative influence on outcomes (Bliddal, Leeds, & Christensen1, 2014).

Overweight conditions and obesity are significantly associated with higher incidence of knee OA (Zheng & Chen, 2015). Knee OA is marked by pain and joint swelling, and/ or crepitus with eventual impaired movement of the knee (Hochberg et al., 2012). Osteoarthritis is defined by clinical presentation of patient symptoms, or radiography, or both. The symptoms of knee OA are pain, stiffness < 30 minutes a day and/ or crepitus. As stated by clinical practice guidelines, initial treatment for knee OA involves self-management, patient education, exercise and weight loss as a multi-component strategy for treating patients with symptomatic OA (Robbins & Kulesa, 2012).

The literature reviews on knee OA in most previous studies were focused on older adults while middle-aged women were disregarded. Appropriate management of knee OA in middle-aged women, however, is a key factor in delaying the progression of knee symptom severity. Physically, women are thinner with less volume of knee cartilage than men (Srikanth et al., 2005). Facing middle-aged is a crisis in human life is accompanied by more changes and complications in women compared to men (Soares, 2010). Having multiple responsibilities during this period, menopause and its side effects, changes in physical appearance and the body, weight gain, retirement financial problems, empty nest syndrome and onset of chronic diseases are some of the common changes in women during middle-aged (Ayranci, Orsal, Orsal, Arslan, & Emeksiz, 2010). As previously stated, females are found have a higher prevalence and severity of OA than males (Boyan et al., 2013). Moreover, the prevalence rate of knee OA rises dramatically post-menopause due to lower estrogen levels. Menopause also frequently influences many changes in body composition such as increased body fat or obesity with impact on bone density, reduced cartilage volume and loss of bone and muscle strength (Riddle, Makowski, & Kong, 2015).

Knee functional status has been viewed in different ways. It is frequently used interchangeably with function, functional ability and health (Prompuk & Moongtui, 2013). Functional status is the degree to which a person is able to perform socially allocated roles free of physical or mental health-related limitations. Knee OA is a highly prevalent condition that can result in disabling pain and loss of physical function (Iqbal, 2014). Several studies have identified the functional status of knee OA in middle-aged women. Knee OA is responsible for activity limitations, restricted ability to walk and stand, and a progressive deformation of the knee joint, because increased joint damage is positively associated with pain and functional limitations leading to difficult mobility (McDonough & Jette, 2010). Forty-seven percent of patients have reported that the worst impact of arthritis is on ADL performance in which the routine daily activities necessary to maintaining independence lead to disability (Bhaskar et al., 2016). Living with knee OA can affect knee functional status and result in physical struggling (Palazzo et al., 2016).

Health-related quality of life [HRQOL] is the value assigned to the duration of life as modified by impairments, functional states, perceptions and social

opportunities influenced by disease, treatment or policy (Megari, 2013). An important aspect in HRQOL studies is how the manifestation of an illness or treatment is experienced by an individual. Patients' heath status assessment includes personal experiences affected by health care interventions as well as changes over time with a chronic disease and no particular treatment. It is generally accepted that HRQOL is a multidimensional construct consisting of at least three broad domains, namely physical, psychological and social functioning affected by disease and/ or treatment (Han, Lee, Lee, & Park, 2003). Patients with knee OA frequently have chronic pain and disability that can lead to a reduction in their HRQOL (Cross et al., 2014; Losina et al., 2015). Wilson and Cleary (1995) also suggested that HRQOL can be used as an outcome of interventions. Knee OA has potentially devastating effects on HRQOL and will represent an increasing economic burden in the future (Baldwin, Briggs, Bagg & Larmer, 2017). Moreover, the pain and physical disability brought about by knee OA also affect social functioning and mental health. Knee OA has significantly negative impact on the HRQOL of patients that includes the physical, psychological and social functioning associated with illness or treatment for knee OA (Hoogeboom et al., 2013). HRQOL is usually measured in chronic conditions and is frequently impaired to a great extent by conditions such as knee OA (Megari, 2013).

Current evidence indicates that individuals and families who engage in self-management [SM] behaviors improve health outcomes. The individual and family self-management theory [IFSMT] adds to the literature on self-management by focusing on individuals, dyads within the family, or the family unit as a whole thereby explicating the process components of self-management. It is a descriptive theory that offers a number of advantages. It combines and expands prior work related to individual and family self-management [SM], focusing on individuals, dyads within the family, or the family unit as a whole. It also attends to the contextual factors known to affect SM and the process of SM, while proposing relationships among contextual and process dimensions (Ryan & Sawin, 2009). IFSMT involves knowledge and beliefs, self-regulation skills and abilities, and social facilitation to manage chronic conditions or engage in healthy behaviors.

Self-management support [SMS] offers a more patient-centered, social and psychological approach. There have been numerous studies of the effectiveness of

self-skills training delivered to patients and the factors relating to acceptability and uptake by patients of one-off training courses (Rogers & Wilder, 2009). Thus, there is a need to understand how a systemic approach to self-management support reconfigures existing relationships, communication and practices as well as how the principles of a whole systems patient-centered approach to self-management can translate and become embedded and integrated into routine practice (McDonald, Khodyakova, Aranjuez, Dudley, & Montell, 2008). SMS describes actions taken by health care professionals and others to support a person's self-management. As the definitions indicate, much of the early discussion on SMS focused on support provided by the health care system. Recently, however, SMS has become recognized as also coming from outside the health care system, and includes environmental factors that support self-management (Brady, 2012).

Self-management support programs are designed to allow people with chronic conditions to take an active part in the management of their own conditions (Foster, Thomas, Hill, & Hay, 2010). The effectiveness of self-management support programs for various chronic diseases has been investigated by several studies. In many studies, improvements were found in patients with diabetes mellitus, hypertension and asthma (Warsi, Wang, LaValley, Avorn, & Solomon, 2004). However, not all chronic diseases have been proven to benefit from self-management support programs. It is difficult , therefore, to draw any conclusions about whether self-management support programs are effective for knee OA. This is because of the variability in the structures of previous studies, which were heterogeneous in terms of different types of arthritis, interventions (group or one-on-one programs, types of education materials, durations of programs and types of program facilitators) as well as different trial structures and variations in outcome measures (Warsi, LaValley, Wang, Avorn, & Solomon, 2003). In addition, although self-management support programs have been proven to be effective in various countries such as the United States of America, the United Kingdom and cities such as Hong Kong (Yip et al., 2007 a, b), such programs need to be specific to a local culture and in tune with ethnic groups (Yip et al., 2007 a).

Although self-management programs have become increasingly popular in the management of chronic diseases, there are many differences in the self-management

models available. Meta analyses of OA self-management programs have concluded that it is difficult to recommend any particular program in preference to another due to inconsistencies in the study designs used to evaluate different programs. However, the length of the program and the mode of delivery vary greatly among programs and illnesses. In view of the high prevalence of knee OA and the absence of unequivocal evidence of program effectiveness, self-management support programs have been tested in quality assurance projects and randomized controlled trials [RCTs], the results of which show improvement in quality of life, pain and function compared to control groups. Accordingly, the population of middle-aged women faces ever-increasing costs associated with OA. Therefore, it is important to establish whether delivery results in added benefits and/ or improvements in outcomes.

Traditional approaches to treatment such as joint replacement are successful for people who have advanced or severe disease, but they are not useful for most patients, who present with milder symptoms or at earlier stages of disease progression. Targets for preventing osteoarthritis of the hip and knee are similar to those for many chronic diseases such as controlling weight, increasing physical activity, improving education and psychological health, and avoiding injury. However, optimal management of symptoms and of restricted activity in people who already have knee pain is a priority for general practitioners, as this can reduce the prevalence of disability among elderly people in the community. Moreover, lack of effectiveness has been attributed to development and implementation methods.

However, there remains an opportunity to reduce the likelihood of progression or to slow progression in patients using therapeutic interventions such as physical therapy and weight loss and arthritis self-management programmes. Early detection and rehabilitation of the patient, education regarding prevention of progression damage would go a long way in improving the lifestyle of the society and the financial and social burden of the society. Only limited studies available regarding this problem in Thailand.

Objectives

To determine the effectiveness of a self-management support intervention on knee functional status and health-related quality of life in middle-aged women with

knee OA by comparing the knee functional status and health-related of quality of life of the participants between the experimental and control groups at pre-intervention, post-intervention and the 4-week followup.

Hypotheses

1. Participants in the intervention group have better knee functional status than that in the control group immediately post-intervention and at the 4-week follow-up.

2. Participants in the intervention group have better health-related of quality of life than that in the control group immediately post-intervention and at the 4-week follow-up.

Conceptual framework

The individual and family self-management theory [IFSMT] is a descriptive theory that offers a number of advantages and was used to guide the present study. This theory combines and expands prior work related to individual and family self-management, focusing on the individual, dyads within the family, or the family unit. It attends to the contextual factors known to affect self-management and the process of self-management in addition to proposing relationships among contextual and process dimensions (Ryan & Sawin, 2009). Self-management support involves providing knowledge and beliefs, encouraging self-regulation skills and abilities, and improving social facilitation to manage chronic conditions or engage in healthy behaviors. whereas self-management programs and interventions facilite development of self-management skills and activities designed to enhance health behavior change, decreased health care costs, and increased quality of life or well being. The identification and development of interventions to enhance individual's ability to manage health-related challenges has been of enduring interest among nursing researchers. The concepts of individual self-management have proven useful in understanding human response to illness and are often the target of nursing interventions. However, the study presents the framework as applicable to self-management in the context of middle-aged women.

The individual and family self-management theory [IFSMT] suggests a dynamic model of self-management consisting of: 1) condition-specific factors and physical/ social environments [context], 2) knowledge and beliefs, self-regulation skills and abilities, and social facilitation [process], and 3) cost, health status and HRQOL [outcomes]. Self-regulation skills includes the processes used to change behaviour, such as setting goals, self-monitoring, reflective thinking, planning/ participating in specific behaviours, management of responses and self-evaluation. Approaches to managing knee OA among middle-aged women using the IFSMT suggest individuals use self-regulation skills and abilities and work in partnership with healthcare providers to improve outcomes.

The process of self-management refers to the use of self- regulation skills to manage chronic conditions or risk factors. These processes generally include activities such as goal setting, self-monitoring and reflective thinking, decision-making, planning for and engaging in specific behaviors, self-evaluation and management of physical, emotional and cognitive responses associated with health behavior change. Self-management programs or interventions are designed by health care professionals with the intent of preparing persons to assume the responsibility of managing their chronic illnesses or engaging in health promotion activities. It has also been used to describe outcomes achieved by engaging in the self-management process. However, chronic diseases are increasing and the patients faced with suffering must adjust their behaviors accordingly in order to improve their health status. As a result, knee OA patients can live with their health conditions to a satisfactory level of knee functional status and HRQOL. This study focusing on self-management individual level. The study framework is illustrated in Figure 1.

Self-management support intervention for middle-aged women	→	Knee functional status
	→	Health-related quality of life [HRQOL]
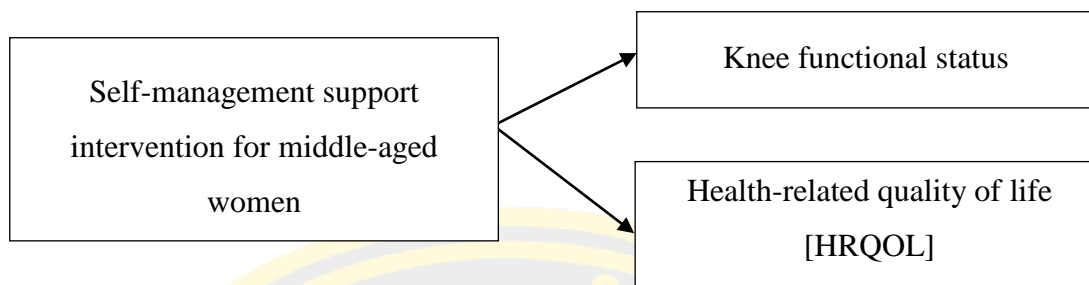
Figure 1 Framework of the study

Scope of study

This randomized controlled trial study was conducted to determine the effects of a self-management support program in middle-aged women with knee OA. The interventions was conducted in Nakhon Si Thammarat province in 2019. The participants comprised 40 participants randomly assigned into the experimental and the control groups of twenty participants each.

Definition of terms

The self-management support intervention refers to a set of activities aimed at improving health outcomes consisting of knee functional status and health-related quality of life. This intervention was developed by the researcher based on the IFSMT and reviewing related literatures and consisted of self-management support, which was the main implementations. The duration of the intervention in middle-aged women with knee OA was 80-90 minutes per session twice a week for four-week.

Knee functional status refers to the ability of middle-aged women with knee OA to take responsiblility for activity limitations leading to difficult mobility, restricted ability to walk and stand. Knee OA may contribute to altered knee joint loading during functional tasks. Due to the ongoing degenerative process, knee joints are painful and demonstrate reduced range of motion, weakness, and proprioceptive deficits. The assessment of functional status in knee OA was measured by the WOMAC (Kuptniratsaikul & Rattanachaiyanont, 2007).

Health-related quality of life [HRQOL] refers to the middle-aged women with a tree dimensional concept that includes the physical, psychological and social functioning associated with illness or treatment in middle-aged women with knee OA. In this study HRQOL was measured by the short form-36 [SF-36] Thai version (Tangtrakulwanich, Wiwatwongwana, Chongsuvivatwong, & Geater, 2006).

CHAPTER 2
LITERATURE REVIEWS

This chapter reviews the empirical evidence related to knee osteoarthritis [OA] in middle-aged women, knee functional status and health-related of quality of life [HRQOL] in persons with knee OA, the individual and family management theory [IFSMT] and evidence-based reviews of knee OA self-management.

Knee OA in middle-aged women

Knee OA is the most common form of arthritis and a leading cause of disability worldwide (Madry, Luyten, & Facchini, 2012). Knee OA is a disorder of the joints and a chronic disease (Lane, Shidara, & Wise, 2017). OA is currently believed to be a highly complex multi-factorial disease. OA is also a degenerative disease characterized by joint narrowing and bone spur formation with the formation of new bone matter and "low-grade inflammation" in the cartilage and synovium. The consequences are loss of joint structure and progressive deterioration of cartilage. Although the disease can be dependent on genetic and epigenetic factors, gender, ethnicity and age. It is also associated with obesity and overweight conditions, dietary factors and sedentary lifestyles (Musumeci et al., 2015).

Knee OA refers to clinical joint pain and stiffness, which are the most common symptoms (van Dijk et al., 2010). Joint inflammation, decreased range of motion and clinical features may include limited movement, effusion, mild inflammation with clicking or crepitus and knee functional limitations with impact on a person's ability to perform the activities of daily living [ADL] (Johnson & Hunter, 2014). Knee OA not only occurs more frequently in women than in men, but also with greater severity (Kidd, 2012). Individuals with occupations that require excessive knee bending/ kneeling or lifting and carrying heavy loads, as well as those who also participate in moderate or vigorous recreational activity, may have increased risk for lower extremity OA due to accumulating effects over time. Women with jobs requiring repetitive knee bending are three times more likely to have knee OA compared with those who have jobs not requiring such activity, even after controlling

for known risk factors (Robbins & Kulesa, 2012). In addition, knee OA often causes interference with work productivity, loss of the capability to walk, walking with a particularly unsteady gait and eventual knee disability, which is also a leading cause of weakness, physical, mental and social disability with reduced quality of life (Musumeci et al., 2015). Moreover, the prolonged physical inactivity observed in individuals suffering from arthritis increases their risk for chronic disease such as coronary heart disease, diabetes, hypertension, obesity and osteoporosis (Macera, Hootman, & Sniezek, 2003).

Causes of knee OA in women

The cause may be multifactorial and include anatomic differences, and genetic and hormonal issues. The anatomic differences between males and females that may play a role include narrower femurs, thinner patellae, larger quadriceps angles, and differences in tibia condylar size. Although these differences exist, there has been no link established between them and the development of OA. Differences in knee cartilage volume, however, may play an important role. Over time women showed more knee cartilage volume loss when compared with their male counterparts. As a result, women may have an increased risk of progression of tibiofemoral cartilage defects. Although not definitively proven, less baseline cartilage and increased volume loss are likely contributing factors to knee arthritis in women. In combination with anatomical differences, kinematic differences may also play a role in the development of OA in women (Arya & Jain, 2013). It has been implied that hormones may play a role in the increased incidence of OA in females, particularly a postmenopausal decrease in estrogen levels. Other risk factors contributing to the burden of OA (McCulloch, Litherland, & Rai, 2017).

However, more studies with long -term follow up are needed to establish a definitive link. Postmenopausal women, in particular, have an increased risk of developing arthritis and this has been linked to the decrease in estrogen during this time. Richmond, Carlson, Register, Shanker, and Loeser (2000) identified estrogen receptors in articular cartilage and although the clinical significance of the receptors is not fully understood, their existence implies a potential relationship between estrogen and articular cartilage health. In a more clinically related study, Zhang et al. (2006)

demonstrated that postmenopausal women who take estrogen replacement therapy have a decreased chance of developing radiographic evidence of knee arthritis.

In addition, the protective effect of estrogen replacement therapy was increased with the duration of the therapy. It appears that estrogen may have a beneficial effect on cartilage; however, the exact mechanism of this protection has yet to be elucidated. Other hormones and growth factors may also affect osteoarthritis in women (Hame & Alexander, 2013).

Diagnosis

The diagnosis of osteoarthritis of the knee does not differ between men and women. A history of knee pain, stiffness, crepitus, and swelling is common to both genders but a difference in the severity of symptoms does exist. Women typically present with worse symptoms including greater complaints of pain and disability. More advanced radiographic findings are also common. Radiographic evaluation should include weight-bearing views to determine the alignment of the limb. The amount of joint space narrowing, osteophyte formation, sclerosis, and subchondral cysts should be identified. Further imaging with magnetic resonance imaging is generally not required for moderate to advanced stages of arthritis unless other pathology is suspected. The reasons for gender-related differences in presentation can only be speculated at this time and further research is needed in order to implement appropriate treatment options (Gwilym, Pollard, & Carr, 2008).

Knee OA can be classified by clinical criteria alone (including pain, age, stiffness, crepitus, bony tenderness and bony enlargement), which makes up the inclusion criteria for most clinical trials in this field. The use of clinical criteria to diagnose OA is also recommended by the national clinical guidelines in Sweden and Denmark, which explicitly state that radiography is not needed for an OA diagnosis (Altman et al., 1986). Imaging findings of OA affects all of the tissues of the synovial joint, which include cartilage, bone, ligament, tendon, synovium and meniscus. In most OA research, the disease has been defined by radiography without necessarily considering other structural findings or symptoms experienced by the patient. This definition does not result in an accurate assessment of the disease, as the presence of radiographic OA is often discordant with the presence of other structural findings and related symptoms. A substantial proportion of patients with classic

radiographic features of OA do not experience clinically relevant symptoms of the disease (Englund et al., 2008). The use of highly sensitive MRI can also be effective, but the clinical relevance of these lesions is unknown. Indeed, in a large study of asymptomatic individuals without radiographic signs of OA, abnormalities thought to be associated with OA were detected in 89 percent of knees by MRI. In a population-based study of ambulatory individuals aged 50–90 years, right-knee meniscal tears were identified by MRI in only 19 percent of women aged 50-59 years and 56 percent of men aged 70-90 years. Among people with Knee OA, the prevalence of meniscal tears was 63 percent in symptomatic individuals and 60 percent in those who were asymptomatic. Of those with MRI-verified meniscal tears, 61 percent had had no pain, aching or stiffness during the preceding month (Guermazi et al., 2012).

The burden of symptomatic osteoarthritis

The measurable impacts of osteoarthritis include pain, loss of function, and physical and psychosocial disability. The data indicate that approximately a third of men and women have radiographic OA in the knee, and that self-reported knee pain may be used as an indicator of knee osteoarthritis.The financial impact is also significant, as increasing rates of joint replacement surgery a cost-effective intervention for severe osteoarthritis are a major contributor to rising direct costs of health care. As with other chronic conditions, symptoms often fluctuate and management can involve multiple health care providers (Litwic, Edwards, Dennison, & Cooper, 2013).

Recommendations for the treatment of knee OA range from activity modification and anti-inflammatory medication to total knee arthroplasty, depending on the disability of the patient and the severity of the disease. Although likely to have existed for some time, only recently have differences in recommendations and treatment based on gender been reported. The non-operative management of osteoarthritis is multimodal, and may include exercise, bracing, non-steroidal anti-inflammatory medication, corticosteroid injections, and complementary and alternative medicine. Exercise can reduce pain and increase function in a patient with early arthritic changes. Some evidence supports the recommendation that a low impact weight-bearing program may be beneficial to patients with osteoarthritis. However, the effects of exercise programs may be lost after 6 months if patients do not maintain the exercise program. The American Academy of Orthopedic Surgeons

[AAOS] also recommends weight loss in addition to activity modification as a means to reduce symptoms. Gender differences with respect to exercise, activity modification and weight loss on the symptoms and progression of knee arthritis have not been fully studied to date. The use of a knee brace is quite common in the treatment of knee OA and can include knee sleeves, hinged knee braces, and custom knee unloading braces (Uhlig, 2010).

Middle-aged women

Middle-aged women are 40-59 years old (WHO, 2018), which is an age group with a high incidence of premenopausal syndrome and BMI that contribute to knee OA. Women categorized in the high BMI group are frequently associated with the risk of developing knee OA (Roschel et al., 2011). It has also been stated that this age group is more likely to have symptomatic features of knee OA. Furthermore, it has been concluded that there is a relationship between knee OA and menopause, which shows that there is an early peaking of the incidence of knee OA in the fifth decade of life.

Most previous studies have focused on knee OA in elderly adults, while middle-aged women were disregarded. Proper management of knee OA in middle-aged women is essential to delaying the progression knee symptom severity and the dramatic rise in the prevalence rate of knee OA after menopause (Heidary, 2011), particularly the increased incidence in middle-aged women (Hame & Alexander, 2013). During menopause, lower estrogen levels often influence many body composition changes such as increased body fat mass or obesity with impact on bone density, reduced volume of cartilage, bone loss or lack of muscle strength (Roman-Blas, Castañeda, Largo, & Herrero-Beaumont, 2009). Basically, there is a reduction in the levels of estrogen as women age. Estrogen has a strong relationship with the onset and progression of OA in menopausal women (Salve, Gupta, Palanivel, Yadav, & Singh, 2010). It also reduces the level of serum calcium and phosphate in joints and inhibits in bone resorption in addition to affecting bone physiology. Moreover, women may have thinner and more reduced volume of knee cartilage than men (Srikanth et al., 2005). As a result, the knee is the first joint to suffer this consequence and could have impaired function, thereby affecting the large working population (Yucesoy, Charles, Baker, & Burchfiel, 2015). Knee OA affects middle-

aged women who suffer from chronic pain, limited physical activities such as walking, sitting, or standing and lower limb disability (Grotle, Hagen, Natvig, Dahl, & Kvien, 2008). In addition, knee OA also induces anxiety, depression and distress. Disability leads to difficult mobility, social isolation and loss of work opportunities (Bhatia et al., 2013).

The estimated prevalence of knee OA is 14.2 percent (15.6% among women; 12.4% among men). Previous findings have also indicated that osteoarthritis is a common disease in middle-aged and older Canadians visiting primary care practitioners (Birtwhistle et al., 2015). Furthermore, one out of every five adults aged 40 years in a Nigerian rural community had symptomatic knee OA with a female preponderance at a ratio of 1.2:1 (Akinpelu, Alonge, Adekanla, & Odole, 2009). A significant relationship ($p < 0.05$) has been found between the prevalence of knee OA in postmenopausal women, which shows that there is an early peaking in the incidence of knee OA in the fifth decade of life due to hormonal imbalance during the post-menopausal phase. Moreover, findings have revealed that the functional activity of individuals is reduced due to knee pain and mal-alignment of the knee joint. Hence, daily activities involving squatting and ground -sitting, particularly for homebound females, affect the functional activity of the knee joint and also reduce the functional ability of individuals. According the studies, similarities have been revealed in the female age group in which common components involved activities such as squatting and prolonged sitting.

Knee functional status and HRQOL in persons with knee OA

Functional status is an individual's ability to perform normal daily activities required to meet basic needs and fulfill usual roles, while maintaining health and well-being. Functional status is the degree to which a person is able to perform socially allocated roles free of physical or mental health-related limitations. In addition, functional status can be influenced by biological or physiological impairment, symptoms, mood and other factors. Functional status is also likely to be influenced by health perceptions (Leidy, 1995). Viewed in different ways, functional status is frequently used interchangeably with function, functioning, functional ability and health (Knight, 2000).

The knee joint is one of the strongest and the largest bones in the human body. The knee, also known as the tibiofemoral joint, is a synovial hinge joint formed between three bones: the femur, tibia, and patella. As the knee is a synovial hinge joint, its function is to permit the flexion and extension of the lower leg relative to the thigh. The knee is a modified hinge joint that permits flexion and extension as well as slight internal and external rotation (Kulowski, 2007). It allows the lower leg to move relative to the thigh while supporting the body's weight. As a result, the knee is the first joint to develop osteoarthritis. Accordingly, this disability burden is attributable to the involvement of knee OA. In terms of disability, lower extremity dysfunction is common in people with osteoarthritis [OA] (Fransen et al., 2011).

OA is currently the most common chronic musculoskeletal disease (Lawrence et al., 2008). Knee OA can lead to functional limitations such as pain, joint stiffness with activity duration of less than 30 minutes and muscle weakness (Taruc-Uy & Lynch, 2013). Knee OA often interferes with work productivity, diminishes the ability to walk with the addition of a particularly unsteady gait and eventually results in knee disability (Musumeci et al., 2015). Functional limitations include restrictions in walking, picking up items from the floor, and climbing stairs. Disability is defined as limitations, difficulty or inability to perform more complex behaviors or activities. Ultimately, disability leads to difficult mobility, social isolation and loss of work opportunities (Bhatia et al., 2013).

Above the age of 50 years (which approximates the age of menopause), the incidence of OA rises more in women than in men, which makes it tempting to postulate that ovarian hormones play a protective role in joint health. It has been postulated that the perimenopausal decrease in progesterone levels results in a transient period of exposure to unopposed estrogens that increases risk of OA. That unopposed estrogen therapy had favorable effects on joint health. It remains unclear how short-term hormonal imbalances or permanent declines in hormone concentrations contribute to the surge in OA that appears to occur around the age of menopause (Stevens-Lapsley & Kohrt, 2010).

Knee OA is a highly prevalent condition that can result in disabling pain and loss of physical function. Several studies have identified the functional status of knee OA in middle-aged women. As previously mentioned, knee OA is responsible

for activity limitations, restricted ability to walk and stand, and a progressive deformation of the knee joint, because increased joint damage is positively associated with pain and functional limitations with difficult mobility (McDonough & Jette, 2010). As a result, the routine daily activities necessary to maintaining independence lead to disability (Bhaskar et al., 2016). Living with knee OA can affect knee functional status and result in physical struggling (Palazzo et al., 2016). Additionally, the onset of muscle weakness and joint proprioception impairment results in limitation of daily activities leading to worsening of postural control and a predisposition to increased risk for falls (Sanchez-Ramirez et al., 2013).

However, much remains unknown about the specific contributions of osteoarthritis and intervening variables to the development of disability. Recently, several studies have confirmed an increased risk for symptomatic knee OA associated with age, female gender, physical activity, occupation and obesity (Litwic et al., 2013). The interactions of these risk factors are both varied and complex (Johnson & Hunter, 2014). Physical activity and repetitive joint use have been associated with an increased risk for OA (Fransen et al., 2011). Occupations associated with the greatest risk include farming, construction work (especially bricklaying and flooring installation), and health care work (McWilliams et al., 2011). In addition, obesity is widely acknowledged as a risk factor for both the incidence and progression of knee OA (Bliddal et al., 2014). Overweight conditions and obesity are significantly associated with higher incidence of knee OA (Zheng & Chen, 2015). The female gender has been found to be related to higher prevalence and severity of OA than the male gender (Boyan et al., 2013). Moreover, the prevalence rate of knee OA rises dramatically during the post-menopause phase due to lower estrogen levels. It also frequently influences many body composition changes such as increased body fat or obesity, both of which have impact on bone density, reduce the volume of cartilage, and reduce muscle strength (Alrushud, Rushton, Kanavaki, & Greig, 2017).

Traditionally, OA was diagnosed by the use of radiography, and joint arthroplasty was regarded as the only effective treatment. However, the results of the past 20 years of research have changed our thinking about the disease, as well as how and when to administer treatment. Although OA was previously regarded as a disease of the elderly, its development starts much earlier than originally thought, and OA is

ranked among the top 20 diseases in the group aged 40-45 years (Braghin, Libardi, Junqueira, Nogueira-Barbosa, & de Abreu, 2018). Today, OA is considered a whole-organ disease that is amenable to prevention and treatment in the early stages. The prevention of knee OA, primary and secondary strategies are necessary to prevent increased rates of OA resulting from an ageing population and increasing rates of obesity and physical inactivity. The strategies developed for knee OA might not be transferable to other joints due to anatomical and other differences. Primary preventive strategies are intended to prevent the onset of specific diseases via risk reduction by altering behaviors or exposures that can lead to disease, or by enhancing resistance to the effects of exposure to a disease agent. Preventing knee injury and obesity during adolescence are examples of strategies that are relevant to knee OA. Secondary prevention includes the detection and treatment of risk factors for progression in individuals who are already at risk (Roos & Arden, 2015).

Previous studies have shown the relationship between knee OA pain and functional decline (Laslett et al., 2012). Improving knee functional status and health education are recommended by all clinical practice guidelines for the management of knee OA (Jevsevar, 2013). There is also a significant relationship between BMI and functional activity scores ($p < 0.05$). Function in patients with knee OA is restricted as a result of excess weight. In one study, preventive measures were able to help Turkish patients with OA maintain their ideal weight.

Furthermore, impaired functional status or inability to perform the activities of daily living leads to interference with social lives and personal relationships, reduces levels of independence and increases the need for assistance. Because interventions for knee OA are largely aimed at the reduction of symptoms, treatments that significantly reduce the signs and symptoms of OA should also lead to an improvement in knee functional status as the severity of symptoms declines. The assessment of functional status in female patients with knee OA, therefore, is an important means of evaluating the benefits.

But there are challenges for primary care of how to provide advice to the many people with this problem, and how to overcome barriers to exercise that may be linked to people's preconceptions (for example, that exercise may harmtheir joint8), or to theirmotivation. Recent trials of physiotherapy-supported exercise interventions

indicate that longerterm change is achievable, but Williams and colleagues rightly ask if something simplemay encourage andmaintain activity change, such as the use of a booklet given to everyonewith clinical osteoarthritis in the knee, designed specifically to overcome beliefs and attitudes that are barriers to exercise. Results of their proofof-principle study suggest that a large trial to investigate this question would be feasible, but that any benefits in terms of extra numbers starting and maintaining exercise are likely to be modest, and that ways to repeat or reinforce advice over time need to be tested. their concern to help the individual. The people' s preconceptions (for example, that exercise may harm their jont) (Hendry, Williams, Markland, Wilkinson, & Maddison, 2006).

However, little is known about self-management programs based on the CCM in people with knee OA, especially those emphasizing muscle strengthening and providing improved function in symptomatic subjects with knee OA (Nguyen, Lefevre-Colau, Poiraudeau, & Rannou, 2016). In particular, it is still not clear whether there is a difference in postural control and function between elderly and middle-aged subjects with knee OA. Instead, knee OA should be viewed as a chronic condition in which prevention and early comprehensive-care models are the accepted norm, as is the case with other chronic diseases. Joint injury, obesity and impaired muscle function are modifiable risk factors amenable to primary and secondary preventive strategies. The strategies most appropriate for each patient should be identified.

The results of reviewed study support that avoidance of activity leads to deterioration of muscle strength and consequently to more limitations in activities in patients with knee (Pisters, Veenhof, Van Dijk, Poiraudeau, & Rannou, 2014). Knee OA is associated with impairments in knee functional status and structures, such as pain and reduced muscle strength, and limitations in activities, such as walking, stair climbing, rising from a chair. Limitations in activities seem to deteriorate slowly over time.

Health-related Quality of Life (HRQOL)

HRQOL defined as the value assigned to duration of life as modified by the impairments, functional states, perceptions and social opportunities that are influenced by disease, injury, treatment or policy (Patrick & Erickson,1993). A main topic in HRQOL includes patients' appraisal of their current level of functioning,

as well as satisfaction with funcionality compared to what patients believe to be ideal. A conceptual model of HRQOL provides a theoretical approach to conceptualizing HRQOL as a multidimensional construct and integrates the biological and psychological aspects of health outcomes (Wilson & Cleary, 1995) at the following five levels: physiological factors, symptom status, functional health, general health perceptions and overall QoL. HRQOL has been widely applied to different populations, including patients with arthritis, Parkinson's disease, cancer and HIV. It is indicated that symptom status, functional health, general health perceptions, and overall QoL are dimensions of HRQOL. The current study showed that participants with knee pain (with and without knee OA) have poorer HRQoL, measured by both generic and disease-specific scales, than the references. The presence of knee OA has additional negative impact on HRQoL above the knee pain alone. Importantly, we found that applying different definitions of knee OA resulted in different levels of HRQoL and this was mainly explained by the knee pain experience. These differences are important to take into account when assessing the impact of knee OA on HRQoL and interpreting the results of cost-utility analyses (Kao, Wu, Tsai, Chang, & Wu, 2012)

During previous decades, there was an increasing predominance of chronic disorders as a result of improved living conditions, better prevention, infectious diseases management, medical technological improvements and overall aging of the population. Therefore, an increasing number of people live with chronic diseases that can adversely affect their HRQOL. In general, chronic diseases are slow in progression, long in duration and require life-long medical treatment. The majority of chronic diseases hold the potential to worsen the overall health of patients by limiting their capacity to live well, while further limiting functional status, productivity and HRQOL. Among these diseases are OA, cancer, heart diseases, stroke, diabetes, HIV, bowel diseases, renal disease and diseases of central nervous system (Megari, 2013).

According to the literature about chronic diseases, HRQOL is studied as a primary or secondary outcome. HRQOL is an important indicator used for evaluating the impact of a disease and the effects of medical intervention. Thus, an improvement in HRQOL is considered an essential primary outcome and determinant of program benefit. The chronic diseases that mostly affect HRQOL in Asian populations are not

the same when compared to Western populations, because Asian populations perceive health more holistically (Cheung et al., 2005). As a result, HRQOL assessment is used as an outcome of any therapeutic intervention (Martinez-Martin & Kurtis, 2012). The interventions that may improve HRQOL include active self-management, support and encouragement strategies, patient education, exercise programs and employment support (Molzahn & Page). HRQOL is, however, useful, within the context of the same chronic disease as a means comparing people at the same stage of the disease, because each disease has its own unique trajectory. Estimation of the relative impact of chronic diseases on HRQOL is necessary in order to better plan and distribute resources for research, training and health care and further promote living well with chronic diseases. Integrated patient treatment should include numerous specialties in addition to physicians, such as psychologists, nurses and social workers, in order to achieve the enhancement of HRQOL in patients with chronic disease.

Knee OA is a leading global cause of HRQOL loss and is associated with significant economic costs as well as reduced overall quality of life (Losina et al., 2015; Cross et al., 2014). Knee OA is responsible for higher major lifetime disability in females than males due to the greater prevalence of knee osteoarthritis and higher life expectancy for females (Abbott, Usiskin, Wilson, Hansen, & Losina, 2017). Knee OA also has potentially devastating effects on HRQOL and represents an increasing economic burden in the future. Moreover, pain and physical disability brought about by OA also affect social functioning, further diminishing the patient's quality of life (Kiadaliri et al., 2016). The burden of OA is, therefore, considerable based on both societal and individual patient perspectives (Jack Farr, Miller, & Block, 2013). The high prevalence of OA and the impact on the individual indicate that resources need to be increased to improve quality of life for people with OA who frequently have a significantly higher probability of absenteeism and more days missed from work. Furthermore, a recent analysis from the USA estimated the annual per capita absenteeism costs to be US$ 469 for female workers and US$ 520 for male workers (Kotlarz, Gunnarsson, Fang, & Rizzo, 2009). In the past two decades, it has been increasingly recognized that a key outcome measure for health care interventions for OA, and many other conditions, is HRQOL (Revicki, Zodet, Joshua-Gotlib, Levine, & Crawley, 2003). This is especially germane for OA where most available

therapies target symptoms rather than modifying the underlying disease process (Cella & Nowinski, 2002). Determining the effectiveness of such therapies, therefore, rests on assessing improvements in the HRQOL of OA patients as illustrated by several randomized clinical trials [RCTs] that showed improvements in HRQOL in OA patients treated with glucosamine sulfate (Jahan, 2017).

The individual and family self-management support [IFSMT]

A middle range theory, individual and family self-management theory [IFSMT] developed by Ryan and Sawin (2009) can provide a framework for assessing, planning, and implementing a theory based approach to care for middle-aged women with knee OA SM outcomes. This study examines essential elements of IFSMT and provides a synthesis of SM literature related to knee functional status and HRQOL. IFSMT conceptualizes SM as a process by which individuals and families use knowledge and beliefs, self-regulation skills and abilities, and social facilitation to achieve proximal and distal outcomes and cost of health) (Ryan & Sawin, 2009). According to IFSMT, SM takes place in the context of risk and protective factors specific to a particular health condition, the physical and social environment and various individual and family factors.

IFSM posits 3 constructs related to self-management including contextual aspects, that is, individual and external factors that might challenge or enhance the patient's ability to successfully self-manage, and the provider's capacity to support self-management efforts; procedural aspects of self-management, including self-regulation (goal setting, self-evaluation, and self-monitoring), self-efficacy, and social facilitation (social support for self-management); and proximal or short-term and distal outcomes such as changes in health behaviors, reduced health system utilization, and costs (Ryan & Sawin, 2009).

As mentioned above, the interaction among dimension is described that factors in the context dimension affect an individual's and family's ability to engage in the process dimension and have direct impact on outcomes. Also, constructs in the process dimension are linked to constructs in the context dimension, are internally related, and affect the outcome dimension. Knowledge and specific health beliefs are

linked to engagement in self-regulation behaviors. Social facilitation is inter-related with knowledge and beliefs and self-regulation. Knowledgeable engagement in supported self-regulation behaviors leads to engagement in self-management behaviors or proximal outcomes. Constructs of the outcome dimensions are affected by both context and process dimensions. Outcomes are proximal and distal, with achievement of proximal outcomes causing, at least in part, distal outcomes.
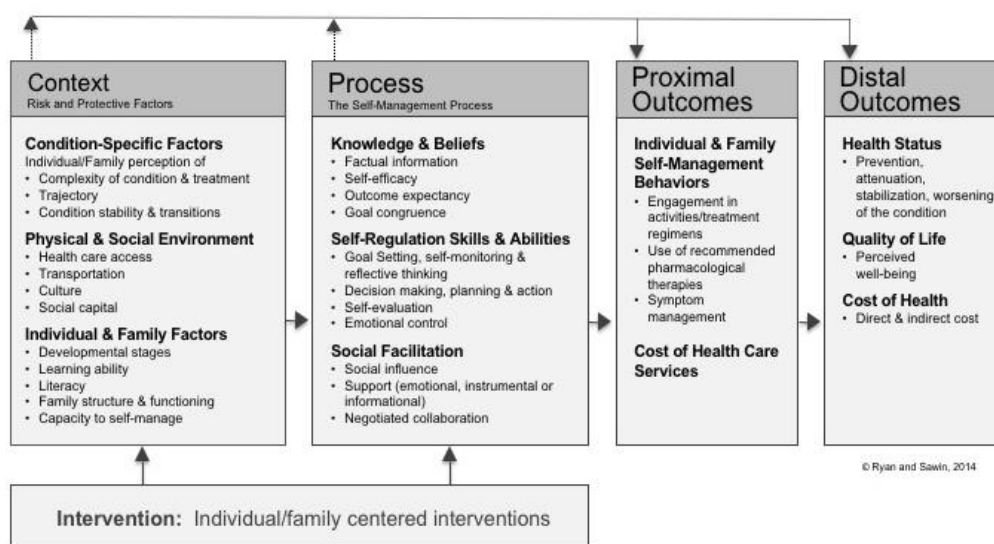
Figure 2 Individual and family self-management theory (Ryan & Sawin, 2014)

According to Ryan and Sawin (2009), they explain that this theory should be an intervention development by addressing either the context or the process. Interventions aim at the context and can reduce risk or foster conditions that support self-management. Interventions aim at the self-management process and can enhance knowledge and beliefs, increase an individual's use of self-regulation behaviors and foster social facilitation. Therefore, persons should be more likely to engage in the recommended health behaviors. They should have knowledge and beliefs consistent with their behaviors, if they develop self-regulation skills and abilities to change their health behaviors, and experience social facilitations support from their health professional that positively influences and supports them to engage in achieving a change in health behaviors for prevention or delay of knee OA complications.

Hence nurses must play an vital role in educating the individual and the family about self management plans and which improves their health outcomes. Hence the investigator applied IFSMT among middle-aged women with knee OA in order to improve their well-being and change their health behaviour pattern and reduce their visit to the health care.

Evidence-based reviews of knee OA self-management

In this review, the studies compared the effects of self-management programs on self-efficacy for self-management with the effects of routine care. Four studies suggested that self-management programs had better effectiveness in improving self-efficacy for self-management of pain and other symptoms than routine care. Self-management programs have been found to be significantly more effective in pain reduction than routine care. An arthritis self-management program [ASMP] with an added exercise component among osteoarthritic knee sufferers was provided for participants in Hong Kong (Asia) with an experimental design. The ASMP developed by Lorig and Fries at Stanford University is based on Bandura's concept of self-efficacy and behavior modificiation (Yip et al., 2007 a, b; Yip, Sit, Wong, Chong, & Chung, 2008).

The ASMP intervention consisted of six two-hour classes held once a week with 10-15 participants led by registered nurses trained in small group leadership and the basic principles of self-management. The classes were conducted according to a structured protocol. The program focused on the use of an action plan and teaching participants how to cope and manage common knee osteoarthritic consequences such as arthritis pain, fatigue, daily activity limitations and stress. The following topics were covered: 1) an overview of self-management principles; 2) medical aspects and pain management; 3) joint protection; 4) physical activity and exercise; 5) available treatments; 6) stress management; 7) nutrition; and 8) communication skills and availability of community resources. The exercises took approximately 15 minutes to execute. The control group received routine orthopedic treatment (treatment prescribed by orthopedic doctors or out-patient clinics) with no other treatment. The participants in the intervention group received a 6-week ASMP with an added exercise component. Outcome measures included arthritic pain and fatigue rating,

practice of light exercise routines, functional status and number of unplanned arthritis-related medical consultations.

Self-efficacy and osteoarthritis pain were the outcome measures (Yip et al., 2007 b; Yip et al., 2008). In addition, self-management programs were found to be more effective in increasing exercise practice than routine care (Yip et al., 2007 a, b). Moreover, a study by Yip et al. (2008) supported that a self-management group showed better improvement in self-rated health than a routine care group. This finding was consistent with the significant effects of self-management programs on improving self-efficacy in this study. The study by Yip et al. (2008) claimed that, a self-management program led to greater decreases in current pain, pain at night and pain during walking when compared to routine care, but not when changing position, which imposes more physical strain.

The effects of self-management, education and specific exercises delivered by health professionals in patients with knee OA by Coleman et al. (2012) in an education self-management program for subjects with knee OA program implemented by health professionals in a primary health care setting was able to achieve and maintain clinically meaningful improvements compared to standard medical management in a control group. In this study, the effects of standard medical management will be compared with the effects of this program in a single-blind randomized study. Participants will be randomized into either intervention or control groups (delayed start). The intervention group will complete the OA knee program and both groups will be followed for 6 months. Assessments will be at baseline, 8 weeks and 6 months. SF-36, WOMAC and VAS pain questionnaires will be completed. Isometric quadriceps and hamstring strength will be measured by using a dynamometer. Knee range of movement will be assessed by using a goniometer and physical function will be determined by a modified timed-up and go test. Data will be analyzed by using repeated measures ANOVA. The results of this study will be compared to the effects of self-management programs on pain reduction with the effects of routine care only. Self-management programs have been found to be significantly more effective in pain reduction and significant difference in quality of life than routine care for OA pain as one of the outcome measures.

In a study entitled family practice nurses supporting self-management in

older patients with mild osteoarthritis: A randomized trial by Wetzels, Harmsen, Van Weel, Grol, and Wensing (2007) the idea was supported that self-management intends to improve lifestyle, which is beneficial for patients with mild OA. A nurse-based intervention in older OA patients' self-management was measured with the aim of assessing its effects on mobility and functioning. Randomized controlled trial of patients ($\geq$ 65 years) with mild hip or knee OA from nine family practices were explored in the Netherlands.

The intervention consisted of supporting patients' self-management of OA symptoms by using a practice-based nurse. The outcome measures were patients' mobility. The intervention consisted of education and self-management of OA symptoms. It was conducted by a nurse and aimed to change life style behavior by improving mobility and physical functioning. Based on a time-scale, the intervention consisted of three parts. First, the patients had to prepare for the home visits of nurses by using an educational leaflet about osteoarthritis (developed by the Dutch College of General Practitioners) and a booklet with health-status charts. The health-status charts were based on the Wonca COOP-charts. The patients needed to state their level of exercise, pain-level and impairments prior to the nurse home visit. The charts were discussed during a 30-minute nurse home visit as the second part of the intervention. In this home visit, the patients gained insight into their own OA symptoms. Subsequently, the patients agreed to try to change one of four lifestyle items (physical exercise, weight loss, use of a walking aid and how to use over-the-counter pain relief medications (pain). The third part of the intervention was a follow-up phone call after approximately three months. In this phone call, the nurse evaluated to what extent the patient had been able to adapt to lifestyle changes and, subsequently, what might be necessary to maintain the changes. The nurse conducting the intervention had undergone certified education in rheumatology. Patients in the control group received only the educational leaflet about osteoarthritis. Patient-reported functioning improved on four scales in the intervention group compared to one scale in the control group. However, this result was not significant. Mobility improved in both groups without a significant difference between the two groups. There were no differences between the groups regarding consultations with family physicians or physiotherapists, or medication use. A nurse-based intervention on older OA patients' self-management

did not improve self-reported functioning or mobility or patients' use of health care resources.

A study of the effects of a self-management intervention among middle-age adults with knee osteoarthritis by Mei-Hua Kao, Pi-Feng Hsu, Sheng-Fang Tien, and Chie-Pein Chen (2017) was based on a quasi-experimental design and applied to middle-aged adults with knee OA. The self-management intervention for knee OA was based on the self-regulation theory. The intervention was divided into the following four parts: 1) an introduction to the causes and symptoms of knee OA; 2) treatments for degenerative knee joints (medications, physical therapy and surgery); 3) importance of self-management (managing diet and weight; the benefits of activities and sports, daily care strategies) and 4) monitoring and treating symptoms (symptom monitoring, symptom management and emotional adjustment and processing).

The intervention was implemented at four weeks after the baseline measurement to avoid any influence of medical treatment. The first session (Week 4) taught self-monitoring, which included identifying participants' symptoms of knee OA and daily activities that were affected by their symptoms. These were recorded in a daily journal, which has been shown to improve self-monitoring when managing health. The journal entries included the date, knee symptom (s) and frequency of symptom (s), situation (s) causing symptoms (work, activity and sports, etc.) and the degree of discomfort. Participants were directed to select a problem area they wanted to improve and were given guidance on the use of coping strategies for managing symptoms and emotions. The second session at five weeks after baseline involved self-judgment. Self-judgment helped participants self-evaluate health status and included interviews, home visits and telephone contact. This format has been demonstrated to provide information to guide patients in setting individual goals. The self-reaction component was conducted in the final session (6 weeks after baseline). Participants were asked about their progress in achieving set goals.

The participants' ability to achieve set goals was evaluated and the participants were provided guidance plans for mitigating knee symptoms. During this stage, information about techniques and coping strategies to relieve symptoms such

as diet, exercise and lifestyle information were provided. This session established incentives to encourage participants to achieve set goals, which can motivate patients to modify behavior. Encouragement from another person was provided by using verbal persuasion via telephone calls or direct person-to-person contact, which can enhance the self-efficacy of patients. During the entire course of the self-management process, the participants were contacted weekly to provide continuous positive feedback and encouragement to meet objectives and create a sense of self-reward. The participants continued the process of self-management for the next 12 weeks. Additional measurements and questionnaire data were obtained for the study at 10 and 18 weeks. Data were obtained either in the outpatient clinic or the home setting. Knee OA patients were recruited from two medical centers in northern Taiwan. A generalized estimating equation compared assessment scores for 105 participants after the intervention (10 and 18 weeks) with scores at four weeks.

According to the findings, knee symptoms and physical function scores significantly improved and quality of life scores significantly increased while body mass index, unplanned medical consultations and doses of pain medication significantly decreased at 10 and 18 weeks compared to four weeks. After making adjustments for the effects of time and significantly related factors, the participants' knee symptoms, physical function, body mass index and quality of life were found to have significantly improved at 10 and 18 weeks compared to four weeks. The self-management intervention based on self-regulation theory improved participants' symptoms and functionality with knee OA, as well as overall health and quality of life.

A study on re-designing care for chronic conditions by improving hospital-based ambulatory care for people with osteoarthritis of the hip and knee by Brand, Amatya, Gordon, Tosti, and Gorelik (2010) involved the implementation of a new chronic disease management osteoarthritis service, which was multidisciplinary and evidence-based with support for patient self-management and care coordination. A musculoskeletal coordinator role was pivotal to service redesign and osteoarthritis pathway implementation. The impact evaluation included service utilization, patient and general practitioner service experience, a before and after audit of clinician adherence to recommendations, and 3-and 6-month patient health outcomes (pain,

physical function, patient and physician global health (visual analogue scale), disability. A total of 123 patients with a median age of 66 years were assessed.

Documentation of osteoarthritis assessment and management improved for all parameters. At three months, there were improvements in self-reported pain ($p < 0.001$), global function ($p < 0.001$), physician- and patient-reported global health ($p < 0.001$), partners in health scores ($p < 0.001$) and hip and knee multi-attribute prioritization tool scores ($p < 0.014$). Body mass index did not improve. Patients and general practitioners reported positive experiences, but there was variable uptake of recommendations by patients. The main factors influencing the uptake of recommendations were access block to community services in the first three months and patient preferences for therapy. The cost implications for implementation were low. The osteoarthritis service model is feasible for implementation, well-received by patients and staff and provides a template for translation into other settings.

The implementation of a community-based aerobic walking program for mild to moderate knee osteoarthritis was explored in a knowledge translation randomized controlled trial (Part II: Clinical outcomes) by Brosseau et al. (2012). The findings indicated a need to improve knowledge translation in order to influence individuals to adopt effective self-management interventions such as an adapted walking program. A single-blind, randomized control trial was conducted. Subjects ($n = 222$) were randomly assigned to one of three knowledge translation groups as follows: 1) walking and behavioral [WB] intervention (18 males, 57 females), which included a supervised community-based aerobic walking program combined with a behavioral intervention and an educational pamphlet on the benefits of walking; 2) walking [W] intervention (24 males, 57 females) wherein participants only received the supervised community-based aerobic walking program intervention and the educational pamphlet; 3) self-directed control [C] (32 males, 52 females) wherein participants only received the educational pamphlet. One-way analyses of variance were used to test for differences in quality of life, adherence, confidence and clinical outcomes among the study groups at each three-month assessment during the 12-month intervention period and the 6-month follow-up period. The results found the clinical and quality of life outcomes to improve among the participants in each of the three comparative groups.

A comparison of strength-training, self-management and a combination of early osteoarthritis of the knee was conducted by McKnight (2012) and involved the implementation of a community-based aerobic walking program for mild to moderate knee OA. A single-blind, randomized control trial was conducted. The subjects were randomized into one of three of the following knowledge translation groups: 1) walking and behavioral [WB] intervention, which included the supervised community-based aerobic walking program combined with a behavioral intervention and an educational pamphlet on the benefits of walking; 2) walking [W] intervention in which participants only received the supervised community-based aerobic walking program intervention and the educational pamphlet; 3) self-directed control [C] wherein participants only received the educational pamphlet.

The three groups showed a significant and large increase from pre- to post-treatment in all physical functioning measures including leg press ($d = .85$), range of motion ($d = 1.00$), work capacity ($d = .60$), balance ($d = .59$), and stair climbing ($d = .59$). There were no significant differences among the groups. Middle-aged, sedentary persons with mild early knee osteoarthritis benefited from strength-training, self-management and a combination of both. These results suggest that both strength-training and self-management are suitable treatments for early onset of knee osteoarthritis in middle-aged adults. Self-management alone may offer the least burdensome treatment for early osteoarthritis.

At study entitled effects of activity strategy training on pain and physical activity in older adults with knee or hip osteoarthritis: a pilot study was conducted by Murphy et al. (2008). to teach adaptive strategies for symptom control and engagement in physical activity [PA]. The randomized controlled pilot trial was conducted at four sites (3 senior housing facilities and 1 senior center) in southeastern, lower Michigan. Fifty-four older adults with hip or knee OA (mean ± *SD* age 75.3 ± 7.1 years) participated. At each site, older adults were randomly assigned to one of two programs: exercise plus AST or exercise plus health education. The programs involved eight sessions over four weeks with two follow-up sessions over a 6-month period, and were conducted concurrently within each site where exercise was coupled with activity strategy training [AST]. Patients were followed up for six weeks. The patients attended eight exercise sessions of 45-minute duration, followed by the

AST session. The patients visited once by OT. The level of complexity was intermediate and pain decreased in both groups. Nevertheless, there was no significant difference between the groups (WOMAC pain: effect size 0.03, $p = 0.47$). Total physical activity [PA] and objective peak PA increased in the exercise plus AST group; but only peak PA was significantly different compared to the exercise plus education group (effect size 0.30, $p = 0.02$).

Summary

The self-management support was recommended by above studies to implement in middle-aged women with knee OA because it can achieve results with less time and cost than other approaches. From above mentioned, it could be concluded that self-management support, especially in group modality, is an efficacy approach for middle-aged women. The suggestions from those studies stated that more outcome research and follow-up studies need to be conducted testing the efficacy of self-management support. This self-management support intervention differs from others as the intervention is specific not only to their pathology [OA], but also to the joint affected (knee). Researcher use tool to deliver information and education covering a core self-management of knee OA topics, while utilising the constructs of SM to enable participants to take control of their knee OA and to improve their self-management.

CHAPTER 3
RESEARCH METHODS

The purpose of this study was to determine the effectiveness of a self-management support intervention on knee functional status and health-related quality of life among middle-aged women with knee OA. The research methods of this study included research design, population and sample, instrumentation, protection of human participants, data collection procedures and data analysis.

Research design

A randomized control trial [RCT] design with pretest-posttest and follow-up with 4 weeks duration and 4 weeks follow-up was employed to determine the effectiveness of a self-management support intervention on knee functional status and health-related quality of life among middle-aged women with knee OA. The participants were individually and randomly assigned to either the experimental or the control groups. The participants were blinded to group allocation.

Study setting

Outpatient department of orthorpedic at the Thasala hospital, Nakhon Si Thammarat province southern of Thailand. This clinic open on Monday and Wednesday. There were approximately 200-300 patients per year. Additionally, at this clinic there was available meeting room activities. This room was used to implement the intervention with given permission by the director of outpatient department of orthorpedic.

Population and sample

Target population

The target population of this study was middle-aged women aged 40-59 years old who have been clinically diagnosed with knee OA. The patients receiving service at outpatient department of orthorpedic, Thasala hospital in 2019. The total

patient in 2019 from medical recorded in the computer center of Thasala hospital 230 cases.

Accessible population

The accessible population was the target population who resided in Thasala District, Nakhon Si Thammarat province, with similar contexts. Sample were selected by a simple random sampling method based on the participants' living area in two communities in Nakhon Si Thammarat. The participants were recruited if they were diagnosed by physician. At the outpatient department of orthorpedic, Thasala hospital. The community of this study meet the following inclusion criteria.

Inclusion criteria

1. The middle-aged women with knee OA were diagnosis more than 3 month

2. No history of any major knee injury

3. No knee surgery or steroid uses

4. Be able to understand of well-communicate Thai language

Exclusion Criteria

1. Serious co-morbidity such as stroke

2. Symptomatic injury to the knee joint with inflammatory joint disease

Sample size

The sample size was calculated by using power calculation with the G*power program (Version 3.1.2.9) (Fual et al., 2009). Power analysis involved *F test* for ANOVA repeated measure within-between factors with a power = .80, a significance level = .05, and an effect size = .61, all of which will be obtained from a previous intervention study on self-efficacy intervention in knee OA (Coleman et al., 2008;Yip et al., 2007 a). These measures were repeated three times with a total minimum sample size of 30 participants. With an estimated attrition rate of 30 percent based on previous studies, finally, a total of 40 participants were recruited and randomly assigned 20 participants per group.

Sampling

Two hundred thirty-eight participants fulfilled the inclusion criteria: age

40-59, and diagnosis of knee OA for more than three months. All list patients received written information about the study. One week after the accepted invitattion, participants were contacted by telephone, and invited to participate in the study. Five patients declined participaton for various resons, the most common resons being lack of time. There are three patients of major injuries caused knee OA by car accidents. Randomization was performed after the baseline examination.

Randomization and blinding

Participants were allocatd to study groups using simple randomization performed in batches of approximately 40 depending on recruitement success (selected by a computer-generated for limited 40 cases from 222 case). They were randomized to either the intervention or the control group. Blinding of participants to determine group allocation. Blinding of participants was not possible, owing to the nature of the intervention. However, the RA performing the assessment did not participate in the facilitaton of the self-management support intervention and thus were bling group allocation. To maintain blinding, the RA were asked no to discuss dtroup allocation with the participants during assessments. All patients were informed that they could be randomly. A flow chart of the recruitment process is given in Figure 3.
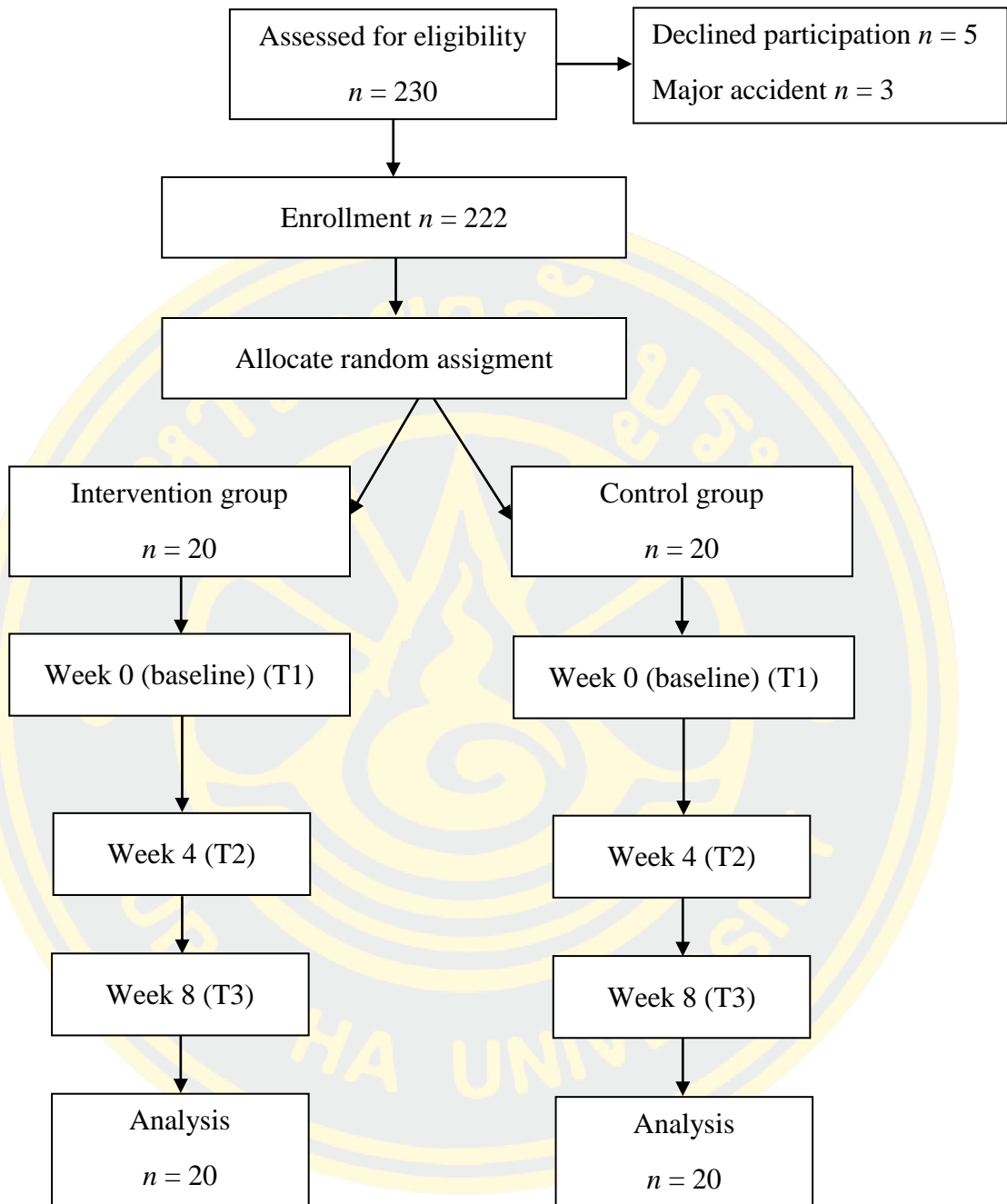
Figure 3 Consort flow diagram of the study

Instrumentation

The following three instruments for data collection and the intervention for implementation. For data collection:

1. A demographic questionnaire was developed by the researcher for collecting data about age, weigh, high, duration of knee OA, marital status, education, income per month (Thai bath) at baseline only.

2. Knee functional status was measured by using the functional dimension of the modified Thai version of Western Ontario and McMaster University Osteoarthritis Index [WOMAC]. It is a self-report scale containing 22 items. (Kuptniratsaikul & Rattanachaiyanont, 2007). There were 3 subscales of pain (5 items), stiffness (2 items) and function (15 items). The participants were asked to rate each item on 0-10 point rating scale from "0" is no or least problem to "10" is very much or most problem. A total score range from 0-220 with a high scrore indicating greater knee functional limitation and a low score interpreting as less knee functional limitation. A previous study The modified 22-item Thai WOMAC index had convergent validity to the algofunctional Lequesne index in pain and function dimensions (Spearman's correlation coefficients were 0.66 and 0.69, respectively). The reliability had correlation coefficients ranging from 0.65 to 0.71. The internal consistency had an α ranging from 0.85 to 0.97 (Kuptniratsailkul & Rattanachaiyanont, 2007)

3. Health-related of quality of life [HRQOL] was measured by the short form survey [SF-36]. The scientific literature on rheumatology recommends that researchers use the SF-36 concurrently. In support of their complementary roles, the detection of clinically important changes is enhanced through the use of a middle-aged measure [SF-36] that properly distinguishes different levels of self-reported general health statuses and co-morbidities not necessarily related to OA. It is most widely used and extensively validated measure of outcome. The SF-36 is a reliable and valid scale for several medical conditions including rheumatic diseases. It has been used to report QOL in several RCTs involving various self-management programs. The instrument contains 36 items in the following eight domains: physical functioning (10 items), role limitations due to physical problems (4 items), physical pain (2 items), general health perceptions (5 items), social functioning (2 items), vitality (4 items), role limitations due to emotional problems (3 items) and general mental health (5 items) and reported health transition (1 item). The score of each item varies from 1-2 points in physical functioning, 1-3 points in general health and 1-6 in

the physical pain, social functioning, and mental health domains. The total score of each domain requires a transformation into 100-point scales. The aggregated SF-36 components are scored in which higher scores represent better HRQOL. From the previous study the reliability of SF-36 was relatively low, especially in the role physical and bodily pain dimensions (Cronbach's alpha < 0.700). Construct validity between each dimension in SF-36 and WOMAC demonstrated coefficients ranging from -0.05 to -0.409 (Tangtrakulwanich et al., 2006).

For implementation:

The next step in self-management support intervention process is to implement the intervention. The researcher needs to implement all of the steps outlined in the function based intervention plan and continue to collect data.

1. The process of activities for intervention group consisted of eight bi-weekly session (Monday and Friday) and approximately 80 minutes per session.

2. Homework guidelines have been formulated for participants for present and discuss next week. It was assignment each week for researcher assess participants understanding and their problem. The participants must complete homework and discuss with researche before start next session. The participants were received homework record forms.

3. Booklet knee OA consist of knowledge about knee OA, pathophysiology, sign and symptom, pain management, knee exercise, and treatment.

Table 1 A summary of implementation

Week	Subject	Content
Wk 1	Knowledge knee OA and exchange of experience OA	Session 1: Goal and expectation Session 2: Providing knowledge of knee OA
Wk 2	Pain management and knee exercise	Session 3: Providing pain management Session 4: Knee exercise
Wk 3	Nutrition and weight control	Session 5: Self-regulation skill Session 6: Nutrition and weight control
Wk 4	Evaluation of self-management and home visiting	Session 7: Self-evaluation Session 8: Home Visits

Usual care (both groups) involved giving patient education such as weigth control, and knee exercise. In addition, at the end of the intervention, both groups had received a book containing descriptions and tips for managing knee OA.

Validity and reliability of instruments

Content validity

1. Instrument for implementation: details of planning and process for the self-management support intervention were validated by a panel of three content experts, including 2 physicians who spetcialty in orthopeadic, spine, bone and joint infection, and a nursing instructor who specialty in women health in community. They were arked to consider and provide comments and suggestion about all content in terms of comparability and appropriateness with the concepts to be used and guideline for knee OA. Then the researcher made revisions responding all experts' comments and suggestions.

2. Instruments for data collection: content validity of the modified Thai vesion WOMAC and the SF-36 were already tested in previous studies (Kuptniratsaikul & Rattanachaiyanont, 2007).

Realiability

The modified Thai version WOMAC and SF-36 were tested for thernal consistency reliability with a total of 5 participant in pilot study. The Cronbach' s alpha reliability of the WOMAC was .80 and SF-36 was .81.

Protection of participant rights

The researcher prepared consent forms for participants in both the control and experimental (intervention) groups to complete and sign before starting the intervention. After approval of the research proposal by the Faculty Ethics Committee code 02-05-2562 of the Faculty of Nursing, Burapha University, middle-aged women who are interested in participation informed about the research objectives, data collection methods, study timeline, risks- benefits of the study and confidentiality policy. Next, after being enrolled in the study and granting informed consent, the participants were randomly assigned to the control and experimental groups. Throughout the study, the researcher maintained the confidentiality and rights of every participant. Participants' information protected by the researcher and completely destroyed after the findings of the study have been published. If the participants have any concerns during the study and want to withdraw, they were able to do so at any time. Thai clinical trial registry [TCTR20191223003].

Pilot study

The pilot study was employed to the applicability of the middle-aged women with knee OA. The participants included five middle-aged women with knee OA who met the inclusion criteria and they participated in all 4 sessions of the self-management support intervention. The setting to pilot study was Mueang Health Promoting Hospitals in Mueang Nakhon Si Thammarat province. After the participants have been recruited for the pilot study, they signed the informed consent form prior to complete all sessions of the intervention.

Research assistant [RA] roles

A RA is register nurse at OPD clinic orthorpedic. The RA was trained about collection data, measurement WOMAC and SF-36. Duties may consist of:

1. Obtain informed consent and keep accurate records for the study. RA must keep data confidential and no discuss.

2. Collaborate with the principal investigator and researcher to implement and maintain protocols for secure storage of data.

3. Appointmentation with participant for maintained in this study.

4. Other duties as assigned.

Data collection procedures

1. Before commencing data collection, the researcher explained the purpose of the research to the director in order to obtain permission for data collection.

2. The researcher prepared the materials such as the booklets for the participants.

3. The researcher trained research assistants to use the data collection instruments. The researcher described the meaning of each item for research assistants.

4. The researcher perform the following with the experimental group.

Experimental group

The information collected before any interventions are implemented is referred to as a baseline. The researcher explained the intervention objectives, procedures, evaluation and follow-up assessment to all participants. Next, the participants who are participants to sign an informed consent form.

Implementation phase:

The self-managemnt support intervention for middle-aged women consisted of essential topics that involved self-management in group participation. Four 80 minute sessions were provided by the researcher. Self-management supported intervention were used to manage their own health and well-being for as many of their health needs as possible. This included health education, engagement in healthy activities which are known to produce positive outcomes.

Week 0: Meeting introduction and baseline measurement. The researcher also asked participants to briefly explain their the intervention' s objections, procedures, evaluation, and follow-up assessment. The participants were sign the informed consents forms after they have agreed to the participate. Then, the participants were asked to complete the WOMAC and SF-36 by the research assistants.

Week 1: knowledge knee OA and Exchange of experience OA

Session 1: Goal and expectation

Several reviews and guidelines on the management of osteoarthritis exist, based on evidence from trials about the effectiveness of the various interventions available. It is important that their management center around a careful assessment of the severity of those patient-related outcomes and not of the severity of joint damage. Knee OA is an increasingly important public-health problem. Therefore, more research is needed about secondary prevention of progressive joint damage and about control of pain.

The objective of this session is searchin goal and expectation about knee OA. To describe, patient-oriented diseases with specific their goal which could be used to enhance self-management support in patients with knee OA. Improving a patient's goal and expectation about their condition helps them participate in decisions about their care.

Session 2: Providing knowledge of knee OA

The important public health decisions, given knowledge about knee OA, symptomatic knee OA. The researcher describe the prevalence, causes and associated risk factors, symptoms, diagnosis and classification, self-management and treatment options and understanding of the presented material. Participants provided with an understanding of their OA including the disease process and its evidenced-based management. This information was shared highlight the importance of following the developed management plans, and the specific lifestyle behavior necessary to facilitate improvement in functional status and quality of life. Some of these behavior modifications, appropriate exercise habits, pain management, the pacing of activity and weight reduction.

The objective of this session is giving knowledge about knee OA. To describe, patient-oriented diseases with specific education programs which could be used to enhance self-management support in patients with knee OA. Improving a patient's knowledge about their condition helps them participate in decisions about their care.

Week 2: Pain management and knee exercise

Session 3: Providing pain management

The researcher also invited to develop a self-management plan based on needs and preferences. The researcher offered patients with knee OA information about pain management their condition and support for self-management activities, including the development and pain monitoring. Developing a plan with agreed treatment goals that helps the patient understand and manage their condition. The plan may include types of pain management specific to their condition, where to find further information, and contact details of support groups. Group discussion (action plan and problem-solving skills). Guiding for self-monitoring records on ergonomic management using a logbook is provided. Individual goals and action plans were designed into daily living activities. Understanding more about your condition and having a self-management plan helps you to manage your symptoms so you can continue or return to usual activities.

The objective of this session is giving pain management about knee OA. To describe, knee pain, medicine and treatment which could be used to enhance self-management support in patients with knee OA. Improving a patient's knowledge about pain management.

Session 4: Knee exercise in patients with knee OA

Knee exercise was instruction for supported, home- based exercise. OA evidence suggests a supervised group or an individual treatment is superior to independent home exercise to achieve reductions in pain, while all modes of delivery produce similar results for physical function. The frequency, duration and intensity of the exercise program may affect clinical outcomes.

The objective of this session is knowledge about knee exercise and physical activity.

Week 3: Nutrition and weight control

Session 5: Self-regulation skill

Self-regulation was instruction for supported, self- management. Knee OA evidence suggests home exercise to achieve reductions in pain, while all modes of delivery produce similar results for physical function. The frequency, duration and intensity of the exercise program may affect clinical outcomes.

The objective of this session is knowledge about pain management and exercise and physical activity. The objective of this session is set the goals for self-management about knee exercise and weight control.

Session 6: Nutrition and weight control

For the nutrition and weight control, the daily caloric intake was adjusted according to change to low carbohydrate and high vegetable diet. The initial diet plan provided an energy-intake (kcal/ day), as predicted by an energy expenditure for women. The objective of this session is to set the goals for self-management about weith control.

Week 4: Evaluation of self-management and home visiting

Session 7: Self-evaluation

Participants were encouraged to lose their body weight through a combination of diet and exercise. Supporting people to lose weight requires appropriate expertise to address the complex interaction of diet, exercise or activity and behavior change. Behavior change underpins successful engagement.

The objective of this session is focusing on the critical elements of self-management include setting goals, monitoring behavior, and evaluating progress. The researcher meet the participants to evaluate self-management and conditions.

Session 8: Home visits

Advice included on appropriate daily activity and there an opportunity for question and answer sessions and sharing information with other participants.

The objective of this session is focusing on the outcomes of a self-management program. The researcher meet the participants to evaluate self-management and conditions.

Post-intervention

The participants requested to complete the WOMAC and SF-36 (Week 4) by the researcher resistant. The participants prepared for an evaluation and ask if they have any questions or problems.

Follow-up (Week 8)

The research assistant asked the participants to complete the WOMAC and SF-36. The research assistants were asked the participants to complete the WOMAC and SF-36. The participants were requested to complete the WOMAC and SF-36. At Week 8, the researcher was to follow them by calling the participants in order to remind them to prepare for an evaluation during the following week and ask if they have any questions or problems.

Control group

The researcher explained the research objectives, procedures, evaluation and follow-up assessment to all participants. Next, the participants asked to sign informed consent forms. The data collection performed at Week 0 before starting the intervention (baseline, T1), at 4 weeks after the intervention (T2) and at the 8-week (T3) follow-up. Lastly the researcher provided booklet and studied material to them to practice by themselves.

Data analysis

Data were analyzed by using a statistical software program with statistical significance set at $p < .05$.

1. Descriptive statistics (frequency, percentage, mean, SD and range) were used to describe the characteristics and the study variables.

2. The two-way repeated measurs ANOVA (one within-one between) was determined the differences in mean scores for knee functional status and HRQOL, comparing the experimental and control groups at 3-point time measures, namely pre-intervention (week 0), post-intervention (week 4), and follow-up (week 8).

CHAPTER 4
RESULTS

This chapter presents the findings of the study with a summary of the sample allocation, characteristics of the participants, testing of the statistical assumptions, descriptive statistics of the outcome variables, and testing of the study hypotheses.

Summary of the sample allocation

A total of 222 middle-aged women were eligible and 40 of those were invited to participate in the study. They agreed and signed informed consents forms to voluntarily participate and were randomly assigned into intervention and control groups with an equal number of 20 participants per group (Figure 4). For the intervention group at baseline (week 0), the participants were asked to complete a demographic questionnaire, the WOMAC and the SF-36. The participant then participated in the 4-week implementation of the intervention. After completing the intervention, they were asked to complete the WOMAC and the SF-36 at post intervention (week 4) and follow up (week 8). Within the control group at baseline measurement (week 0), the participants were also complete a demographic questionnaire, the WOMAC and the SF-36. At four and eight weeks after the first meeting at baseline, they wreaked to complete the same questionnaires (except a demographic questionnaire).

Characteristics of the participants

For the intervention group, there were 20 participants with a mean age of 52.35 years ($SD = 5.82$ range = 40-59). The mean BMI (kg/ m^2) was 27.12 kg/ m^2 ($SD = 3.87$, range = 20.44-34.13). The mean duration of knee OA was 3.3 years ($SD = 2.54$, range = 1-10). Most of them were married (80%) and had educational levels at the primary school level (60%). Approximately 40 percent of participants had no underlying disease. More than half of them (55%) had monthly family incomes of 3,000-5,000 Thai baht. While most were farmers (45%) and house housekeeper (35%).

For the control group, there were 20 participants with a mean age of 53 years ($SD = 5.47$, range = 40-59). The mean BMI (kg/ m^2) was 29.29 kg/ m^2 ($SD = 4.61$, range = 22.77-38.05) and the mean duration of knee OA was 3.2 years ($SD = 3.41$, range = 1-12). Most of the participants were married (80%) and had education levels of the primary school level (75%). About 40 percent of the participants had no underlying disease. Most of them (40%) had monthly family incomes of 3,000-5,000 Thai baht, while most were housekeeper (45%) and small business (20%).

The participants' characteristics between the control and intervention groups were compared by using independent t-test for continuous and chi-square for categorical data to determine their differences. No significant differences were found in the participants' characteristics between the two groups ($p > .05$). The details are shown in Table 2.

Table 2 Characteristic of the participants

Characteristic	Intervention group (n = 20)		Control group (n = 20)		t	χ^2	P
	n	%	n	%			
Age (years)	M = 52.35 (SD = 5.82, range = 40-59)		M = 53 (SD = 5.47, range = 42-59)		.62		.24
BMI (kg/ m^2)	M = 27.12 (SD = 3.87, range=20.44-34.13)		M = 29.29 (SD = 4.61, range=22.77-38.05)		-1.61		.12
≥ 25	15	75	17	85			
Duration of knee OA (years)	M = 3.20 (SD = 3.41, range = 1-12)		M=3.30 (SD = 2.54, range=1-10)		.11		.92
Marital status						.68*	1
Single	1	5	2	10			
Married	16	80	16	80			
Widow/ divorce	3	15	2	10			

Table 2 (Continued)

Characteristic	Intervention group (n = 20)		Control group (n = 20)		t	χ^2	P
	n	%	n	%			
Education						6.66*	0.12
No literate	1	5	0	0			
1° school	12	60	15	75			
2° school	6	30	4	20			
Diploma/ Bachelor	1	5	1	5			
Underling disease						.10	.75
No	11	55	12	60			
Yes	9	45	8	40			
Hypertension	6	30	9	45		2.5	.11
Diabetes	5	25	5	25			
Monthly income (Thai baht)						.06	.572
3,000-5,000	11	55	8	40			
5,001-10,000	9	45	7	35			
>10,000	0	0	5	25			
Occupation						5.84*	0.17
House worker	7	35	9	45			
Farmer	9	45	3	15			
Small business	1	5	4	20			
Employee/ Labor	3	15	3	15			

*Fisher's exact test

Evaluations of statistical assumptions for the dependent variables

The assumptions for subsequently statistical analyses were tested.
The following assumptions were examined to ensure the validity of the statistical
calculations.

1. Normality distribution

Knee functional status and HRQOL at three time measures were tested for
univariate normality, a Shapiro-Wilk's test ($p > .05$), visual inspection of the
participants' histogram, normal Q-Q plots and box plot. Fisher's measure of skewness

and kurtosis was calculated by dividing the skewness or kurtosis value by the standard error for skewness or kurtosis. Values above +1.96 or below -1.96 were significant at the .05 level. These results indicate that this distribution was significantly skewed and signified kurtosis. Fisher's measure of kurtosis, which indicates this variable as an assumption of normal distribution. The results showed that the total scores for the WOMAC and HRQOL were normally distributed for both the intervention and control groups.

    2. Homogeneity of variance (between-subject)

Levenete's statistic was used to test the assumption of homogeneity of variance for the between-subject design. The test of homogeneity of variances for the between-subject comparison showed no significance ($p > .05$). This indicated that the variance of the dependent variables between groups was equal. Then the Homogeneity of variance assumption was met. All of the error variance of the subscale was equal across groups.

    3. Assumption of sphericity (within-subject)

Mauchly's test of sphericity was used to test the assumption of sphericity. The total score of WOMAC and HRQOL were significant ($p < .05$). It was indicated that the homogeneity of variance-covariance matrices was not equal, and the sphericity assumptions were not met. Therefore, Greenhouse-Geisser was seleted to report the results of repeated measure ANOVA in these aspects.

    4. Test for outliers

The univariate outliers of variable were tested by Box-plot, which showed that the control group had four outliers (Case No. 21 and 23 for data of WOMAC Time 2, and Case No. 22 and 38 for data HRQOL, time 2). There was no influence on the normality of distribution. The intervention group had one outlier (Case No. 2 for data of HRQOL, Time 3). Thus, the total sample was 19 case for the intervention group and 17 cases for control group.

Descriptive statistics of the outcome variables

In this study, outcome variables included knee functional status indicating by a total score of WOMAC, and health related quality of life (HRQOL) indicating by a total score of SF-36. They were measured at baseline (pre-intervention [week 0]),

post-intervention (week 4), and follow-up (week 8). Means and standard deviations of total and subscale scores of WOMAC and SF-36 were used to describe these variables for both the intervention and the control groups among 3-time measures. Details were presented in Table 3 and Table 4.

Table 3 Means and standard deviations of WOMAC measured at baseline (week 0), post-intervention (week 4) and follow-up (week 8) for the control and the intervention groups

Variable	Week	Intervention (*n* = 19)		Control (*n* = 17)	
		M	*SD*	*M*	*SD*
Knee functional status					
Total score WOMAC	0	73.58	44.50	68.65	20.90
	4	45.47	41.32	60.82	8.44
	8	21.90	23.27	76.41	13.05
Subscale score					
Pain	0	16.68	10.96	20.59	5.30
	4	9.32	7.83	13.59	3.92
	8	4.47	5.47	17.76	4.70
Stiffness	0	6.05	4.55	5.71	5.17
	4	4.32	3.25	4.65	.862
	8	.95	1.58	2.29	1.57
Functional status	0	50.84	31.11	42.35	13.86
	4	31.84	32.08	42.59	5.94
	8	16.47	17.52	56.35	9.79

Table 4 Means and standard deviations of SF-36 measured at baseline (week 0),
post-intervention (week 4) and follow-up (week 8) of the control and the
intervention groups

Variable	Week	Intervention (*n* = 19)		Control (*n* = 17)	
		M	*SD*	*M*	*SD*
Health related quality of life					
Total SF-36 score	0	57.17	16.193	58.87	13.33
	4	73.14	14.31	71.60	5.79
	8	90.65	3.69	70.61	8.30
Subscale score					
Physical functioning	0	59.21	16.27	62.94	21.58
	4	70.00	10.14	71.18	9.77
	8	84.47	13.01	69.71	5.15
Role-physical	0	31.58	35.20	48.53	43.72
	4	69.74	43.76	86.77	15.61
	8	100.00	.00	88.24	15.61
Bodily pain	0	49.61	32.93	52.94	24.11
	4	71.97	21.17	72.50	20.95
	8	95.00	10.24	73.53	22.15
General health	0	80.00	5.53	46.47	14.77
	4	65.00	17.16	45.88	15.54
	8	80.00	5.53	46.47	14.77
Social functioning	0	65.13	25.20	88.97	15.86
	4	85.53	18.29	85.29	17.25
	8	95.39	8.55	85.29	17.25

Table 4 (Continued)

Variable	Week	Intervention (*n* = 19)		Control (*n* = 17)	
		M	*SD*	*M*	*SD*
Vitality	0	57.89	17.66	59.12	9.88
	4	65.66	12.13	56.47	6.316
	8	85.26	4.85	54.41	7.48
Role-emotional	0	29.82	41.42	47.06	45.73
	4	84.39	37.05	94.12	13.10
	8	100.00	.00	86.27	16.91
Mental health	0	63.68	20.38	64.94	15.97
	4	72.84	9.39	56.94	10.15
	8	85.05	5.63	60.94	10.25

Comparisons of pre-intervention scores of outcome variables

At baseline (week 0), the scores of all outcome variables were compared between the intervention and control groups were conducted to examine their differences before implementation of the intervention by using independent t-test. The results showed no significant differences ($p > .05$) in knee functional status and HRQOL between the intervention and control group at pre-intervention (Table 5).

Table 5 Comparisons of the mean scores of outcome variables between the control and intervention groups measured at baseline (week 0) by independent *t*-test

Variable	Intervention (*n* = 19)		Control (*n* = 17)		*t*	*p*-value
	M	*SD*	*M*	*SD*		
Knee functional status	73.58	44.50	68.65	20.90	.417	.679
HRQOL	57.17	16.19	58.87	13.33	-.952	.348

Testing of research hypotheses

1. Comparisons of knee functional status between the intervention and control groups, and within the intervention group

Two-way repeated measures ANOVA (one-between and one-within) was used to determine the mean differences in the total WOMAC scores (knee functional status) between the participants in the intervention group who receive the self-management support intervention and those in the control group who did not receive the intervention among three-time measures at weeks 0 (baseline), 4 (post-intervention), and 8 (follow-up).

The results showed that the main effect of group and time had significant differences ($F_{1,34} = 6.73$, $p = .014$ and $F_{1.63} = 14.37$, $p = .000$, respectively). Moreover, the interaction effect (Time*Group) also had statistically significant difference ($F_{1.63, 55.43} = 23.97$, $p = .000$) (Table 6). In the graph, the line connecting the intervention groups shows a decrease. The connecting line in the intervention group showed a dramatic decrease, while there were minimal changes in the control group. The details are shown in Figure 4.

After the interaction and main effects showed significance, the simple effects were later tested to determine the effect of each group at each time. The simple effects showed that at baseline (week 0) and post-intervention (week 4), the mean WOMAC scores between the intervention and control groups were not different ($p > .05$). At the follow-up (week 8). However, there was a significant difference ($F_{1,34} = 19.28$, $p < .05$) (Table 7). This finding implies that the knee functional status of the participants in the intervention group was better than those in the control group during the follow-up period.

For the simple effect of time, there were statistically significant differences in the intervention and control groups (Table 8). For the intervention group, the mean WOMAC scores at the follow-up (week 8) were lower than those at baseline (week 0), and post-intervention (week 4) ($M_{diff} = 51.68$ and $M_{diff} = 23.58$, $p < .001$, respectively), and the mean score of the WOMAC at post-intervention (week 4) was lower than the same score at baseline (week 0) ($M_{diff} = 28.11$, $p < .001$) (Table 9). These findings indicate that the participants in the intervention group had better knee functional status after receiving the self-management support intervention than before

intervention. When the time changed increasingly, knee functional status improved.

Table 6 Repeated measure ANOVA of total WOMAC scores

Source of variation	SS	df	MS	F	p-value
Between subject					
Group	12610.61	1	12610.61	6.73	.014
Error	63737.57	34	1874.63		
Within subject					
Time	9820.55	1.63	15299.24	14.37	<.001
Time* Group	16388.04	1.63	10627.99	23.97	<.001
Error time	23244.06	55.43	419.335		
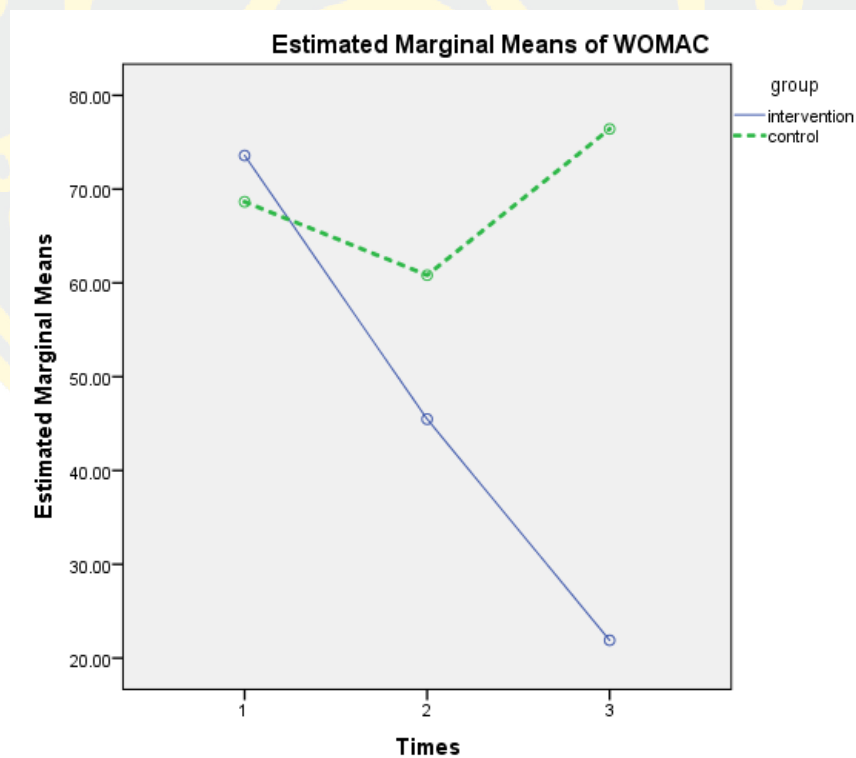
Figure 4 Comparisons of estimated marginal means WOMAC scores

Table 7 Simple effect of groups on WOMAC at each point of times

Source	df	SS	MS	F
Baseline (week 0)				
Between subject	1	1482.25	1482.25	1.32
Error	34	114586.85	1123.40	
Post-intervention (week 4)				
Between subject	1	802.78	802.78	0.72
Error	34	114586.85	1123.40	
Follow-up (week 8)				
Between subject	1	21658	21658	19.28*
Error	34	114586.85	1123.40	

* $p < .05$, $F_{0.5}(1, 34) = 4.17$

Table 8 Simple effect of time on WOMAC scores in the intervention and control
groups

Source	df	SS	MS	F
Intervention group				
Between subject	18	58418.32		
Interval	2	25441.82	12720.91	25.85*
Error	36	17712.84	492.02	
Total	56	101572.98		
Control group				
Between subject	18	5319.25		
Interval	2	2065.45	1032.73	5.98*
Error	36	5531.22	172.85	
Total	56	12915.92		

* $p < .05$, $F_{0.5}(2, 36) = 4.05$

Table 9 Pairwise comparisons using Bonferroni of the mean difference in WOMAC
scores between each pair of time differences in the intervention and control
groups

Time	M_{diff}	SE	*p*-value
Intervention group			
Week 0 vs. Week 4	28.11	7.25	<.001
Week 0 vs. Week 8	51.68	5.60	<.001
Week 4 vs. Week 8	23.58	4.90	<.001
Control group			
Week 0 vs. Week 4	7.83	7.67	.315
Week 0 vs. Week 8	-7.77	5.92	.198
Week 4 vs. Week 8	-15.59	5.18	.005

**2. Comparisons of HRQOL among three-time measurements between
the intervention and the control groups, and among three-time measurements
within subjects.**

Two-way repeated measures ANOVA (one- between and one-within)
was used to determine the mean differences in total SF-36 [HRQOL] scores between
participants in the intervention group, who received the self-management support
intervention, and those in the control group, who did not receive the intervention
among three-time measures at week 0 (baseline), 4 (post-intervention), and 8 (follow-up).

The results showed the main effects on the groups were significant
differences ($F_{1, 34} = 6.34$, $p = .017$). Moreover, the main effect of time and the
interaction effect (Time*Group) were also statistically significantly different
($F_{2, 68} = 16.91$, $p = .000$) (Table 9). In the graph, the line connecting the intervention
groups showed an increase. The connecting line in the control group showed a
dramatic increase, while there were minimal changes in the control group. The details
are shown in Figure 5.

After the interaction and main effects showed significance, the simple effects
were later tested to determine the effects of each group at each time. The simple effects

showed that at baseline (week 0) and post-intervention (week 4), the mean SF-36 scores between the intervention and control groups were no different ($p > .05$), while at the follow-up (week 8), there was a significant difference ($F_{1, 34} = 90.86, p < .05$) (Table 10). This finding implies that the HRQOL of the participants in the intervention group was better than that of the control group during the follow-up period.

For the simple effect of time, there were statistically significant differences in the intervention group and no significant differences in the control group (Table 11). For the intervention group, the mean scores for HRQOL at the follow-up (week 8) were higher than those at baseline (week 0), and post-intervention (week 4) ($M_{diff} = -13.91$ and $M_{diff} = -30.18, p < .001$, respectively). Furthermore, the mean score for HRQOL at post-intervention (week 4) was lower than the same score at baseline (week 0) ($M_{diff} = -16.27, p < .001$) (Table 12). These findings indicate that the participants in the intervention group had better knee functional status after receiving the self-management support intervention than before receiving the intervention. When the time changed increasingly, HRQOL also improved.

Table 10 Repeated measure ANOVA of total HRQOL score

Source of variation		SS	df	MS	F	p-value
Between subject						
	Group	1090.29	1	1090.29	6.34	.017
	Error	5847.47	34			
Within subject						
	Time	5894.01	2	2947.01	36.08	<.001
	Time* Group	2763.24	2	1381.62	16.91	<.001
	Error time	5554.96	68			
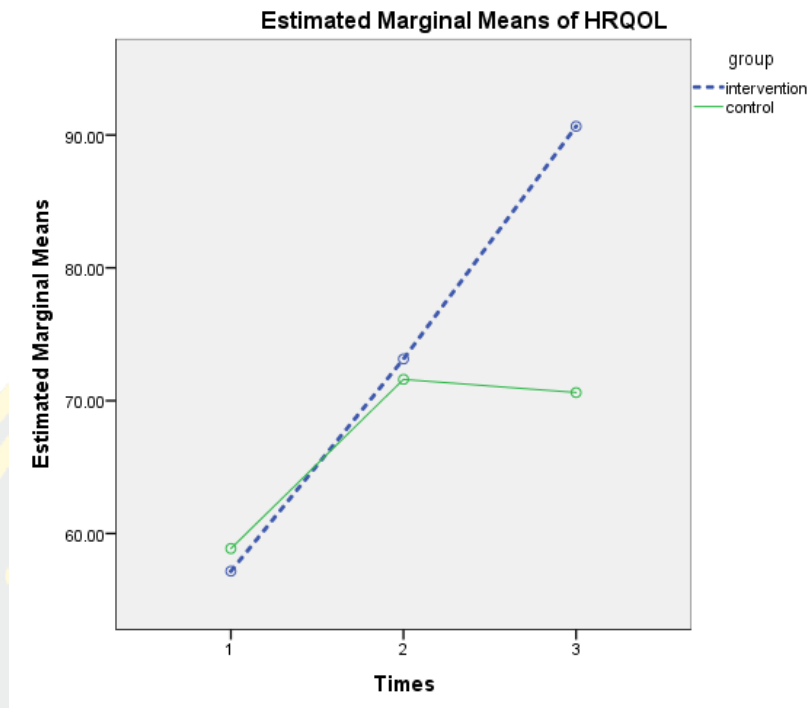
Figure 5 Comparisons of estimated marginal means scores of HRQOL

Table 11 Simple effect of group on HRQOL at each time.

Source	df	SS	MS	F
Baseline (week 0)				
Between subject	1	156.57	156.57	.872
Error	34	6105.48	179.57	
Post-intervention (week 4)				
Between subject	1	93.64	93.64	.806
Error	34	3948.56	116.13	
Follow-up (week 8)				
Between subject	1	3603.33	3603.33	90.86*
Error	34	1348.40	39.66	

* $p < .05$, $F_{0.5}(1, 34) = 4.17$

Table 12 Simple effect of time on HRQOL in the intervention and control groups

Source	df	SS	MS	F
Intervention group ($n = 19$)				
Between subject	18	1410.25		
Interval	2	8744.98	4372.49	24.19*
Error	36	6507.02	180.75	
Total	56	16662.25		
Control group ($n = 17$)				
Between subject	16	-217405.29		
Interval	2	418.98	209.49	0.01
Error	32	574454.35	17951.70	
Total	50	357468		

* $p < .05$, $F_{0.5}$ (2, 36) = 3.23

Table 13 Pairwise comparisons using Bonferroni on the mean differences in HRQOL
scores between each pair of time differences in the intervention and control
groups

Time	M_{diff}	SE	p-value
Intervention group			
Week 0 vs. Week 4	-13.91	2.84	<.001
Week 0 vs. Week 8	-30.18	3.32	<.001
Week 4 vs Week 8	-16.24	2.56	<.001
Control group			
Week 0 vs. Week 4	-6.50	3.03	.039
Week 0 vs. Week 8	-5.96	3.51	.098
Week 4 vs Week 8	0.54	2.71	.844

Summary of the findings

The WOMAC and HRQOL were used three time measurements to determine the effects of self-management support intervention. The mean WOMAC and HRQOL scores at baseline were compared between the intervention and control groups. The results showed that there were no differences in the total and subscale scores at baseline between the two groups.

Repeated measure ANOVA were performed to determine the differences of the interaction effect (Time*Group), and main effects of the intervention on the outcome variables (knee functional status and HRQOL) between groups and within group (3-time measurements). One-way ANOVA with Bonferroni post hoc was analyzed to compare the time differences in the intervention group after the main effect of time was found to be significant.

The total WOMAC scores at three time measurements were compared between subjects. The findings showed that the participants who received the self-management support intervention had lower scores than who did not receive the intervention. The WOMAC graph of the mean score changes in both groups showed significant differences. Within the intervention group, the total WOMAC scores among the three-time measurement were compared. Bonferroni post hoc was used for pairwise comparisons for within subject. The results showed that the total mean WOMAC score at post-intervention (week 4) was lower than at baseline (week 0). Moreover, the total mean score at follow-up (week 8) was lower than at post-intervention and baseline (week 0).

Knee functional status after the intervention between the intervention and control groups were different. Thus, hypothesis 1 was supported. There were also differences between each pair of times in the intervention group.

The three aspects of the WOMAC were also compared between and within groups after completing the three-time measurements. For between groups, the results showed that the participants in the intervention had three better subscale scores than those in the control group.

Hypothesis 2 was supported, because the HRQOL between the intervention and control group was different. This means there were differences in the SF-36 scores among three-times of measurement in the intervention group. However, there

were differences between any pairs of time in the control group at week 0 and week 4.

Effect size evaluation

The researcher calculated the standardized differences between the means (Cohen's d) to determine the effect size, or the magnitude of the treatment effect. This statistic can be used in within-subject designs. The effect size presents the ability to detect an association between a predictor and an outcome variable (Hulley, Cummings, Browner, Grady & Newman, 2007). The effect size was calculated by the following formula:

Effect Size = $\underline{\text{Experimental group mean} - \text{Control group mean}}$
Control group standard deviation

The effect size was large for WOMAC (0.68 follow-up respectively). In addition, the effect size was also median for HRQOL (0.46 at follow-up, respectively). According to Cohen's effect size values, there were three levels of value of effect size: small = 0.2, median = 0.5, and large = 0.8 (Cohen, 1992).

CHAPTER 5
CONCLUSION AND DISCUSSION

This chapter presents a summary and discussion of the findings. Strength, limitations, suggestions and recommendations are also described.

Summary of the study

The outcomes of this clinical intervention were a decrease in pain, improvement in quality of life, and an improvement in OA specific health status. These findings have a number of important implications for the management of patients with OA.

This study aimed to examine the effectiveness of a self-management support intervention on knee functional status and health-related quality of life [HRQOL] in middle-aged women with knee OA by comparing knee functional status and HRQOL participants between the intervention and control groups. A randomized control trial design was used to recruit and allocate the sample with 19 and 17 participants in the intervention and control groups respectively. All of the participants were measured three-times at baseline (week 0), post-intervention (week 4), and follow-up (week 8). The modified Thai version the WOMAC was used to measure knee functional status and the short form 36 (SF-36) questionnaires was used to measure HRQOL. Cronbach's alphas at three measurements were .85-.97, and 0.7, respectively. Data were analyzed by using descriptive statistics, independent t-test, chi-square and two-way repeated measured ANOVA. The data collection was conducted at an outpatient knee OA clinic at Thasala hospital, Thailand, from August to November 2019. Twenty participants with knee OA were recruited into the study by using inclusion criteria and simple random sampling.

The SMS intervention was developed based on the IFSMT of Ryan and Sawin (2009). The content of the study materials was created based on the knee OA guidelines and empirical studies on the subject. The SMS intervention comprised of four sessions over four weeks at 80 minutes per session as follows: 1) session 1: knowledge knee OA and exchange of experience knee OA; 2) session 2: pain

management and knee exercise; 3) session 3: nutrition and weight control and 4) session 4: evaluation of self-management and home visiting.

The findings showed no differences in the participant characteristics between the intervention and control groups. In addition, between the two groups at baseline (week 0), WOMAC and HRQOL were not significantly different. Participants who received the self-management support intervention had better WOMAC and HRQOL scores than those who did not. Moreover, within the intervention group between week 0, and week 8, the WOMAC and HRQOL were significantly different. The knee functional status and HRQOL of the middle-aged women in the intervention group who received the intervention were different from those in the control group and also differed with changes over time within the intervention group.

Discussion of the findings

The findings can be discussed according to the research hypotheses as followings: Hypothesis 1: the participants in the intervention group will have better knee functional status than those in the control group at post-intervention (week 4) and at follow-up (week 8). The results showed that the self-management support intervention was effective in that middle-aged women who received the intervention had better knee functional status than the participants who did not receive the intervention.

The total WOMAC score (knee functional status) between the participants in the intervention group who received the self-management support intervention and those in the control group who did not receive the intervention among three-time measurements at week 0 (baseline), week 4 (post-intervention), and week 8 (follow-up). The results showed that the main effects of group and time were significantly different ($F_{1, 34} = 6.73$, $p = .014$ and $F_{1.63} = 14.37$, $p = .000$, respectively). Moreover, the interaction effect (Time*Group) was also different with statistical significance ($F_{1.63, 55.43} = 23.97$, $p = .000$). This finding implies that the knee functional status of the participants in the intervention group was better than those in the control group at the follow-up. For the simple effect of time, there were statistically significant differences in the intervention and control groups. For the intervention group, the

mean WOMAC scores at follow-up (week 8) were lower than those at baseline (week 0), and post-intervention (week 4) (M_{diff} = 51.68 and M_{diff} = 23.58, $p < .001$, respectively), and the mean score of the WOMAC at post-intervention (week 4) was lower than those at baseline (week 0) (M_{diff} = 28.11, $p < .001$). These findings indicate that the participants in the intervention group had better knee functional status after receiving the self-management support intervention than before receiving the intervention. As time changed increasingly, knee functional status improved.

Knee osteoarthritis (OA) is a chronic disease of the synovial joints, resulting in pain accompanied by varying degrees of functional limitations (Lane et al., 2017). As patients transition into a life involving chronic illness, the transition can either become a stressful time due to feelings of powerlessness, loss of autonomy and disruptions in daily life, or a time to reevaluate their lives and take control by incorporating self-management knowledge and skills with education from health professionals (O'Connel, Carthy, & Savage, 2018). Individual and family members have an important role in the recognition, assessment and recovery of patients' health conditions. They often know patients very well and can provide detailed information about the patient's history, routines or symptoms, which may assist in determining the best treatment and ongoing support. Knee OA is a chronic disease and its symptoms require long-term, habitual management. A passive coping style, through which people become behaviorally inhibited and avoid taking an active role in self-managing their pain, has been consistently related to poorer outcomes across various chronic pain disorders. Hence, the findings could be viewed as supporting the inclusion of SMS (Brady, 2012).

The individual and family self-management theory [IFSMT] illustrate the complexity of the process of self-management and provides a framework for demonstrating to how contextual risk and protective factors as well as the components of the process of self-management contribute to patient outcomes such as self-management behaviors, health status and quality of life. Consistent with the "process by which individuals and families use knowledge and beliefs, self-regulation skills and abilities, and social facilitation to achieve health-related outcomes" (Ryan & Sawin, 2009). Hence, patients and families are expected to engage in behaviors promoting health and modifying lifestyles. Research on self-management [SM]

support has shown significant improvement in health outcomes (Lorig & Holman, 2003), increased quality of life and feasible clinical practice, which seems useful and acceptable to patients (Thorstensoon, Garellick, Rystedt, & Dahlberg, 2015). The nature of patents' contacts with services and patients' specific needs and preferences are what must be considered when deciding on the most appropriate support mode to effectively engage patients and promote self-management (Lawn & Schoo, 2010).

The impacts of chronic health problems are linked with patients' behaviors and family attitudes towards the illness. Health care delivery has moved to hospitalizations, which can often be eliminated or shortened. Health promotion activities are increasingly appreciated for individuals and families as the strategies are incorporated into the health care delivery system. Hence, patients and families are expected to engage in behaviors promoting health and modifying lifestyle. Self-management engages individuals and families as a whole in achieving outcomes.

The findings supported the self-management support intervention in that family and health professional support had a positive influence on knee functional status in term of knowledge, knee pain management, exercise and weight control. Nevertheless, there were no changes at post-intervention (week 4) because improving the knee functional status of this group was related to many factors, including participant practices to weight control, pain management and exercise preferences of participants. In addition, most participant were afraid of exercise. In particular, the acceptance of exercise was a slow process. Therefore, offering new exercises should be included in the material presented to motivate patients. Previous studies of the self-management intervention emphasized home environment and family support in promoting middle-aged women by improving health-related behaviors. In addition to the overall finding on the middle-aged women three subscales were also examined based on the following. The findings showed that the self-management support intervention could improve knee functional status and pain in the WOMAC score of the intervention group. According to Coleman et al. (2012), who studies the short and medium- term effects of self-management programs for individuals with osteoarthritis of the knee as, designed and delivered by health professionals in a quality assurance

study found the results show improvement in pain during the intervention and in mental health at week 8.

In a study by Kao et al. (2016). the effects of a self-management intervention among middle-aged adults with knee osteoarthritis were studied and showed significantly improved quality of life. The control group showed increased WOMAC score at week 8. According to Schoo, Morris, and Bui (2004). pain frequency and intensity decreased significantly during weeks 1-4, but not during weeks 5-8 of a home exercise program for knee OA. The weakness of muscles adjacent to the painful joint is a common feature of knee OA. Adequate muscle strength is required for many activities of daily living and muscle weakness is a major factor contributing to knee OA related functional disability. There is some evidence that higher quadriceps muscle volume might protect against incident knee pain and ongoing cartilage loss and recent findings suggest that the magnitude of quadriceps strength gains partially mediate the pain-relieving effect of resistance training in knee OA.

Unfortunately, exercise is considered to be a core treatment for knee OA and it is universally recommended amongst treatment guidelines for all individuals with knee OA, regardless of their individual presentation. Exercise has a number of potential benefits, including improving pain, physical function and mood. Exercise likely reduces knee OA pain by several different mechanisms, including increased central nervous system inhibition, local and systemic reductions in inflammation, psychosocial effects and biomechanical effects at the affected joint (Iwanoto, Sato, Takeda & Matsumoto, 2011). Exercise for knee OA might include low impact aerobic exercise, such as walking or cycling, resistance training for muscle strengthening, stretching, and other forms of exercise with similar or better effect sizes for knee OA pain. The strongest evidence for pain relief and improvements in function exist in people with knee OA (Nejati, Farzinmehr, & Moradi-Lakeh, 2015). Exercise prescriptions should be individualized based on assessment findings and be patient-centered involving shared decision-making between the patient and clinician. Given that patient adherence to exercise declines over time, appropriate attention should be pain as reduced adherence attenuates the benefits of exercise. Another key point concerning adherence is that exercises are safe. Furthermore, while pain exacerbations

may occur at times, these will reduce over the course of a training program and people with knee OA will continue to benefit from ongoing exercise (Button, Roo, Spasic, Adamson, & Deursen, 2015). Benefits can continue for several months and this decline steadily continues, depending upon factors such as age and physical activity level (Quillfeldt & Marks, 2016).

As a result, weight loss interventions are recommended by several international treatment guidelines for OA as part of the core treatment for people with knee OA that are overweight or obese. Furthermore, education regarding the importance of maintaining a healthy lifestyle and body weight is recommended for all people with knee OA. More recently, a reduction in systemic inflammatory biomarkers was also been observed. Ideally, weight loss interventions should comprise a combination of dietary advice and exercise, including explicit individual weight loss goals and problem-solving regarding how to reach these goals

Furthermore, as movement frequently increased their pain, they worried that this might be doing their joints further harm and described avoiding physical activity and exercise as a result. These findings suggest a need for strategies tackling these maladaptive beliefs and behaviors. Such an approach might be particularly effective if the pain-relieving effects of exercise and its role in desensitizing the nociceptive system are specifically emphasized and incorporated into the education session(s), as this has been shown to enhance positive expectations and increase exercise induced pain relief (Rice, McNair, Huysmans, Letzen, & Finan, 2019).

Hypothesis 2: The participants in the intervention group have better health-related of quality of life than those in the control group at post-intervention (week 4) and at follow-up (week 8).

The results showed the main effect of groups were significant difference ($F_{1, 34} = 6.34$, $p = .017$). Moreover, the main effect of time and the interaction effect (Time*Group) were also different with statistically significance ($F_{2, 68} = 16.91$, $p = .000$). After the interaction and main effects showed significance, the simple effects were later tested to determine the effects of each group each time. The simple effects showed that at baseline (week 0) and post-intervention (week 4), the mean SF-36 scores between the intervention and control groups were not different ($p > .05$). At follow-up (week 8), however, there was a significant difference ($F_{1, 34} = 90.86$,

$p < .05$) (Table 9). This finding implies that the HRQOL of the participants in the intervention group was better than that of the control group during the follow-up period. For the simple effect of time, there were statistically significant difference in the intervention group and no significant differences in the control group. For the intervention group, the mean scores of HRQOL at follow-up (week 8) were higher than those at baseline (week 0), and post-intervention (week 4) (M_{diff} = -13.91 and M_{diff} = -30.18, $p < .001$, respectively). Furthermore, the mean scores for HRQOL at post-intervention (week 4) were lower than those at baseline (week 0) (M_{diff} = -16.27, $p < .001$). These findings indicate that the participants in the intervention group had better knee functional status after receiving the self-management support intervention than before receiving the intervention. When the time changed increasingly, HRQOL also improved.

These findings support latest Osteoarthritis Research Society International [OARSI] guidelines for the non-surgical management of knee OA, which recommend exercise therapy (land-based and/or water-based) for improving pain and function. Similarly, studies from this reported that hip and quadriceps strength training, walking programs, functional exercises, endurance and balance training improved health-related and knee-related QoL. Additionally, a recent study provided an overview of Cochrane reviews to determine the effectiveness of different exercise interventions on knee functional status (Briani et al., 2018). Many people believe that exercise may result in bone and cartilage loss and are therefore resistant to exercise in general, yet avoidance of activity. The knee OA program includes general information about the benefits of exercise and specific advice on joint protection during exercise for those with knee OA. Exercise is only one component of the program, and it is up to each individual to decide how much emphasis is given to exercise from week to week during the program.

As stated above, knee OA is a chronic disease and a major health problem. The significant burden of this disease, in terms of economic impact and HRQOL has been confirmed by various studies of HRQOL as a multidimensional construct with integrated biological and psychological aspects of health outcomes. Knee OA has a significant negative impact on HRQOL. Identification of therapies that improve HRQOL in knee OA patients may mitigate the clinical, economic and social burdens

of this disease (Farr, Mille, & Block, 2013). Knee OA is one of the most common systemic diseases affecting all of the structures of the joints surrounding tissues leading to physical disability reducing quality of life as follows: 1) greater disease severity was related to lower self-efficacy and life satisfaction; 2) greater social support was related to greater self-efficacy and life satisfaction, social support was positively correlated with socioeconomic status (Pattayakorn et al., 2010). The results showed that there were no differences in the HRQOL of middle-aged women between the control and intervention groups after the intervention or within the intervention group, at week 0 and week 4.

Kao et al. (2016) reported findings from the effects of self-management intervention among middle-aged adults with knee OA, finding knee symptoms and physical functional scores to be significantly improved. Improved HRQOL also increased chances of independent living, which would have additional payer impact. According to a study by Zakaria, Bakr, Hasmoni, Rani, and Kadir (2009) patients with knee OA attending primary care clinics had relatively poor quality of life pertaining to the physical health components, but less impact was seen on the patients' mental health. When females were compared to males, females reported worse QOL. Obesity as well as lower level of physical activity were reported with lower QoL scores. Knee self-management programs delivered by healthcare professionals improved QoL in patients with knee OA. Educational level and higher total mindfulness were reported to improve QoL whereas poverty, psychological distress, depression and lacking familial relationships reduce it. Surgical KOA interventions resulted in good to excellent outcomes generally; although, results varied by age, weight, and depression (Vitaloni et al., 2019).

Strength and limitation

The strengths of the study should be acknowledged according to the following three essential points: First, the randomized control trial [RCT] was considered the gold standard for determining causation, the RCT was the test the effectiveness of the self-management support intervention. Moreover, the sample of the study was also randomly assigned to either an intervention group or a control group. Second, although some of the sample was deleted from the study, the sample

size was still sufficient to illustrate the statistical significance of the findings. Third, the self-management support intervention was successful as expected in that the outcomes showed significant differences between groups at different time points.

There were five limitations to this study that should be addressed as follows. First, the findings from one setting, which was used in the present study, require caution inferring to further research. Second, the overall outcomes could not show successful sustainability in improving knee functional status and HRQOL. Third, the participants were working during the study and engaged in activities such as a high level of walking at work, which affected pain and different BMI in group. Fourth, the self-management support intervention should have a time frame to evaluate improved knee functional status and HRQOL. Fifth, medication or other treatments were not recorded, which might have affected changes in BMI and knee pain. In addition, the women who provided baseline knee pain data and were included in the current knee pain study had higher levels of education and lower BMI than those who did not complete the follow-up. Data were not collected regarding work absence or other metrics to illustrate the effects of the SMS on function and quality of life. The intervention follow-up at week 8, longer term effects will need to be determined.

Suggestions and recommendations

A limitation of this study was its weight control. Furthermore, the sample for the study could not be representative of the general knee OA population as female menopause was very high. The study does not present weight loss as a possible result of knee functional status and HRQOL. Future investigation of the self-management intervention is needed. Future studies should address the comparative sensitivity of generic and disease-specific measures in the same subject over time. These programs can be heterogeneous in the implementation of specific strategies, but commonly try to counter unhelpful illness and treatment beliefs and impart transferable skills that empower individuals to effectively manage their symptoms long-term. However, the researcher found a specific pooled effect of pain reduction and quality of life improvement for self-management programs that contained exercise programs, which suggests the latter might be a key component for knee OA. Future research is recommended to useded mobile health [mHealth] that expanding rapidly and there is

an enormous amount of health apps available. mHealth could help overcome current patient and scientific problems such as lack of information, coping difficulties, treatment adherence etc.

Implementation

The results of this study provided evidence to guide health providers in improving knee functional status and HRQOL in middle-aged women with knee OA. Moreover, this intervention offers an increased scope of practice for health professionals, nurses or care givers with evidence to support the use of collaborative chronic care models. Chronic illness raises important considerations for any attempt at progress and development of a consensus self-management support. This is an important conceptual debate for policymakers and researchers to rethink their role and determine how best to equitably support patient self-management. The model calls for reflexive awareness and sensitivity to personal roles in the socio-political dimensions of clinical practice. Furthermore, supportive policies and strategic alliances for knee OA need to be developed through integration, establishment of structures and priorities at the health care organization and community levels. Developing chronic disease policies and implementing policy into practice is viewed as integral to the provision of nursing care for knee OA in order to reach policy goals and benefit the development of chronic care patients.

Conclusion

In this study self-management support intervention showed significant improvement in health outcomes and increased quality of life. In conclusion, the IFSMT provides a good fit for SM in middle-aged women with knee OA. Overall, there is greater support for SMS that is based upon the magnitude of effects in RCTs. Exercise is recommended for the management of knee OA in all clinical guidelines irrespective of disease severity, pain levels, and functional status. For knee OA, the evidence supports the benefits of various types of exercise for improving pain and function. Therefore, nurses and other health care professionals should help knee OA patients acquire the knowledge and skills required for health management.

Key factors in the long-term success and sustainability of sector reform were found to include continued support by agencies for development, implementation

and evaluation. This disease and site-specific self-management education program improved the health status of people with knee OA in the short term. Although no approved disease-modifying drugs or other curative interventions are available, certain measures can have a positive impact on pain, functional status and quality of life in people with knee OA. The factors involved in development of knee OA and the evidence based measures that can slow its progression and consider the roles of nurses encountering OA in primary care and specialty settings.
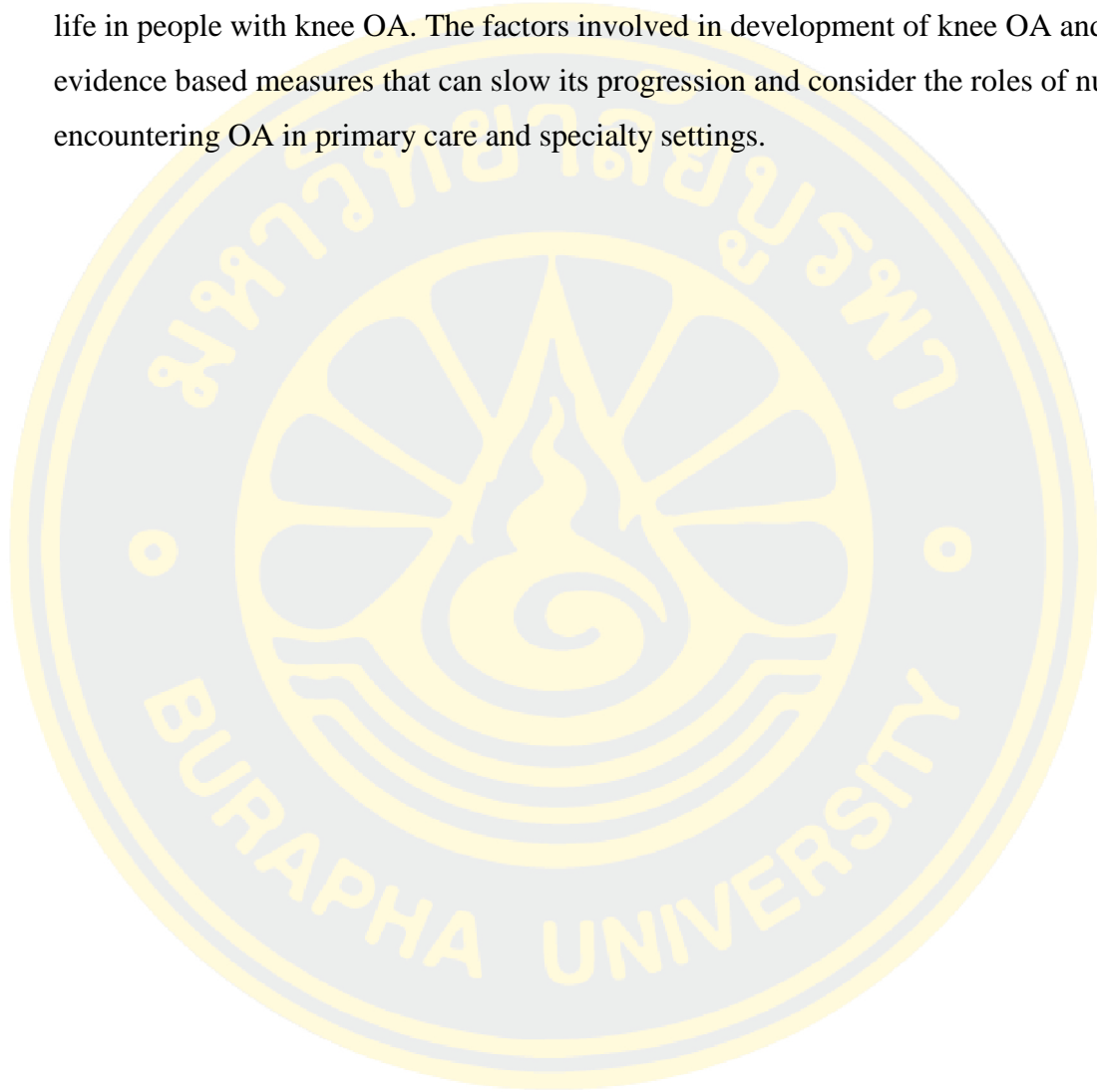
REFERENCES

Abbott, J. H., Usiskin, I. M., Wilson, R., Hansen, P., & Losina, E. (2017). The quality-of -life burden of knee osteoarthritis in New Zealand adults: A model-based evaluation. Plos One. *12, 10*(1-12).

Adams, S. G., Smith, P. K., Allan, P. F., Anzueto, A., Pugh, J. A., & Cornell, J. E. (2007). Systematic review of the chronic care model in chronic obstructive pulmonary disease prevention and management. *Archives of Internal Medicine, 167*(6), 551-561.

Akinpelu, A. O., Alonge, T. O., Adekanla, B. A., & Odole, A. C. (2009). Prevalence and pattern of symptomatic knee osteoarthritis in Nigeria: A community-based study. *Internet Journal of Allied Health Sciences and Practice, 7*(3), 1-7.

Alrushud, A. S., Rushton, A. B., Kanavaki, A. M., & Greig, C. A. (2017). Effect of physical activity and dietary restriction interventions on weight loss and the musculoskeletal function of overweight and obese older adults with knee osteoarthritis: A systematic review and mixed method data synthesis. *British Medical Journal Open, 7*(6), 1-9.

Altman, R., Asch, E., Bloch, D., Bole, G., Borenstein, D., Brandt, K., & Howell, D. (1986). Development of criteria for the classification and reporting of osteoarthritis: Classification of osteoarthritis of the knee. *Arthritis & Rheumatism: Official Journal of the American College of Rheumatology, 29*(8), 1039-1049.

Arya, R. K., & Jain, V. (2013). Osteoarthritis of the knee joint: An overview. *Journal, Indian Academy of Clinical Medicine, 14*(2), 154-62.

Ayranci, U., Orsal, O., Orsal, O., Arslan, G., & Emeksiz, D. F. (2010). Menopause status and attitudes in a Turkish midlife female population: An epidemiological study. *BioMed Central Women's Health, 10*(1), 1-6.

Baldwin, J., Briggs, A., Bagg, W., & Larmer, P. (2017). An osteoarthritis model of care should be a national priority for New Zealand. *The New Zealand Medical Journal, 130*(1467), 78- 86.

Bennell, K. L., Egerton, T., Martin, J., Abbott, J. H., Metcalf, B., McManus, F., Sims, K., Pua, Y. H., Wrigley, T. V., Forbes, A., Smith, C., Harris, A., & Smith, C. (2014). Effect of physical therapy on pain and function in patients with hip osteoarthritis: a randomized clinical trial. *Journal of the American Medical Association, 311*(19), 1987-1997.

Bennell, K., & Hinman, R. (2005). Exercise as a treatment for osteoarthritis. *Current Opinion in Rheumatology, 17*(5), 634-640.

Bhaskar, A., Areekal, B., Vasudevan, B., Ajith, R., Ravi, S., & Sankar, S. (2016). Osteoarthritis of knee and factors associated with it in middle aged women in a rural area of central Kerala, India. *International Journal of Community Medicine and Public Health, 3*(10), 2926-2931.

Bhatia, D., Bejarano, T., & Novo, M. (2013). Current interventions in the management of knee osteoarthritis. *Journal of Pharmacy & Bioallied Sciences, 5*(1), 30-36.

Birtwhistle, R., Morkem, R., Peat, G., Williamson, T., Green, M. E., Khan, S., & Jordan, K. P. (2015). Prevalence and management of osteoarthritis in primary care: An epidemiologic cohort study from the Canadian primary care sentinel surveillance network. *Canadian Medical Association Journal, 3*(3), 1-6.

Bliddal, H., Leeds, A. R., & Christensen, R. (2014). Osteoarthritis, obesity and weight loss: Evidence, hypotheses and horizons-a scoping review. *Obesity Reviews, 15*(7), 578-586.

Bodenheimer, T., Lorig, K., Holman, H., & Grumbach, K. (2002). Patient self-management of chronic disease in primary care. *Journal of the American Medical Association, 288*(19), 2469-2475.

Boyan, B. D., Tosi, L. L., Coutts, R. D., Enoka, R. M., Hart, D. A., Nicolella, D. P., & Kohrt, W. M. (2013). Addressing the gaps: Sex differences in osteoarthritis of the knee. *Biology of Sex Differences, 4*(1), 1-5.

Brady, T. (2012). Strategies to support self-management in osteoarthritis: Five categories of interventions, including education. *Orthopaedic Nursing, 31*(2), 124-130.

Braghin, R. D. M. B., Libardi, E. C., Junqueira, C., Nogueira-Barbosa, M. H., & de Abreu, D. C. C. (2018). Exercise on balance and function for knee osteoarthritis: A randomized controlled trial. *Journal of Bodywork and Movement Therapies, 22*(1), 76-82.

Brand, C. A., Amatya, B., Gordon, B., Tosti, T., & Gorelik, A. (2010). Redesigning care for chronic conditions: Improving hospital-based ambulatory care for people with osteoarthritis of the hip and knee. *Internal Medicine Journal, 40*(6), 427-436.

Briani, R. V., Ferreira, A. S., Pazzinatto, M. F., Pappas, E., Silva, D. D. O., & de Azevedo, F. M. (2018). What interventions can improve quality of life or psychosocial factors of individuals with knee osteoarthritis? A systematic review with meta-analysis of primary outcomes from randomized controlled trials. *British Journal of Sports Medicine, 52*(16), 1031-1038.

Brosseau, L., Wells, G. A., Kenny, G. P., Reid, R., Maetzel, A., Tugwell, P., Huijbregts, M., McCullough, C., De Angelis, G., & Chen, L. (2012). The implementation of a community-based aerobic walking program for mild to moderate knee osteoarthritis (OA): A knowledge translation (KT) randomized controlled trial (RCT): Part I: The uptake of the Ottawa panel clinical practice guidelines (CPGs). *BioMed Central Public Health, 12*(1), 871.

Buchbinder, R. (2014). Effect of physical therapy on pain and function in patients with hip osteoarthritis: A randomized clinical trial. *Journal of the American Medical Association, 311*(19), 1987-1997.

Button, K., Roos, P. E., Spasić, I., Adamson, P., & van Deursen, R. W. (2015). The clinical effectiveness of self-care interventions with an exercise component to manage knee conditions: A systematic review. *The Knee, 22*(5), 360-371.

Cella, D., & Nowinski, C. J. (2002). Measuring quality of life in chronic illness: The functional assessment of chronic illness therapy measurement system. *Archives of Physical Medicine and Rehabilitation, 83*, S10-S17.

Centers for Disease Control and Prevention. (2016). *Improving the quality of life for people with arthritis at a glance 2016*. Retrieved from https://www.cdc.gov/chronicdisease/resources/publications/aag/arthritis.htm

Cheung, J. C. K., Kwan, A. Y. H., Chan, S. S. C., Ngan, R. M. H., Ng, S. H., Leung, E. M. F., & Lau, A. (2005). Quality of life in older adults: Benefits from caring services in Hong Kong. *Social Indicators Research, 71*(1-3), 291-334.

Chodosh, J., Morton, S. C., Mojica, W., Maglione, M., Suttorp, M. J., Hilton, L., Rhodes, S., & Shekelle, P. (2005). Meta-analysis: Chronic disease self-management programs for older adults. *Annals of Internal Medicine, 143*(6), 427-438.

Choi, W., Zheng, H., Franklin, P., & Tulu, B. (2019). Mhealth technologies for osteoarthritis self-management and treatment: A systematic review. *Health Informatics Journal, 25*(3), 984-1003.

Coleman, S., Briffa, N. K., Carroll, G., Inderjeeth, C., Cook, N., & McQuade, J. (2008). Effects of self-management, education and specific exercises, delivered by health professionals, in patients with osteoarthritis of the knee. *BioMed Central Musculoskeletal Disorders, 9*(1), 1-7.

Cohen, J. (1992). A power primer. Psychological Bulletin, 112, 155- 159. Coleman, S., Briffa, N. K., Carroll, G., Inderjeeth, C., Cook, N., & McQuade, J. (2012). A randomised controlled trial of a self-management education program for osteoarthritis of the knee delivered by health care professionals. *Arthritis Research & Therapy, 14*(1), 1-14.

Creedon, R., & Weathers, E. (2011). The impact of nurse prescribing on patients with osteoarthritis. *British Journal of Community Nursing, 16*(8), 393-398.

Cross, M., Smith, E., Hoy, D., Nolte, S., Ackerman, I., Fransen, M., Bridgett, L., Williams, S., Guillemin, F., Hill, C. L., Laslett, L. L., Jones, G., Cicuttini, F., Osborne, R., Vos, T., Buchbinder, R., Woolf, A., & March, L. (2014). The global burden of hip and knee osteoarthritis: Estimates from the global burden of disease 2010 study. *Annals of the rheumatic diseases, 73*(7), 1323-1330.

Davy, C., Bleasel, J., Liu, H., Tchan, M., Ponniah, S., & Brown, A. (2015). Effectiveness of chronic care models: Opportunities for improving healthcare practice and health outcomes: A systematic review. *BioMed Centril Health Services Research, 15*(1), 1-11.

de Meneses, S. F., Rannou, F., & Hunter, D. J. (2016). Osteoarthritis guidelines: Barriers to implementation and solutions. *Annals of Physical and Rehabilitation Medicine, 59*(3), 170-173.

Ding, C., Cicuttini, F., Scott, F., Glisson, M., & Jones, G. (2003). Sex differences in knee cartilage volume in adults: Role of body and bone size, age and physical activity. *Rheumatology, 42*(11), 1317-1323.

Edwards, J. J., Khanna, M., Jordan, K. P., Jordan, J. L., Bedson, J., & Dziedzic, K. S. (2015). Quality indicators for the primary care of osteoarthritis: A systematic review. *Annals of the Rheumatic Diseases, 74*(3), 490-498.

Englund, M., Guermazi, A., Gale, D., Hunter, D. J., Aliabadi, P., Clancy, M., & Felson, D. T. (2008). Incidental meniscal findings on knee MRI in middle-aged and elderly persons. *New England Journal of Medicine, 359*(11), 1108-1115.

Farr, I. J., Miller, L. E., & Block, J. E. (2013). Quality of life in patients with knee osteoarthritis: A commentary on nonsurgical and surgical treatments. *Open Orthopaedics Journal, 7*, 619-623.

Faul, F., Erdfelder, E., Buchner, A., & Lang, A. G. (2009). Statistical power analyses using G* Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods, 41*(4), 1149-1160.

Foster, C., & Fenlon, D. (2011). Recovery and self-management support following primary cancer treatment. *British Journal of Cancer, 105*(S1), S21-8.

Foster, N. E., Thomas, E., Hill, J. C., & Hay, E. M. (2010). The relationship between patient and practitioner expectations and preferences and clinical outcomes in a trial of exercise and acupuncture for knee osteoarthritis. *European Journal of Pain, 14*(4), 402-409.

Fransen, M., Bridgett, L., March, L., Hoy, D., Penserga, E., & Brooks, P. (2011). The epidemiology of osteoarthritis in Asia. *International Journal of Rheumatic Disease, 14*(2), 113-121.

Frei, A., Senn, O., Huber, F., Vecellio, M., Steurer, J., Woitzek, K., Rosemann, T., & Steurer-Stey, C. (2014). Congruency of diabetes care with the chronic care model in different swiss health care organizations from the patients' perspective: A cross sectional study. *Swiss Medical Weekly, 10*(144), 1-6.

Grotle, M., Hagen, K. B., Natvig, B., Dahl, F. A., & Kvien, T. K. (2008). Prevalence and burden of osteoarthritis: Results from a population survey in Norway. *The Journal of Rheumatology, 35*(4), 677-684.

Gwilym, S. E., Pollard, T. C. B., & Carr, A. J. (2008). Understanding pain in osteoarthritis. The Journal of bone and joint surgery. *British Volume, 90*(3), 280-287.

Guermazi, A., Niu, J., Hayashi, D., Roemer, F. W., Englund, M., Neogi, T., Aliabadi, P., McLennan, E. C., & Felson, T. D. (2012). Prevalence of abnormalities in knees detected by MRI in adults without knee osteoarthritis: Population based observational study (Framingham osteoarthritis study). *BioMed Journal, 345*, 1-26.

Gugiu, C., Coryn, C. L., & Applegate, B. (2010). Structure and measurement properties of the patient assessment of chronic illness care instrument. *Journal of Evaluation in Clinical Practice, 16*(3), 509-516.

Hame, S. L., & Alexander, R. A. (2013). Knee osteoarthritis in women. *Current Reviews in Musculoskeletal Medicine, 6*(2), 182-187.

Han, K., Lee, P., Lee, S., & Park, E. (2003). Factors influencing quality of life in people with chronic illness in Korea. *Journal of Nursing Scholarship, 35*(2), 139-144.

Heidari, B. (2011). Knee osteoarthritis prevalence, risk factors, pathogenesis and features: Part I. *Caspian Journal of Internal Medicine, 2*(2), 205-212.

Hendry, M., Williams, N. H., Markland, D., Wilkinson, C., & Maddison, P. (2006). Why should we exercise when our knees hurt? A qualitative study of primary care patients with osteoarthritis of the knee. *Family Practice, 23*(5), 558-567.

Hochberg, M. C., Altman, R. D., April, K. T., Benkhalti, M., Guyatt, G., McGowan, J., Towheed, T., Welch, V., Wells, G., & Tugwell, P. (2012). American college of rheumatology 2012 recommendations for the use of nonpharmacologic and pharmacologic therapies in osteoarthritis of the hand, hip, and knee. *Arthritis Care & Research, 64*(4), 465-474.

Hootman, J. M., Macera, C. A., Ham, S. A., Helmick, C. G., & Sniezek, J. E. (2003). Physical activity levels among the general US adult population and in adults with and without arthritis. *Arthritis Care & Research: Official Journal of the American College of Rheumatology, 49*(1), 129-135.

Hoogeboom, T. J., Den Broeder, A. A., De Bie, R. A., & Van Den Ende, C. H. (2012 a). Longitudinal impact of joint pain comorbidity on quality of life and activity levels in knee osteoarthritis: Data from the osteoarthritis initiative. *Rheumatology, 52*(3), 543-546.

Hoogeboom, T. J., Kwakkenbos, L., Rietveld, L., den Broeder, A. A., de Bie, R. A., & van den Ende, C. H. (2012 b). Feasibility and potential effectiveness of a non-pharmacological multidisciplinary care programme for persons with generalized osteoarthritis: A randomized, multiple-baseline single-case study. *British Medical Journal open, 2*(4), 1-9.

Hoogeboom, R., K., van Kessel, P. M., Hochstenbach, F., Wormhoudt, T. A., Reinten, R. J. A., Wagner, K., Kater, A. P., Guikema, J. E. J., Bende, R. J., & van Noesel, C. J. M. (2013). A mutated B cell chronic lymphocytic leukemia subset that recognizes and responds to fungi. *Journal of Experimental Medicine, 210*, 59-70.

Hurley, M. V., Walsh, N. E., Mitchell, H. L., Pimm, T. J., Patel, A., Williamson, E., Jones, R. H., Dieppe, P. A., & Reeves, B. C. (2007). Clinical effectiveness of a rehabilitation program integrating exercise, self-management, and active coping strategies for chronic knee pain: A cluster randomized trial. *Arthritis Care & Research, 57*(7), 1211-1219.

Hulley S. B., Cummings, S. R., Browner, W. S., Grady, D. G., & Newman, T. B. (2007). *Designing clinical research* (3rd ed.). Philadelphia, PA: Lippincott Williams & Wilkins.

Iqbal, H. M. N. (2015). *Development of bio-composites with novel characteristics through enzymatic grafting*. Doctoral dissertation, Life Sciences, Faculty of Science and Technology, University of Westminster.

Iqbal, M. N., Haidri, F. R., Motiani, B., & Mannan, A. (2011). Frequency of factors associated with knee osteoarthritis. *The Pakistan Medical Association, 61*(8), 786-789.

Iwamoto, J., Sato, Y., Takeda, T., & Matsumoto, H. (2011). Effectiveness of exercise for osteoarthritis of the knee: A review of the literature. *World Journal of Orthopedics, 2*(5), 37-42.

Jack Farr, I. I., Miller, L. E., & Block, J. E. (2013). Quality of life in patients with knee osteoarthritis: A commentary on nonsurgical and surgical treatments. *The Open Orthopaedics Journal, 7*, 619-623.

Jahan, A. M. (2017). Randomized controlled trial of the effects of a self-management patient education program on overall quality of life and knee pain of older people with mild to moderate knee (s) osteoarthritis. *International Journal of Clinical Trials, 4*(2), 80-87.

Jevsevar, D. S. (2013). Treatment of osteoarthritis of the knee: Evidence-based guideline. *Journal of the American Academy of Orthopaedic Surgeons, 21*(9), 571-576.

Johnson, V. L., & Hunter, D. J. (2014). The epidemiology of osteoarthritis. *Best Practice & Research Clinical Rheumatology, 28*(1), 5-15.

Kao, M. H., Tsai, Y. F., Chang, T. K., Wang, J. S., Chen, C. P., & Chang, Y. C. (2016). The effects of self-management intervention among middle-age adults with knee osteoarthritis. *Journal of Advanced Nursing, 72*(8), 1825-1837.

Kao, M. J., Wu, M. P., Tsai, M. W., Chang, W. W., & Wu, S. F. (2012). The effectiveness of a self-management program on quality of life for knee osteoarthritis [OA] patients. *Archives of gerontology and geriatrics, 54*(2), 317-324.

Kiadaliri, A. A., Lamm, C. J., de Verdier, M. G., Engström, G., Turkiewicz, A., Lohmander, L. S., & Englund, M. (2016). Association of knee pain and different definitions of knee osteoarthritis with health-related quality of life: A population-based cohort study in southern Sweden. *Health and Quality of Life Outcomes, 14*(1), 1-7.

Kidd, B. (2012). Mechanisms of pain in osteoarthritis. *The Musculoskeletal Journal of Hospital for Special Surgery, 8*(1), 26-28.

Kotlarz, H., Gunnarsson, C. L., Fang, H., & Rizzo, J. A. (2009). Insurer and out-of-pocket costs of osteoarthritis in the US: Evidence from national survey data. *Arthritis & Rheumatism: Official Journal of the American College of Rheumatology, 60*(12), 3546-3553.

Knight, M. M. (2000). Cognitive ability and functional status. *Journal of Advanced Nursing, 31*(6), 1459-1468.

Kulowski, J. (2007). The classic: Flexion contracture of the knee: The mechanics of the muscular contracture and the turnbuckle cast method of treatment; with a review of fifty-five cases. *Clinical Orthopaedics and Related Research, 464*, 4-10.

Kuptniratsaikul, V., & Rattanachaiyanont, M. (2007). Validation of a modified Thai version of the Western Ontario and McMaster [WOMAC] osteoarthritis index for knee osteoarthritis. *Clinical Rheumatology, 26*(10), 1641-1645.

Kuptniratsaikul, V., Tosayanonda, O., Nilganuwong, S., & Thamalikitkul, V. (2002). The efficacy of a muscle exercise program to improve functional performance of the knee in patients with osteoarthritis. *Journal of the Medical Association of Thailand, 85*(1), 33-40.

Lane, N. E., Shidara, K., & Wise, B. L. (2017). Osteoarthritis year in review 2016: Clinical. *Osteoarthritis and Cartilage, 25*(2), 209-215.

Laslett, L. L., Quinn, S. J., Winzenberg, T. M., Sanderson, K., Cicuttini, F., & Jones, G. (2012). A prospective study of the impact of musculoskeletal pain and radiographic osteoarthritis on health related quality of life in community dwelling older people. *BioMed Central Musculoskeletal Disorders, 13*(1), 1-8.

Lawn, S., & Schoo, A. (2010). Supporting self-management of chronic health conditions: Common approaches. *Patient Education and Counseling, 80*(2), 205-211.

Lawrence, R. C., Felson, D. T., Helmick, C. G., Arnold, L. M., Choi, H., Deyo, R. A., Gabriel, S., Hirsch, R., Hochberg, M. C., Hunder, G. G., Jordan, J. M., Katz, J. N., Kremers, H. M., & Wolfe, F. (2008). Estimates of the prevalence of arthritis and other rheumatic in the united states: Part II. *Arthritis & Rheumatism, 58*(1), 26-35.

Leidy, N. K. (1995). Functional performance in people with chronic obstructive pulmonary disease. *The Journal of Nursing Scholarship, 27*(1), 23-34.

Leidy, N. K. (2008). Addressing behavioral and emotional aspects of COPD. *Journal Hopkins Advanced Studies in Medicine, 8*(13), 463-468.

Litwic, A., Edwards, M. H., Dennison, E. M., & Cooper, C. (2013). Epidemiology and burden of osteoarthritis. *British Medical Bulletin, 105*(1), 185-199.

Lorig, K. R., & Holman, H. R. (2003). Self-management education: History, definition, outcomes, and mechanisms. *Annals of Behavioral Medicine, 26*(1), 1-7.

Lorig, K., Ritter, P. L., & Plant, K. (2005). A disease-specific self-help program compared with a generalized chronic disease self-help program for arthritis patients. *Arthritis Care & Research: Official Journal of the American College of Rheumatology, 53*(6), 950-957.

Losina, E., Paltiel, A. D., Weinstein, A. M., Yelin, E., Hunter, D. J., Chen, S. P., Klara, K., Suter, L. G., Soloman, D. H., Burbine, S. A., Walensky, R. P., & Katz, J. N. (2015). Lifetime medical costs of knee osteoarthritis management in the united states: Impact of extending indications for total knee arthroplasty. *Arthritis Care & Research, 67*(2), 203-215.

Louthrenoo, W. (2015). An insight into rheumatology in Thailand. *Nature Reviews Rheumatology, 11*(1), 55-61.

Lugo, J. P., Saiyed, Z. M., & Lane, N. E. (2015). Efficacy and tolerability of an undenatured type II collagen supplement in modulating knee osteoarthritis symptoms: A multicenter randomized, double-blind, placebo-controlled study. *Nutrition Journal, 15*(1), 1-15.

MacDonald, C. W., Whitman, J. M., Cleland, J. A., Smith, M., & Hoeksma, H. L. (2006). Clinical outcomes following manual physical therapy and exercise for hip osteoarthritis: A case series. *Journal of Orthopedic & Sports Physical Therapy, 36*(8), 588-599.

Macera, C. A., Hootman, J. M., & Sniezek, J. E. (2003). Major public health benefits of physical activity. *Arthritis Care & Research: Official Journal of the American College of Rheumatology, 49*(1), 122-128.

Madry, H., Luyten, F. P., & Facchini, A. (2012). Biological aspects of early osteoarthritis. *Knee Surgery, Sports Traumatology, Arthroscopy, 20*(3), 407-422.

Maleki-Fischbach, M., & Jordan, J. M. (2010). New developments in osteoarthritis. Sex differences in magnetic resonance imaging-based biomarkers and in those of joint metabolism. *Arthritis Research & Therapy, 12*(4), 1-8.

Martin, C., & Sturmberg, J. (2009). Complex adaptive chronic care. *Journal of Evaluation in Clinical Practice, 15*(3), 571-577.

Martinez-Martin, P., & Kurtis, M. M. (2012). Health-related quality of life as an outcome variable in Parkinson's disease. *Therapeutic Advances in Neurological Disorders, 5*(2), 105-117.

Maurits, M. P., Yuminaga, H., Huizinga, T. W. J., & Knevel, R. (2019). Mobile health applications in rheumatology: Could they improve our care and research? *International Journal of Clinical Rheumatology, 14*(1), 44-49.

McCulloch, K., Litherland, G. J., & Rai, T. S. (2017). Cellular senescence in osteoarthritis pathology. *Aging Cell, 16*(2), 210-218.

McDonald, J. A., Khodyakova, A., Aranjuez, G., Dudley, C., & Montell, D. J. (2008). PAR-1 kinase regulates epithelial detachment and directional protrusion of migrating border cells. *Current Biology, 18*(21), 1659-1667.

McDonough, C. M., & Jette, A. M. (2010). The contribution of osteoarthritis to functional limitations and disability. *Clinics in Geriatric Medicine, 26*(3), 387-399.

McKnight, P. E., Kasle, S., Going, S., Villanueva, I., Cornett, M., Farr, J., Wright, J., &
Zautra, A. (2010). A comparison of strength training, self-management, and
the combination for early osteoarthritis of the knee. *Arthritis Care &
Research: Official Journal of the American College of Rheumatology,62*(1),
45-53.

McWilliams, D. F., Leeb, B. F., Muthuri, S. G., Doherty, M., & Zhang, W. (2011).
Occupational risk factors for osteoarthritis of the knee: A meta-analysis.
Osteoarthritis and Cartilage, 19(7), 829-839.

Megari, K. (2013). Quality of life in chronic disease patients. *Health Psychology
Research, 1*(3), 141-148.

Mei-Hua Kao, R. N., Pi-Feng Hsu, R. N., Sheng-Fang Tien, R. N., & Chie-Pein Chen,
M. D. (2017). Effects of support interventions in women hospitalized with
preterm labor show less. *Clinical Nursing Research, 28*(6), 726-743.

Molzahn, A. E., & Page, G. (2006). Field testing the WHOQOL-100 in Canada.
Canadian Journal of Nursing Research, 38, 106-123.

Murphy, S. L., Schwartz, T. A., Helmick, C. G., Renner, J. B., Tudor, G., Koch, G.,
Dragomir, A., Kalsbeek, W. D., Luta, G., & Jordan, J. M. (2008). Lifetime risk
of symptomatic knee osteoarthritis. *Arthritis Care & Research: Official
Journal of the American College of Rheumatology, 59*(9), 1207-1213.

Murphy, S. L., Strasburg, D. M., Lyden, A. K., Smith, D. M., Koliba, J. F., Dadabhoy,
D. P., & Wallis, S. M. (2008). Effects of activity strategy training on pain and
physical activity in older adults with knee or hip osteoarthritis: A pilot study.
*Arthritis Care & Research: Official Journal of the American College of
Rheumatology, 59*(10), 1480-1487.

Musumeci, G., Aiello, F. C., Szychlinska, M. A., Di Rosa, M., Castrogiovanni, P., &
Mobasheri, A. (2015). Osteoarthritis in the XXIst century: Risk factors and
behaviours that influence disease onset and progression. *International Journal
of Molecular Sciences, 16*(3), 6093-6112.

Nejati, P., Farzinmehr, A., & Moradi-Lakeh, M. (2015). The effect of exercise therapy
on knee osteoarthritis: A randomized clinical trial. *Medical journal of the
Islamic Republic of Iran, 29*, 1-8.

Neogi, T., & Zhang, Y. (2013). Epidemiology of osteoarthritis. *Rheumatic Disease Clinics, 39*(1), 1-19.

Nguyen, U. S. D., Zhang, Y., Zhu, Y., Niu, J., Zhang, B., & Felson, D. T. (2011). Increasing prevalence of knee pain and symptomatic knee osteoarthritis: Survey and cohort data. *Annals of Internal Medicine, 155*(11), 725-732.

Nguyen, C., Lefevre-Colau, M. M., Poiraudeau, S., & Rannou, F. (2016). Rehabilitation (exercise and strength training) and osteoarthritis: A critical narrative review. *Annals of Physical and Rehabilitation Medicine, 59*(3), 190-195.

O'Connell, S., Mc Carthy, V. J., & Savage, E. (2018). Frameworks for self-management support for chronic disease: A cross-country comparative document analysis. *BioMed Central Health Services Research, 18*(1), 1-10.

O'Neill, T. W., & Felson, D. T. (2018). Mechanisms of osteoarthritis (OA) pain. *Current Osteoporosis Reports, 16*(5), 611-616.

Østerås, N., van Bodegom-Vos, L., Dziedzic, K., Moseng, T., Aas, E., Andreassen, Ø., Mdala, O., Natvig, B., Rotterud, J. H, Schijervheim, U. B., Vlienland, T. V., & Hagen, K. B. (2015). Implementing international osteoarthritis treatment guidelines in primary health care: Study protocol for the SAMBA stepped wedge cluster randomized controlled trial. *Implementation Science, 10*(1), 165-175.

Palazzo, C., Klinger, E., Dorner, V., Kadri, A., Thierry, O., Boumenir, Y., Martin, W., Poiraudeau, S., & Ville, I. (2016). Barriers to home-based exercise program adherence with chronic low back pain: Patient expectations regarding new technologies. *Annals of Physical and Rehabilitation Medicine, 59*(2), 107-113.

Patrick, D. L., & Erickson, P. (1993). *Health status and health policy: Quality of life in health care evaluation and resource allocation*. New York: Oxford University Press.

Pattayakorn, P., Hanucharurnkul, S., Goeppinger, J., Vorapongsathorn, T., Malathum, P., & Chotanaphuti, T. (2010). Factors influencing life satisfaction among older Thai women with knee osteoarthritis. *Pacific Rim International Journal of Nursing Research, 14*(1), 3-16.

Pisters, M. F., Veenhof, C., Van Dijk, G. M., & Dekker, J. (2014). Avoidance of activity and limitations in activities in patients with osteoarthritis of the hip or knee: A 5 year follow-up study on the mediating role of reduced muscle strength. *Osteoarthritis and Cartilage, 22*(2), 171-177.

Prompuk, B., & Moongtui, W. (2013). A concept analysis: Functional status. *Nursing Journal, 40*, 129-137.

Quillfeldt, A. F., & Marks, R. M. (2016). Effects of strength training, multimodal exercise and manual mobilization on pain and function in knee osteoarthritis: A systematic review and meta-analysis. *Edorium Journal of Disability and Rehabilitation, 2*, 34-42.

Revicki, D. A., Zodet, M. W., Joshua-Gotlib, S., Levine, D., & Crawley, J. A. (2003). Health-related quality of life improves with treatment-related GERD symptom resolution after adjusting for baseline severity. *Health and Quality of life Outcomes, 1*(1), 1-9.

Rice, D., McNair, P., Huysmans, E., Letzen, J., & Finan, P. (2019). Best evidence rehabilitation for chronic pain part 5: Osteoarthritis. *Journal of Clinical of Medicine, 8*, 1-31.

Richmond, R. S., Carlson, C. S., Register, T. C., Shanker, G., & Loeser, R. F. (2000). Functional estrogen receptors in adult articular cartilage: Estrogen replacement therapy increases chondrocyte synthesis of proteoglycans and insulin-like growth factor binding protein 2. *Arthritis & Rheumatism: Official Journal of the American College of Rheumatology, 43*(9), 2081-2090.

Riddle, D. L., Makowski, M., & Kong, X. (2015). Knee osteoarthritis worsening across the disease spectrum and future knee pain, symptoms, and functioning: A multisite prospective cohort study. *Arthritis Care & Research, 67*(12), 1722-1729.

Robbins, L., & Kulesa, M. G. (2012). The state of the science in the prevention and management of osteoarthritis. *The Musculoskeletal Journal of Hospital for Special Surgery, 8*(2), 151-158.

Rodriguez-Merchan, E. C. (2016). Conservative treatment of acute knee osteoarthritis: A review of the Cochrane library. *Journal of Acute Disease, 5*(3), 190-193.

Rogers, M. W., & Wilder, F. V. (2009). Exercise and hand osteoarthritis symptomatology: Acontrolled crossover trial. *Journal of Hand Therapy, 22*(1), 10-18.

Roman-Blas, J. A., Castañeda, S., Largo, R., & Herrero-Beaumont, G. (2009). Osteoarthritis associated with estrogen deficiency. *Arthritis Research & Therapy, 11*(5), 1-14.

Roopsawang, I., & Aree-Ue, S. (2015). Knee osteoarthritis in adult and older thais living in rural and urban areas: A comparative study. *Pacific Rim International Journal of Nursing Research, 19*(3), 187-201.

Roopsawang, I., & Kawinwonggowit, V. (2019). Factors predicting functional ability among older adults undergoing hip and knee arthroplasty. *Pacific Rim International Journal of Nursing Research, 23*(2), 156-169.

Roos, E. M., & Arden, N. K. (2016). Strategies for the prevention of knee osteoarthritis. *Nature Reviews Rheumatology, 12*(2), 92-101.

Roschel, H., Neves-Junior, M., Gualano, B., Barroso, R., Robles, C., de Sá Pinto, A. L., Fuller, R., & Lima, F. R. (2011). Familiarisation with lower limb strength testing in middle-aged women with osteoarthritis of the knee. *Physiotherapy, 97*(4), 350-353.

Rosemann, T., Laux, G., Szecsenyi, J., Wensing, M., & Grol, R. (2008). Pain and osteoarthritis in primary care: Factors associated with pain perception in a sample of 1,021 patients. *Pain Medicine, 9*(7), 903-910.

Ryan, P., & Sawin, K. J. (2009). The individual and family self-management theory: Background and perspectives on context, process, and outcomes. *Nursing Outlook, 57*(4), 217-225.

Ryan, P. A., & Sawin, K. J. (2014). *Individual and family self-management theory (revised figure)*. Retrieved from https://www4.uwm.edu/nursing/about/ centers-institutes/self-management/theory.cfm

Salve, H., Gupta, V., Palanivel, C., Yadav, K., & Singh, B. (2010). Prevalence of knee osteoarthritis amongst perimenopausal women in an urban resettlement colony in South Delhi. *Indian Journal of Public Health, 54*(3), 155-157.

Sanchez-Ramirez, D. C., van der Leeden, M., Knol, D. L., van der Esch, M., Roorda, L. D., Verschueren, S., Lems, W. F., & Dekker, J. (2013). Association of postural control with muscle strength, proprioception, self-reported knee instability and activity limitations in patients with knee osteoarthritis. *Journal of Rehabilitation Medicine, 45*(2), 192-197.

Schoo, A. M., Morris, M. E., & Bui, Q. M. (2004). Influence of home exercise performance, concurrent physical activities and analgesics on pain in people with osteoarthritis. *New Zealand Journal of Physiotherapy, 32*(2), 67-74.

Soares, C. N. (2010). Can depression be a menopause-associated risk? *BioMed Central Medicine, 8*(1), 1-5.

Spreeuwenberg, C. (2008). The chronic care model as vehicle for the development of disease management in Europe. *International Journal of Integrated Care, 8*(5), None. doi: http://doi.org/10.5334/ijic.297

Srikanth, V. K., Fryer, J. L., Zhai, G., Winzenberg, T. M., Hosmer, D., & Jones, G. (2005). A meta-analysis of sex differences prevalence, incidence and severity of osteoarthritis. *Osteoarthritis and Cartilage, 13*(9), 769-781.

Stevens-Lapsley, J. E., & Kohrt, W. M. (2010). Osteoarthritis in women: Effects of estrogen, obesity and physical activity. *Women's Health, 6*(4), 601-615.

Steultjens, M. P. M., Dekker, J., & Bijlsma, J. W. J. (2002). Avoidance of activity and disability in patients with osteoarthritis of the knee: The mediating role of muscle strength. *Arthritis & Rheumatism: Official Journal of the American College of Rheumatology, 46*(7), 1784-1788.

Stuckey, H. L., Adelman, A. M., & Gabbay, R. A. (2011). Improving care by delivering the chronic care model for diabetes. *Diabetes Management, 1*(1), 37-52.

Tangtrakulwanich, B., Wiwatwongwana, S., Chongsuvivatwong, V., & Geater, A. F. (2006). Comparison of validity, and responsiveness between general and disease-specific quality of life instruments (Thai version) in knee osteoarthritis. *Journal of the Medical Association Thailand, 89*(9), 1454-1459.

Taruc-Uy, R. L., & Lynch, S. A. (2013). Diagnosis and treatment of osteoarthritis. *Primary Care: Clinics in Office Practice, 40*(4), 821-836.

Thorstensson, C. A., Garellick, G., Rystedt, H., & Dahlberg, L. E. (2015). Better management of patients with osteoarthritis: Development and nationwide implementation of an evidence-based supported osteoarthritis self-management programme. *Musculoskeletal Care, 13*(2), 67-75.

Uhlig, T. (2010). The burden of osteoarthritis: the societal and the patient perspective. *Clinical Practice, 7*(6), 605-619.

van Dijk, G. M., Veenhof, C., Spreeuwenberg, P., Coene, N., Burger, B. J., Schaardenburg, D., Van den, C., & Deckker, J. (2010). Prognosis of limitations in activities in osteoarthritis of the hip or knee: A 3-year cohort study. *Archives of Physical Medicine and Rehabilitation, 91*(1), 58-66.

Vitaloni, M., Botto-van Bemden, A., Contreras, R. M. S., Scotton, D., Bibas, M., Quintero, M., Monfort, J., Carne, X., de Abajo, F., Oswald, E., Cabot, M. R., Matucci, M., du Souich, P., Ingrid, M., Eakin, G & Verges, J. (2019). Global management of patients with knee osteoarthritis begins with quality of life assessment: A systematic review. *BioMed Central Musculoskeletal Disorders, 20*(1), 1-12.

Wagner, E. H. (1998). Chronic disease management: What will it take to improve care for chronic illness? *Effective Clinical Practice: Effective Clinical Practice, 1*(1), 2-4.

Wagner, E. H., Austin, B. T., & Von Korff, M. (1996). Organizing care for patients with chronic illness. *The Milbank Quarterly, 74*(4), 511-544.

Wagner, E. H., Austin, B. T., Davis, C., Hindmarsh, M., Schaefer, J., & Bonomi, A. (2001). Improving chronic illness care: Translatng evidence into action. *Health Affairs, 20*(6), 64-78.

Warsi, A., LaValley, M. P., Wang, P. S., Avorn, J., & Solomon, D. H. (2003). Arthritis self-management education programs: A meta-analysis of the effect on pain and disability. *Arthritis & Rheumatism: Official Journal of the American College of Rheumatology, 48*(8), 2207-2213.

Warsi, A., Wang, P. S., LaValley, M. P., Avorn, J., & Solomon, D. H. (2004). Self-management education programs in chronic disease: A systematic review and methodological critique of the literature. *Archives of internal Medicine, 164*(15), 1641-1649.

Wetzels, R., van Weel, C., Grol, R., & Wensing, M. (2008). Family practice nurses supporting self-management in older patients with mild osteoarthritis: A randomized trial. *BioMed Central Family Practice, 9*(1), 1-6.

Wetzels, R., Harmsen, M., Van Weel, C., Grol, R., & Wensing, M. (2007). *Interventions for improving older patients' involvement in primary care episodes*. Retrieved from https://doi.org/10.1002/14651858.CD004273. pub2

World Health Organization [WHO]. (2018). *Proposed working definition of an older person in Africa for the MDS project*. Retrieved from http://www.who.int/healthinfo/survey/ageingdefnolder/en/

Wilson, I. B., & Cleary, P. D. (1995). Linking clinical variables with health-related quality of life: A conceptual model of patient outcomes. *Journal of the American Medical Association, 273*(1), 59-65.

Yip, Y. B., Sit, J. W., Fung, K. K., Wong, D. Y., Chong, S. Y., Chung, L. H., & Ng, T. P. (2007 a). Effects of a self-management arthritis program with an added exercise component for osteoarthritic knee: Randomized controlled trial. *Journal of Advanced Nursing, 59*, 20-28.

Yip, Y. B., Sit, J. W., Fung, K. K., Wong, D. Y., Chong, S. Y., Chung, L. H., & Ng, T. P. (2007 b). Impact of an Arthritis Self-Management Program with an added exercise component for osteoarthritic knee sufferers on improving pain, functional outcomes and use of health care services: An experimental Study. *Patient Education and Counseling, 65*, 113-121.

Yip, Y. B., Sit, J. W., Wong, D. Y., Chong, S. Y., & Chung, L. H. (2008). A 1-year follow-up of an experimental study of a self-management arthritis program with an added exercise component of clients with osteoarthritis of the knee. *Psychology, Health and Medicine, 13*(4), 402-414.

Yucesoy, B., Charles, L. E., Baker, B., & Burchfiel, C. M. (2015). Occupational and genetic risk factors for osteoarthritis: A review. *Work, 50*(2), 261-273.

Zakaria, Z. F., Bakar, A. A., Hasmoni, H. M., Rani, F. A., & Kadir, S. A. (2009). Health-related quality of life in patients with knee osteoarthritis attending two primary care clinics in Malaysia: A cross-sectional study. *Asia Pacific Family Medicine, 8*(1), 1-7.

Zhang, Q., Zhang, L., Wang, B., Ou, C.Y., Chien, C.T., & Jiang, J. (2006). A hedgehog-induced BTB protein modulates hedgehog signaling by degrading Ci/ Gli transcription factor. *Developmental Cell, 10*(6), 719-729.

Zhang, Y., & Jordan, J. M. (2010). Epidemiology of osteoarthritis. *Clinics in Geriatric Medicine, 26*(3), 355-369.

Zhang, Y., & Niu, J. (2016). Shifting gears in osteoarthritis research toward symptomatic osteoarthritis. *Arthritis & Rheumatology, 68*(8), 1797-1800.

Zheng, H., & Chen, C. (2015). Body mass index and risk of knee osteoarthritis: Systematic review and meta-analysis of prospective studies. *British Medical Journal, 5*(12), 1-8.

APPENDICES

APPENDIX A

Inviting documents of experts

รายนามผู้ทรงคุณวุฒิ

1. รองศาสตราจารย์ ดร.บุญสิน ตั้งตระกูลวนิช   ภาควิชาศัลยศาสตร์ออร์โธปิดิกส์
และกายภาพบำบัด คณะแพทยศาสตร์
มหาวิทยาลัยสงขลานครินทร์

2. ผู้ช่วยศาสตราจารย์ ดร.แสงอรุณ อิสระมาลัย   การพยาบาลสาธารณสุขศาสตร์
คณะพยาบาลศาสตร์
มหาวิทยาลัยสงขลานครินทร์

3. นายแพทย์ธนศักดิ์ ยะคำป้อ   อาจารย์ประจำภาควิชาศัลยศาสตร์
ออร์โธปิดิกส์ คณะแพทยศาสตร์
มหาวิทยาลัยบูรพา

บันทึกข้อความ

ส่วนงาน มหาวิทยาลัยบูรพา คณะพยาบาลศาสตร์ งานบริการการศึกษา (บัณฑิตศึกษา) โทร ๒๒๓๖
ที่ ศธ ๖๒๐๖/๐๕๙๕   วันที่ ๑๖ พฤษภาคม พ.ศ. ๒๕๖๒
เรื่อง ขออนุญาตเชิญบุคลากรในสังกัดเป็นผู้ตรวจสอบความตรงตามเนื้อหาของเครื่องมือการวิจัย

เรียน คณบดีคณะแพทยศาสตร์

      ด้วย นางสาวทิพวรรณ บุญสนอง รหัสประจำตัว ๕๙๘๑๐๐๐๘ นิสิตหลักสูตรปรัชญาดุษฎีบัณฑิต
สาขาวิชาพยาบาลศาสตร์ (หลักสูตรนานาชาติ) คณะพยาบาลศาสตร์ มหาวิทยาลัยบูรพา ได้รับอนุมัติเค้าโครง
ดุษฎีนิพนธ์ เรื่อง "EFFECTS OF THE SELF-MANAGEMENT SUPPORT INTERVENTION ON KNEE
FUNCTIONAL STATUS AND HEALTH-RELATED QUALITY OF LIFE AMONG MIDDLE-AGED WOMEN
WITH KNEE OSTEOARTHRITIS: A RANDOMIZED CONTROLLED TRIAL" โดยมีรองศาสตราจารย์ ดร.
นุจรี ไชยมงคล เป็นประธานกรรมการควบคุมดุษฎีนิพนธ์ ซึ่งอยู่ในขั้นตอนการเตรียมเครื่องมือการวิจัย

      เนื่องจาก นพ.ธนศักดิ์ ยะคำป้อ บุคลากรในสังกัดของท่านเป็นผู้มีความเชี่ยวชาญเกี่ยวกับการวิจัย
ดังกล่าวอย่างดียิ่ง ในการนี้ คณะฯ จึงขออนุญาตเชิญเป็นผู้ตรวจสอบความตรงตามเนื้อหาของเครื่องมือ
การวิจัยของนิสิต

      จึงเรียนมาเพื่อโปรดพิจารณาอนุญาตด้วย จะเป็นพระคุณยิ่ง

(ผู้ช่วยศาสตราจารย์ ดร.พรชัย จูลเมตต์)
คณบดีคณะพยาบาลศาสตร์

สำเนาเรียน นพ.ธนศักดิ์ ยะคำป้อ

ที่ ศธ ๖๒๐๖/ ๐๕๗๗

มหาวิทยาลัยบูรพา คณะพยาบาลศาสตร์
๑๖๙ ถนนลงหาดบางแสน ตำบลแสนสุข
อำเภอเมือง จังหวัดชลบุรี ๒๐๑๓๑

๒๕ พฤษภาคม ๒๕๖๒

เรื่อง ขออนุญาตเชิญบุคลากรในสังกัดเป็นผู้ตรวจสอบความตรงตามเนื้อหาของเครื่องมือการวิจัย

เรียน คณบดีคณะแพทยศาสตร์ มหาวิทยาลัยสงขลานครินทร์

      ด้วย นางสาวทิพวรรณ บุญสนอง รหัสประจำตัว ๕๙๘๑๐๐๐๘ นิสิตหลักสูตรปรัชญาดุษฎีบัณฑิต สาขาวิชาพยาบาลศาสตร์ (หลักสูตรนานาชาติ) คณะพยาบาลศาสตร์ มหาวิทยาลัยบูรพา ได้รับอนุมัติเค้าโครง ดุษฎีนิพนธ์ เรื่อง "EFFECTS OF THE SELF-MANAGEMENT SUPPORT INTERVENTION ON KNEE FUNCTIONAL STATUS AND HEALTH-RELATED QUALITY OF LIFE AMONG MIDDLE-AGED WOMEN WITH KNEE OSTEOARTHRITIS: A RANDOMIZED CONTROLLED TRIAL" โดยมีรองศาสตราจารย์ ดร. นุจรี ไชยมงคล เป็นประธานกรรมการควบคุมดุษฎีนิพนธ์ ซึ่งอยู่ในขั้นตอนการเตรียมเครื่องมือการวิจัย

      เนื่องจาก รองศาสตราจารย์ ดร. นพ.บุญสิน ตั้งตระกูลวนิช บุคลากรในสังกัดของท่านเป็นผู้มีความเชี่ยวชาญเกี่ยวกับการวิจัยดังกล่าวอย่างดียิ่ง ในการนี้ คณะฯ จึงขออนุญาตเชิญเป็นผู้ตรวจสอบความตรงตามเนื้อหาของเครื่องมือการวิจัยของนิสิต

      จึงเรียนมาเพื่อโปรดพิจารณาอนุญาตด้วย จะเป็นพระคุณยิ่ง

ขอแสดงความนับถือ

(ผู้ช่วยศาสตราจารย์ ดร.พรชัย จูลเมตต์)
คณบดีคณะพยาบาลศาสตร์ ปฏิบัติการแทน
ผู้ปฏิบัติหน้าที่อธิการบดีมหาวิทยาลัยบูรพา

ที่ ศธ ๖๒๐๖/๐๔๗๗๒

มหาวิทยาลัยบูรพา คณะพยาบาลศาสตร์
๑๖๙ ถนนลงหาดบางแสน ตำบลแสนสุข
อำเภอเมือง จังหวัดชลบุรี ๒๐๑๓๑

๑๕ พฤษภาคม ๒๕๖๒

เรื่อง ขออนุญาตเชิญบุคลากรในสังกัดเป็นผู้ตรวจสอบความตรงตามเนื้อหาของเครื่องมือการวิจัย

เรียน คณบดีคณะพยาบาลศาสตร์ มหาวิทยาลัยสงขลานครินทร์

ด้วย นางสาวทิพวรรณ บุญสนอง รหัสประจำตัว ๕๙๘๑๐๐๐๘ นิสิตหลักสูตรปรัชญาดุษฎีบัณฑิต สาขาวิชาพยาบาลศาสตร์ (หลักสูตรนานาชาติ) คณะพยาบาลศาสตร์ มหาวิทยาลัยบูรพา ได้รับอนุมัติเค้าโครง ดุษฎีนิพนธ์ เรื่อง "EFFECTS OF THE SELF-MANAGEMENT SUPPORT INTERVENTION ON KNEE FUNCTIONAL STATUS AND HEALTH-RELATED QUALITY OF LIFE AMONG MIDDLE-AGED WOMEN WITH KNEE OSTEOARTHRITIS: A RANDOMIZED CONTROLLED TRIAL" โดยมีรองศาสตราจารย์ ดร. นุจรี ไชยมงคล เป็นประธานกรรมการควบคุมดุษฎีนิพนธ์ ซึ่งอยู่ในขั้นตอนการเตรียมเครื่องมือการวิจัย

เนื่องจาก ผู้ช่วยศาสตราจารย์ ดร.แสงอรุณ อิสระมาลัย บุคลากรในสังกัดของท่านเป็นผู้มีความ เชี่ยวชาญเกี่ยวกับการวิจัยดังกล่าวอย่างดียิ่ง ในการนี้ คณะฯ จึงขออนุญาตเชิญเป็นผู้ตรวจสอบความตรง ตามเนื้อหาของเครื่องมือการวิจัยของนิสิต

จึงเรียนมาเพื่อโปรดพิจารณาอนุญาตด้วย จะเป็นพระคุณยิ่ง

ขอแสดงความนับถือ

(ผู้ช่วยศาสตราจารย์ ดร.พรชัย จูลเมตต์)
คณบดีคณะพยาบาลศาสตร์ ปฏิบัติการแทน
ผู้ปฏิบัติหน้าที่อธิการบดีมหาวิทยาลัยบูรพา

งานบริการการศึกษา (บัณฑิตศึกษา)
โทรศัพท์ (๐๓๘) ๑๐๒๘๓๖, ๑๐๒๘๗๕
โทรสาร (๐๓๘) ๓๙๓๔๗๖

APPENDIX B

Ethical document

THE INSTITUTIONAL REVIEW BOARD (IRB) FOR GRADUATE STUDIES
FACULTY OF NURSING, BURAPHA UNIVERSITY, THAILAND

Thesis Title	Effects of the Self-management Support Intervention on Knee Functional Status and Health-related Quality of Life among Middle-age Women with Knee Osteoarthritis: A Randomized Controlled Trial
Name	Ms. Thippawan Bunsanong ID: 59810008 Doctor of Philosophy in Nursing Science (International Program)

Number of the IRB approval   02 – 05 – 2562

The Institutional Review Board (IRB) for graduate studies of Faculty of Nursing, Burapha University reviewed your submitted proposal. The contingencies have been addressed and the IRB **approves** the protocol. Work on this project may begin. This approval is for a period of one year from the date of this letter and will require continuation approval if the research project extends beyond **June 17th, 2020.**

If you make any changes to the protocol during the period of this approval, you must submit a revised protocol to the IRB committee for approval before implementing the changes.

Date of Approval   June 17th, 2019

chrita Woebrl

Chintana Wacharasin, R.N., Ph.D.

Chairperson of the IRB
Faculty of Nursing, Burapha University, THAILAND

Tel.: 66-038-102823
Fax: 66-038-393476
E-Mail: naruemit@buu.ac.th

ใบยินยอมเข้าร่วมการวิจัย

หัวข้อวิทยานิพนธ์ เรื่อง ผลของการสนับสนุนการจัดการตนเองของหญิงวัยกลางคน
ที่มีภาวะข้อเข่าเสื่อมต่อหน้าที่การทำงานของข้อเข่าและคุณภาพชีวิต: การทดลองแบบสุ่มและ
มีกลุ่มควบคุม

     วันให้คำยินยอม วันที่.............เดือน.......................................พ.ศ. ....

     ก่อนที่จะลงนามในใบยินยอมเข้าร่วมการวิจัยนี้ ข้าพเจ้าได้รับการอธิบายจากผู้วิจัย
ถึงวัตถุประสงค์ของการวิจัย วิธีการวิจัย ประโยชน์ที่จะเกิดขึ้นจากการวิจัยอย่างละเอียดและ
มีความเข้าใจดีแล้ว ข้าพเจ้ายินดีเข้าร่วมโครงการวิจัยนี้ด้วยความสมัครใจ และข้าพเจ้ามีสิทธิ
ที่จะบอกเลิกการเข้าร่วมในโครงการวิจัยนี้เมื่อใดก็ได้ และการบอกเลิกการเข้าร่วมการวิจัยนี้
จะไม่มีผลกระทบใด ๆ ต่อข้าพเจ้า

     ผู้วิจัยรับรองว่าจะตอบคำถามต่าง ๆ ที่ข้าพเจ้าสงสัยด้วยความเต็มใจ ไม่ปิดบัง
ซ่อนเร้นจนข้าพเจ้าพอใจ ข้อมูลเฉพาะเกี่ยวกับตัวข้าพเจ้าจะถูกเก็บเป็นความลับและจะเปิดเผย
ในภาพรวมที่เป็นการสรุปผลการวิจัย

     ข้าพเจ้าได้อ่านข้อความข้างต้นแล้ว และมีความเข้าใจดีทุกประการ และได้ลงนาม
ในใบยินยอมนี้ด้วยความเต็มใจ

         ลงนาม...ผู้ยินยอม

           (..)

         ลงนาม...พยาน

           (..)

         ลงนาม...ผู้วิจัย

           (..)

เอกสารชี้แจงผู้เข้าร่วมการวิจัย

(กลุ่มทดลอง)

การวิจัยเรื่อง   ผลของการสนับสนุนการจัดการตนเองของหญิงวัยกลางคนที่มีภาวะข้อเข่าเสื่อม
ต่อหน้าที่การทำงานของข้อเข่าและคุณภาพชีวิต: การทดลองแบบสุ่มและ
มีกลุ่มควบคุม

รหัสจริยธรรมการวิจัย   02-05-2562

ชื่อผู้วิจัย   นางสาวทิพวรรณ บุญสนอง

      การศึกษาครั้งนี้ทำขึ้นเพื่อประเมินผลของการสนับสนุนการจัดการตนเองของหญิง
วัยกลางคนที่มีภาวะข้อเข่าเสื่อมต่อหน้าที่การทำงานของข้อเข่าและคุณภาพชีวิต ท่านได้รับเชิญให้
เข้าร่วมการวิจัยครั้งนี้ เนื่องจากท่านมีคุณสมบัติตรงกับการศึกษาครั้งนี้ เมื่อท่านเข้าร่วมการวิจัยแล้ว
สิ่งที่ท่านจะต้องปฏิบัติคือ ตอบแบบสอบถามข้อมูลทั่วไป และประเมินข้อเข่าเสื่อมและแบบประเมิน
คุณภาพชีวิต จำนวน 3 ครั้ง คือ ครั้งแรกที่พบผู้วิจัย (สัปดาห์ 0) ครั้งที่สองเมื่อเสร็จสิ้นกิจกรรมกลุ่ม
(สัปดาห์ 4) และครั้งสุดท้าย (สัปดาห์ 8) แต่ละครั้งใช้เวลาในการตอบ 10-15 นาที นอกจากนี้ ผู้วิจัย
จะขอให้ท่านเข้าร่วมกิจกรรมกลุ่มที่ผู้วิจัยกำหนดขึ้น จำนวน 4 ครั้ง แต่ละครั้งใช้เวลา 80 นาที

      การวิจัยนี้จะเป็นประโยชน์ต่อตัวท่าน จะได้เรียนรู้เกี่ยวกับการจัดการตนเองเกี่ยวกับ
การจัดการความปวด การบริหารข้อเข่าและการควบคุมน้ำหนักตัว ส่งผลให้การทำหน้าที่ของข้อเข่า
และคุณภาพชีวิตดีขึ้น การเข้าร่วมวิจัยของท่านครั้งนี้เป็นไปด้วยความสมัครใจ ท่านสามารถเข้าร่วม
การวิจัยนี้ หรือถอนตัวออกจากการวิจัยได้ตลอดเวลาโดยไม่มีผลกระทบใด ๆ ทั้งสิ้น และไม่ต้อง
แจ้งให้ผู้วิจัยทราบล่วงหน้า ผู้วิจัยจะเก็บรักษาข้อมูลของท่านโดยใช้รหัสตัวเลขแทนการระบุชื่อ
และสิ่งใด ๆ ที่อาจอ้างอิงหรือทราบได้ว่าข้อมูลนี้เป็นของท่าน ข้อมูลของท่านที่เป็นกระดาษ
แบบสอบถามจะถูกเก็บอย่างมิดชิด และปลอดภัยในตู้เก็บเอกสารและล็อคกุญแจตลอดเวลา
สำหรับข้อมูลที่เก็บในคอมพิวเตอร์ของผู้วิจัยจะถูกใส่รหัสผ่าน ข้อมูลที่กล่าวมาทั้งหมดจะมีเพียง
ผู้วิจัยและอาจารย์ที่ปรึกษาเท่านั้นที่สามารถเข้าถึงข้อมูลได้ ผู้วิจัยจะรายงานผลการวิจัย และการ
เผยแพร่ผลการวิจัยในภาพรวม และข้อมูลทั้งหมดจะถูกทำลาย ภายหลังจากการเผยแพร่ผลการวิจัย
เรียบร้อยแล้ว

    หากท่านมีปัญหาหรือข้อสงสัยประการใด สามารถสอบถามได้โดยตรงจากผู้วิจัย
ในวันทำการรวบรวมข้อมูลหรือสามารถติดต่อสอบถามเกี่ยวกับการวิจัยครั้งนี้ได้ตลอดเวลาที่
นางสาวทิพวรรณ บุญสนอง หมายเลขโทรศัพท์ 085-0811445 หรือที่ รองศาสตราจารย์ ดร.นุจรี
ไชยมงคล อาจารย์ที่ปรึกษาหลัก หมายเลขโทรศัพท์ 038-102809

                นางสาวทิพวรรณ บุญสนอง
                ผู้วิจัย

หากท่านได้รับการปฏิบัติที่ไม่ตรงตามที่ได้ระบุไว้ในเอกสารชี้แจงนี้ ท่านสามารถแจ้งให้ประธาน
คณะกรรมการพิจารณาจริยธรรมฯ ทราบได้ ที่เลขานุการคณะกรรมการจริยธรรมฯ ฝ่ายวิจัย
คณะพยาบาลศาสตร์ มหาวิทยาลัยบูรพา โทร. 038-102823

เอกสารชี้แจงผู้เข้าร่วมการวิจัย

(กลุ่มควบคุม)

การวิจัยเรื่อง   ผลของการสนับสนุนการจัดการตนเองของหญิงวัยกลางคนที่มีภาวะข้อเข่าเสื่อม
ต่อหน้าที่การทำงานของข้อเข่าและคุณภาพชีวิต: การทดลองแบบสุ่มและ
มีกลุ่มควบคุม

รหัสจริยธรรมการวิจัย

ชื่อผู้วิจัย   นางสาวทิพวรรณ บุญสนอง

    การศึกษาครั้งนี้ทำขึ้นเพื่อประเมินผลของการสนับสนุนการจัดการตนเองของหญิง
วัยกลางคนที่มีภาวะข้อเข่าเสื่อมต่อหน้าที่การทำงานของข้อเข่าและคุณภาพชีวิต ท่านได้รับเชิญให้
เข้าร่วมการวิจัยครั้งนี้ เนื่องจากท่านมีคุณสมบัติตรงกับการศึกษาครั้งนี้ เมื่อท่านเข้าร่วมการวิจัยแล้ว
สิ่งที่ท่านจะต้องปฏิบัติคือ ตอบแบบสอบถามข้อมูลทั่วไป แบบประเมินข้อเข่าเสื่อมและแบบประเมิน
คุณภาพชีวิต จำนวน 3 ครั้ง คือ ครั้งแรกที่พบผู้วิจัย (สัปดาห์ 0) ครั้งที่สองเมื่อสัปดาห์ที่ 4 และครั้ง
สุดท้ายสัปดาห์ที่ 8 แต่ละครั้งใช้เวลาในการตอบ 10-15 นาที

    การวิจัยนี้อาจไม่เกิดประโยชน์ต่อตัวท่าน แต่จะเป็นประโยชน์ต่อภาพรวม การเข้าร่วมวิจัย
ของท่านครั้งนี้เป็นไปด้วยความสมัครใจ ท่านสามารถเข้าร่วมการวิจัยนี้ หรือถอนตัวออกจาก
การวิจัยได้ตลอดเวลาโดยไม่มีผลกระทบใด ๆ ทั้งสิ้น และไม่ต้องแจ้งให้ผู้วิจัยทราบล่วงหน้า
ผู้วิจัยจะเก็บรักษาข้อมูลของท่านโดยใช้รหัสตัวเลขแทนการระบุชื่อ และสิ่งใด ๆ ที่อาจอ้างอิงหรือ
ทราบได้ว่าข้อมูลนี้เป็นของท่าน ข้อมูลของท่านที่เป็นกระดาษแบบสอบถามจะถูกเก็บอย่างมิดชิด
และปลอดภัยในตู้เก็บเอกสารและล็อคกุญแจตลอดเวลา สำหรับข้อมูลที่เก็บในคอมพิวเตอร์ของ
ผู้วิจัยจะถูกใส่รหัสผ่าน ข้อมูลที่กล่าวมาทั้งหมดจะมีเพียงผู้วิจัยและอาจารย์ที่ปรึกษาเท่านั้น
ที่สามารถเข้าถึงข้อมูลได้ ผู้วิจัยจะรายงานผลการวิจัย และการเผยแพร่ผลการวิจัยในภาพรวม
และข้อมูลทั้งหมดจะถูกทำลาย ภายหลังจากการเผยแพร่ผลการวิจัยเรียบร้อยแล้ว

หากท่านมีปัญหาหรือข้อสงสัยประการใด สามารถสอบถามได้โดยตรงจากผู้วิจัย ในวันทำการรวบรวมข้อมูลหรือสามารถติดต่อสอบถามเกี่ยวกับการวิจัยครั้งนี้ได้ตลอดเวลาที่ นางสาวทิพวรรณ บุญสนอง หมายเลขโทรศัพท์ 085-0811445 หรือที่ รองศาสตราจารย์ ดร.นุจรี ไชยมงคล อาจารย์ที่ปรึกษาหลัก หมายเลขโทรศัพท์ 038-102809

                                นางสาวทิพวรรณ บุญสนอง

                                ผู้วิจัย

หากท่านได้รับการปฏิบัติที่ไม่ตรงตามที่ได้ระบุไว้ในเอกสารชี้แจงนี้ ท่านสามารถแจ้งให้ประธาน คณะกรรมการพิจารณาจริยธรรมฯ ทราบได้ ที่เลขานุการคณะกรรมการจริยธรรมฯ ฝ่ายวิจัย คณะพยาบาลศาสตร์ มหาวิทยาลัยบูรพา โทร. 038-102823

ที่ อว ๘๐๐๖/๐๓๗๒

มหาวิทยาลัยบูรพา คณะพยาบาลศาสตร์
๑๖๙ ถนนลงหาดบางแสน ตำบลแสนสุข
อำเภอเมือง จังหวัดชลบุรี ๒๐๑๓๑

๑๐   กรกฎาคม ๒๕๖๒

เรื่อง   ขอความอนุเคราะห์ให้นิสิตเก็บรวบรวมข้อมูลเพื่อดำเนินการวิจัย

เรียน   ผู้อำนวยการโรงพยาบาลท่าศาลา

สิ่งที่ส่งมาด้วย   ๑. ผลการพิจารณาจริยธรรมการวิจัย
                     ๒. เครื่องมือที่ใช้ในการวิจัย

        ด้วย นางสาวทิพวรรณ บุญสนอง รหัสประจำตัว ๕๙๘๑๐๐๐๘ นิสิตหลักสูตรปรัชญาดุษฎีบัณฑิต
สาขาวิชาพยาบาลศาสตร์ (หลักสูตรนานาชาติ) คณะพยาบาลศาสตร์ มหาวิทยาลัยบูรพา ได้รับอนุมัติเค้าโครง
ดุษฎีนิพนธ์ เรื่อง "EFFECTS OF THE SELF-MANAGEMENT SUPPORT INTERVENTION ON KNEE
FUNCTIONAL STATUS AND HEALTH-RELATED QUALITY OF LIFE AMONG MIDDLE-AGED WOMEN
WITH KNEE OSTEOARTHRITIS: A RANDOMIZED CONTROLLED TRIAL" โดยมีรองศาสตราจารย์ ดร.
นุจรี ไชยมงคล เป็นประธานกรรมการควบคุมดุษฎีนิพนธ์

        ในการนี้ คณะฯ จึงขอความอนุเคราะห์จากท่านอำนวยความสะดวกให้นิสิตเก็บรวบรวมข้อมูล
จากกลุ่มตัวอย่างคือ หญิงวัยกลางคนที่มีภาวะข้อเข่าเสื่อม ณ โรงพยาบาลท่าศาลา จำนวน ๔๐ ราย ระหว่าง
วันที่ ๑ กันยายน ถึงวันที่ ๓๐ พฤศจิกายน พ.ศ. ๒๕๖๒

        จึงเรียนมาเพื่อโปรดพิจารณาให้ความอนุเคราะห์ด้วย จะเป็นพระคุณยิ่ง

ขอแสดงความนับถือ

(ผู้ช่วยศาสตราจารย์ ดร.พรชัย จูลเมตต์)
คณบดีคณะพยาบาลศาสตร์ ปฏิบัติการแทน
ผู้ปฏิบัติหน้าที่อธิการบดีมหาวิทยาลัยบูรพา

-สนอ ผอ.รพ.ท่าศาลา
เห็นควรมอบภูมิ...ฯรพ.

งานบริการการศึกษา (บัณฑิตศึกษา)
โทรศัพท์ (๐๓๘) ๑๐๒๘๘๒๖, ๑๐๒๘๐๘
โทรสาร (๐๓๘) ๓๙๓๘๘๗๖
ผู้วิจัยโทร ๐๙-๕๐๘๑-๐๙๙๙

คำสั่ง
☐ ดำเนินการ ☐ ทราบ ☐ ติดประกาศ
☐ เจ้าของเรื่องผู้ประสาน

แบบฟอร์มขออนุญาตเก็บข้อมูลเพื่อการศึกษาวิจัย / วิทยานิพนธ์ ณ โรงพยาบาลท่าศาลา

ส่วนที่ ๑ ข้อมูลผู้ศึกษาวิจัย

ผู้วิจัยหลัก ฉขย / นาง / นางสาว......ทิพจารกา......นามสกุล......บุญทอง......

นักศึกษาหลักสูตร / ตำแหน่ง......ปริญญาการวิจัยบัณฑิตฯ......สาขา......ภาพพยาบาลศาสตร์......

คณะ......พยาบาลศาสตร์......สถาบัน / หน่วยงาน......มหาวิทยาลัยบูรพา......

สถานที่ติดต่อ...

เบอร์โทรศัพท์ / โทรสาร / E-mail address......085-0811445......

หนังสือขออนุญาต สถาบัน / หน่วยงาน......คณะพยาบาลศาสตร์ มหาวิทยาลัยบูรพา......

.................เลขที่......ศธ 8106/0196 ถึงวันที่ ๑๐ ก.ค 2542

ส่วนที่ ๒ สาระสำคัญของการศึกษาวิจัย

ชื่อเรื่องวิจัยหรือวิทยานิพนธ์ (ภาษาไทย)......ผลของการสนับสนุน การจัดการตนเอง ของผู้สูงอายุโรคเบาหวาน ที่มี

ภาวะเจ็บเป็นเสี่ยง ต่อหน้าที่การทำงานของไตเจ็บและคุณภาพชีวิต : การทดลอง แบบสุ่ม และวัดซ้ำ ๔ ตามกลุ่ม

ชื่อเรื่องวิจัยหรือวิทยานิพนธ์ (ภาษาอังกฤษ)...

รูปแบบการศึกษา

☐ การศึกษาเชิงปริมาณ (Quantitative Study)

    ☐ การศึกษา / วิจัยเชิงพรรณนา (Descriptive Study)

    ☑ การศึกษา / วิจัยเชิงวิเคราะห์ (Analytic Study)

        ☐ การสังเกต (Observational Study)   ☐ Cohort Study

                              ☐ Case Control Study

        ☑ การทดลอง (Experimental Study)

    ☐ การศึกษาเชิงคุณภาพ (Qualitative Study)

    ☐ อื่น ๆ ระบุ...

วิธีการเก็บข้อมูล

    ☑ สัมภาษณ์ / สอบถาม

    ☐ ทบทวนเวชระเบียน

    ☐ หัตถการ ระบุ.................................

    ☐ ตรวจร่างกาย

    ☐ อื่น ๆ ระบุ.................................

เครื่องมือที่ใช้ในการเก็บข้อมูล (ให้แนบเอกสารทั้ง ๕ ข้อ พร้อมโครงร่างการวิจัย / วิทยานิพนธ์)

1. แบบสอบถาม / แบบสัมภาษณ์ / แบบเก็บข้อมูล ☐ ไม่มี ☑ มี
2. การเก็บสิ่งส่งตรวจจากกลุ่มตัวอย่าง ☑ ไม่มี ☐ มี ระบุ.................
3. เอกสารชี้แจงการเข้าร่วมโครงการและแนวทางการพิทักษ์สิทธิ ☐ ไม่มี ☑ มี
4. แบบฟอร์มยินยอมเข้าร่วมการศึกษา ☐ ไม่มี ☑ มี
5. อื่น ๆ...

แบบฟอร์มขออนุญาตเก็บข้อมูลเพื่อการศึกษาวิจัย / วิทยานิพนธ์ ณ โรงพยาบาลท่าฉลาด (ต่อ)

ผู้ถูกเก็บข้อมูล ☑ ผู้ป่วย ☐ ญาติผู้ป่วย ☐ เจ้าหน้าที่ / บุคลากร ☐ อื่น ๆ ระบุ.............................

ผู้เก็บข้อมูล ☑ ผู้วิจัย ☑ อื่น ๆ ระบุ..ผู้ช่วยวิจัย...............

ช่วงเวลาในการเก็บข้อมูล 1 กันยายน ถึงวันที่ 30 พฤศจิกายน 2562

สถานที่เก็บข้อมูล........OPD orthopedic.

ได้รับทุนสนับสนุนจากสถาบัน / องค์กร....(ได้รับทุนสนับสนุนจาก มหาวิทยาลัยบูรพาฯ)

จำนวนเงิน........10000 บาท

หมายเหตุ กรุณากรอกข้อมูลให้ครบถ้วน และส่งพร้อมโครงร่างการวิจัย รวมจำนวน 3 ชุด เพื่อความสะดวกและรวดเร็วใน
การพิจารณาของคณะกรรมการศึกษาวิจัย โรงพยาบาลท่าฉลาด

ส่วนที่ ๓ คำยินยอมของผู้วิจัย

หลังจากเสร็จสิ้นการศึกษาวิจัยหรือวิทยานิพนธ์แล้ว

๑. กรณีที่ผลการศึกษา มีผลกระทบที่ทำให้เกิดความเสื่อมเสียต่อโรงพยาบาล หรือบุคลากร ข้าพเจ้าจะแจ้งให้
โรงพยาบาลทราบ และขออนุญาตก่อนดำเนินการเผยแพร่

๒. หากโรงพยาบาลทำการศึกษาวิจัยในเรื่องที่เกี่ยวข้องนี้ ข้าพเจ้ายินดีและพร้อมให้คำปรึกษา หากทาง
โรงพยาบาลต้องการ

๓. ข้าพเจ้ายินดีมอบผลงานวิจัยหรือวิทยานิพนธ์ฉบับสมบูรณ์ให้โรงพยาบาล จำนวน ๑ เล่ม เพื่อเป็นประโยชน์
ในการศึกษาค้นคว้าและพัฒนางานของโรงพยาบาล

ลงชื่อ...............................ผู้ศึกษาวิจัย

(นศ.ทิพวรรณ บุญสนอง.......)

วันที่ 1 เดือน สิงหาคม พ.ศ. 2562

ส่วนที่ ๔ ข้อพิจารณาของผู้อำนวยการหรือผู้รับมอบอำนาจ

☐ อนุญาต ☐ ไม่อนุญาตเนื่องจาก...

ลงชื่อ...............................

(นายไพศิษฐ์ เพชรมะสิ)

นายแพทย์ชำนาญการพิเศษ ปฏิบัติราชการแทน

วันที่........เดือน.........ผู้อำนวยการโรงพยาบาลท่าฉลาด

ส่วนที่ ๕ การติดตาม (เจ้าหน้าที่งานผลิตและพัฒนาบุคลากร)

☐ ได้รับวิจัยหรือวิทยานิพนธ์ฉบับสมบูรณ์ เมื่อวันที่...........เดือน.....................พ.ศ...........

ลงชื่อ.....................................

(.....................................)

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

ที่ อว ๘๑๐๖/๐๓๗๒

มหาวิทยาลัยบูรพา คณะพยาบาลศาสตร์
๑๖๙ ถนนลงหาดบางแสน ตำบลแสนสุข
อำเภอเมือง จังหวัดชลบุรี ๒๐๑๓๑

๑๐   กรกฎาคม ๒๕๖๒

เรื่อง ขอความอนุเคราะห์ให้นิสิตเก็บรวบรวมข้อมูลเพื่อดำเนินการวิจัย

เรียน ผู้อำนวยการโรงพยาบาลท่าศาลา

สิ่งที่ส่งมาด้วย   ๑. ผลการพิจารณาจริยธรรมการวิจัย
               ๒. เครื่องมือที่ใช้ในการวิจัย

        ด้วย นางสาวทิพวรรณ บุญสนอง รหัสประจำตัว ๕๙๘๑๐๐๐๘ นิสิตหลักสูตรปรัชญาดุษฎีบัณฑิต
สาขาวิชาพยาบาลศาสตร์ (หลักสูตรนานาชาติ) คณะพยาบาลศาสตร์ มหาวิทยาลัยบูรพา ได้รับอนุมัติเค้าโครง
ดุษฎีนิพนธ์ เรื่อง "EFFECTS OF THE SELF-MANAGEMENT SUPPORT INTERVENTION ON KNEE
FUNCTIONAL STATUS AND HEALTH-RELATED QUALITY OF LIFE AMONG MIDDLE-AGED WOMEN
WITH KNEE OSTEOARTHRITIS: A RANDOMIZED CONTROLLED TRIAL" โดยมีรองศาสตราจารย์ ดร.
นุจรี ไชยมงคล เป็นประธานกรรมการควบคุมดุษฎีนิพนธ์

        ในการนี้ คณะฯ จึงขอความอนุเคราะห์จากท่านอำนวยความสะดวกให้นิสิตเก็บรวบรวมข้อมูล
จากกลุ่มตัวอย่างคือ หญิงวัยกลางคนที่มีภาวะข้อเข่าเสื่อม ณ โรงพยาบาลท่าศาลา จำนวน ๔๐ ราย ระหว่าง
วันที่ ๑ กันยายน ถึงวันที่ ๓๐ พฤศจิกายน พ.ศ. ๒๕๖๒

        จึงเรียนมาเพื่อโปรดพิจารณาให้ความอนุเคราะห์ด้วย จะเป็นพระคุณยิ่ง

                                ขอแสดงความนับถือ

                        (ผู้ช่วยศาสตราจารย์ ดร.พรชัย จูลเมตต์)
                        คณบดีคณะพยาบาลศาสตร์ ปฏิบัติการแทน
                        ผู้ปฏิบัติหน้าที่อธิการบดีมหาวิทยาลัยบูรพา

APPENDIX C

Instrument

ผลของการเสริมสร้างพลังอำนาจในการจัดการตนเองของครอบครัวผู้ดูแลผู้ที่มีภาวะหัวใจล้มเหลวเรื้อรังต่อเนื่องต่อการทำหน้าที่

: ประเมินครั้งที่ 2 เมื่อครบสองสัปดาห์

การทดลองแบบกลุ่มและประเมินผลแบบกลุ่ม

สัปดาห์ที่ 1 การให้ความรู้และประเมินการณ์โรคข้อเข่าเสื่อม เวลา 13.00-14.20 น.

กิจกรรมครั้งที่ 1: เป็นประสงค์ ความคาดหวังและแนวปฏิบัติของกลุ่ม

วัตถุประสงค์	เนื้อหา	เวลา	กิจกรรม
1. เพื่อให้ผู้เข้าร่วมได้รู้จักกันเพื่อเข้าใจกัน	- สร้างสัมพันธภาพระหว่างผู้วิจัยและผู้เข้าร่วม สร้างบรรยากาศการเรียนรู้ให้ผ่อนคลาย	30 นาที	1. ผู้วิจัยกล่าวทักทายและแนะนำตนเองและชี้แจง 2. ผู้วิจัยชี้แจงรายละเอียดและวัตถุประสงค์ของโปรแกรม ในการเข้าร่วมและสร้างแรงจูงใจ 3. ผู้เข้าร่วมกิจกรรมแนะนำตนเอง
2. เพื่อให้ผู้เข้าร่วมได้สร้างข้อปฏิบัติของกลุ่มร่วมกัน		20 นาที	ผู้วิจัยชวนผู้เข้าร่วมกิจกรรมสร้างข้อตกลงร่วมกันเพื่อเป็นแนวปฏิบัติในการเข้าร่วมกิจกรรมดังต่อไปนี้ 1. การตรงต่อเวลา 2. การให้เกียรติและรับฟังความคิดเห็นของผู้อื่นโดยไม่ตัดสินและไม่ขัดจังหวะในการพูด 3. การมีส่วนร่วมและแสดงความคิดเห็นไม่วิพากษ์วิจารณ์หรือตัดสิน 4. การรักษาความลับของกลุ่มไม่นำเรื่องราวของผู้อื่นไปเผยแพร่ 5. การไม่ส่งเสียงดังรบกวนผู้อื่นในการทำกิจกรรม

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วัตถุประสงค์	เนื้อหา	เวลา	กิจกรรม
3. เพื่อให้ผู้ร่วมวิจัย เห็นประโยชน์ของการรวมกลุ่ม ช่วยเหลือซึ่งกันและกัน		20 นาที	กิจกรรมละลายพฤติกรรม (Ice breaker): ปั่นฮอนต่อ ไปมี 1. แบ่งกลุ่มออกเป็นกลุ่มย่อยประมาณ 5 คน และร่วมกันระดมความคิดเกี่ยวกับ "โรคข้อเข่าเสื่อม" โดยให้แต่ละกลุ่ม "จับหาคำที่มีคำว่า" เพื่อมอบหมายเพื่อการสนับสนุนที่เกี่ยวข้องกับโรคข้อเข่าเสื่อม 2. ให้แต่ละกลุ่มบอกความรู้ที่เกี่ยวกับโรคข้อเข่าเสื่อม 3. ให้แต่ละกลุ่มบอกความหมายของคำที่เกี่ยวกับกลุ่มของการการสนับสนุน 4. ร่วมกันระดมความคิดเกี่ยวกับการสร้างให้กลุ่มช่วยเหลือซึ่งกันและกันและการสร้างสัมพันธภาพของตนเอง 5. ผู้วิจัยสรุปเปิดกิจกรรมเพื่อชี้ประเด็นการของการสร้างสัมพันธภาพในกลุ่มแสดงความคิดเห็นภายในกลุ่ม
		10 นาที	ผลการดำเนิน (Session procession) 1. อะไรเป็นสิ่งที่ดีเรียนรู้ในวันนี้? 2. การเคลื่อนร่างกายมีธรรมของอะไรท่านจะนำไปทำต่อไหม?

วัตถุประสงค์	เนื้อหา	เวลา	กิจกรรม
	มีความรู้โดยตรงทำให้กระบวนการเกิดรอยแตกเล็ก ๆ น้อย ๆ โดยที่ ร่างกายพยายามซ่อมแซมรอยร้าวเหล่านี้แต่ไม่สามารถ ทำการซ่อมแซมของกระดูกอ่อนได้ทันจึงทำให้เกิดการสึก กร่อนมากขึ้น เมื่อกระดูกอ่อนที่หุ้มบริเวณกระดูกผิวข้อ สึกกร่อนไปจึงทำให้มีเนื้อกระดูกงอกขึ้นมา ทำให้เกิด การเสียดสีเมื่อมีการเคลื่อนไหวของข้อ ข้อต่อมีการเคลื่อนไหวลำบาก มีเสียงดังในข้อ และเมื่อข้อมีการเสื่อมมาก ทำให้เกิดอาการปวดและการอักเสบ ทำให้กระดูกผิวข้อมี การเปลี่ยนแปลงรูปร่างไป		
2. เพื่อให้ อสม.มีความรู้ ความเข้าใจและ พัฒนาทักษะ การประเมินภาวะโรค ข้อเข่าเสื่อมของ ประชาชนในเขต รับผิดชอบ		30 นาที	วิทยากรบรรยายให้ความรู้และแลกเปลี่ยนประสบการณ์ เรื่องการประเมินภาวะโรคข้อเข่าเสื่อม ดังนี้ 1. ความรู้เรื่องโรคข้อเข่าเสื่อม 2. การประเมินภาวะโรคข้อเข่าเสื่อม คำถาม 1. การประเมินภาวะโรคข้อเข่าเสื่อม อย่างไร?

วัตถุประสงค์	เนื้อหา	เวลา	กิจกรรม
			2. ท่านมีความเห็นต่อแนวทางการปฏิบัติตนเพื่อป้องกันฟื้นฟูตนเองจากโรคข้อเข่าเสื่อมอย่างไร?
			3. ท่านมีความเห็นอย่างไรต่อการจัดการออกกำลังกายหรือผ่อนคลายกล้ามเนื้อจากโรคข้อเข่าเสื่อม?
3. เพื่อการส่งเสริมให้ผู้ร่วมวิจัยสามารถนำไปใช้ในการจัดการตนเองให้สอดคล้องกับตนเอง		20 นาที	1. ผู้ร่วมวิจัยปฏิบัติตามความคิดเห็นเกี่ยวกับการปฏิบัติงานหรือกิจกรรมจากโรคข้อเข่าเสื่อม
			สรุปผล
		10 นาที	1. อะไรคือสิ่งที่ท่านจะพัฒนาหรือปรับปรุงเพื่อให้การจัดการตนเองและการได้รับการส่งเสริมสุขภาพเกี่ยวกับโรคข้อเข่าเสื่อม?

กิจกรรมที่มอบหมาย

1. ผู้ร่วมวิจัยประเมินตนเองเกี่ยวกับการปฏิบัติตนที่เกิดขึ้นจากโรคข้อเข่าเสื่อม
2. ผู้ร่วมวิจัยบันทึกความคิดของตนการได้รับการส่งเสริมและความคิดเกี่ยวกับการจัดการตนเอง

เอกสารที่ใช้ร่วม

1. สมุดบันทึกประจำตัว
2. ใบสื่อการรู้และความคิดของผู้ป่วยโรคข้อเข่าเสื่อม
3. QR Code สื่อโปรแกรมการเข้าร่วมวิจัย เรื่อง "โรคข้อเข่าเสื่อม"

สัปดาห์ที่ 2 การจัดการความปวดและการบริหารข้อเข่า เวลา 13.00-15.40 น.

กิจกรรมครั้งที่ 3: การจัดการความปวดผู้ป่วยโรคข้อเข่าเสื่อม

วัตถุประสงค์	เนื้อหา	เวลา	กิจกรรม
	1. ผู้วิจัยทบทวนความรู้เกี่ยวกับความปวดของผู้		1. เปิดโอกาสให้สอบถามข้อสงสัย
	2. ทบทวนกระบวนการ และทักษะการปฏิบัติการ		2. สรุปกิจกรรมในครั้งที่ 1
	เกี่ยวกับการเสริมสร้างการมีส่วนร่วมในการจัดการตนเอง		3. ร่วมกันสรุปประเด็นจากกิจกรรมที่ได้รับมอบหมาย คือ
			ปัญหาที่เกิดขึ้นจากการใช้ข้อเข่าเสื่อม และสิ่งที่ต้องการ
1. เพื่อความรู้และความเข้าใจเกี่ยวกับ ความปวดโรคข้อเข่า เสื่อม	**การปวดของโรคข้อเสื่อม** ลักษณะอาการปวดของโรคข้อเข่าเสื่อมมีอาการแตกต่างกัน ไปมาก ในบางรายจะมีอาการปวดอย่างมากเป็นครั้งคราว การรำคาญ ความปวดของโรคข้อเสื่อมอาจได้รับอิทธิพลจากกิจกรรมเคลื่อน ไหวของข้อ หรือได้จากอื่น ๆ ที่ทำให้ต่อเนื่องอื่น ๆ **การประเมินของโรคข้อเสื่อม** ในภาพรวมโดยใช้รูปแบบสอบถาม The We3stern Ontario and McMaster Universities Arthritis Index; WOMAC ได้รวมการประเมินความรุนแรงของความปวดไว้ด้วย รวมถึงความพิการของข้อและอีกหลายประเด็นที่เกี่ยวกับ การทำงานของข้อ อย่างไรก็ตามความรู้สึกในระยะอาจ	20 นาที	1. ผู้วิจัยให้ความรู้เกี่ยวกับความปวดและจะการจัดการความ ปวดของผู้ป่วยโรคข้อเข่าเสื่อม 2. ผู้วิจัยขอบรรยายศัพท์ **"7 วิธีดูแลข้อเข่าเสื่อม"**

วัตถุประสงค์	เนื้อหา	เวลา	กิจกรรม
	ตามแนวทางของงานวิจัยนี้จะเกิดจากโรคข้อเสื่อมที่มีการพัฒนาการเป็นไป อย่างช้าๆ ของผู้ที่มีกระดูกอ่อนผิดปกติ **การรักษาภาวะโรคข้อเสื่อม** **การใช้ยา** การใช้ยาส่วนใหญ่มักมีประสิทธิภาพที่ไม่ดีและอยู่ในช่วงสั้นๆ ความไม่ปลอดภัยจากผลข้างของการใช้ยา ยาที่แนะนำให้ ใช้บ่อยในโรคข้อเสื่อม คือ Paracetamol แต่มักมีข้อด้อย ในการรักษาเป็นไปตามการให้ที่ผู้ป่วยต้องการด้านไม่ดังเสียง ความไม่ปลอดภัยด้วย Non-steroidal	30 นาที	ผู้เข้ารับการอบรมสามารถจะทำให้การอบรมเป็นไปตามเป้าหมาย 2. ร่วมกันแลกเปลี่ยนข้อคิดเห็นตามที่มะจะปับหรือจะรองออกไปให้ถึงถึรับ และการกำหนดเป้าหมาย **คำถาม** 1. อะไรที่จะช่วยให้เป้าหมายจะระบะถ้าหากจะระอยออกไปถึงถ้รับ 2. อะไรที่คือเป้าหมายที่สามารถทำได้ 3. อะไรที่จะทำให้ท่านเข้าใจในการจึงเป็นเป้าหมาย 4. อะไรคือสิ่งที่คุณเชื่อว่าเป็นเป้าหมายของตัวเรา
2. ผู้เข้ารับการอบรมและ สมาชิกในครอบครัว ทำให้การกำหนดเป้า หมายสำเร็จ			

วัตถุประสงค์	เนื้อหา	เวลา	กิจกรรม
3. ผู้เข้ารับการอบรมมีความรู้ความเข้าใจเกี่ยวกับสาระการเรียนรู้ในการเปลี่ยนแปลงในการกำหนดเป้าหมายในการจัดการเรียนรู้		20 นาที	1. จากกิจกรรมที่ผ่านมาผู้เข้ารับการอบรมและวิทยากรร่วมกันสรุปและสร้างความเข้าใจที่ตรงกันของกระบวนการในการจัดการและอภิปรายร่วมกันถึงแนวปฏิบัติและอุปสรรคในการจัดการเรียนรู้ของตนเอง
			2. ร่วมกันอภิปรายแนวทางที่สำคัญของการบรรลุเป้าหมาย
		10 นาที	ขั้นตอนการจัดการเรียนรู้
			1. อธิบายถึงวิธีการที่จะทำให้ประสบผลสำเร็จในการบรรลุเป้าหมาย
			2. อธิบายถึงการปฏิบัติเพื่อให้เกิดผลในการกำหนดเป้าหมาย

กิจกรรมที่มอบหมาย

1. ระบุกิจกรรมการจัดการความรู้และการนำไปใช้ให้สมบูรณ์ในแบบบันทึก
2. ระบุแนวทางการจัดการของตนเองและลงการเปลี่ยนแปลงในการจัดการของตนเองในแบบบันทึก
3. ให้ QR Code เรื่อง "7 วิธีจูงใจอย่างเนียน"

QR CODE

1. "โรคข้อเข่าเสื่อม" : พบหมอรามา ช่วง Meet The Expert 13 มีนาคม พ.ศ. 2560 (3/5)

   https://youtu.bu/cK3Br0NzldM

2. 7 วิธีดูแลข้อเข่าเสื่อม

https://youtu.be/la4Y5Hp4O1Y
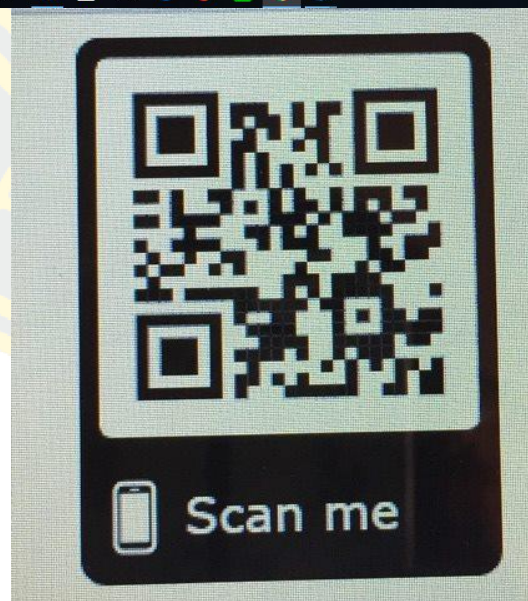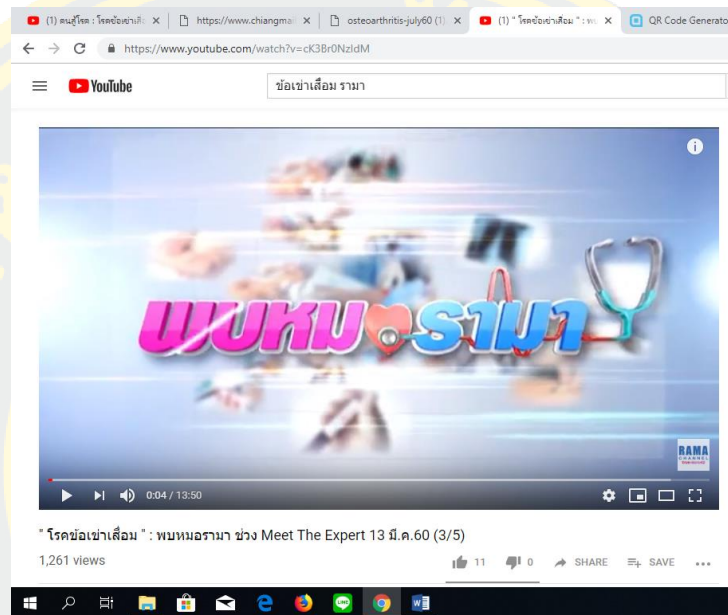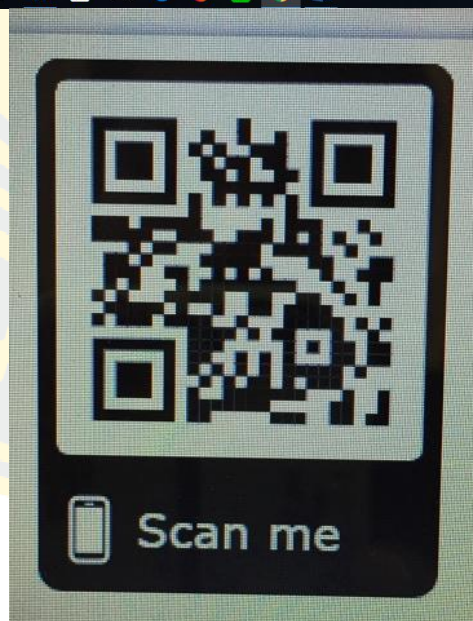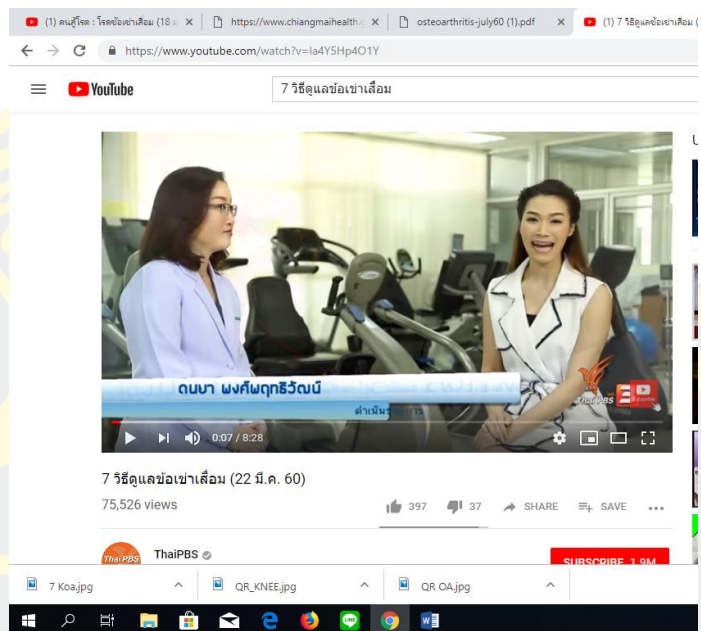
3. ฟิตเข่าดี หนีเข่าเสื่อม (28 มีนาคม พ.ศ. 2560)

https//youtu.be/qHJS5w4fDVY
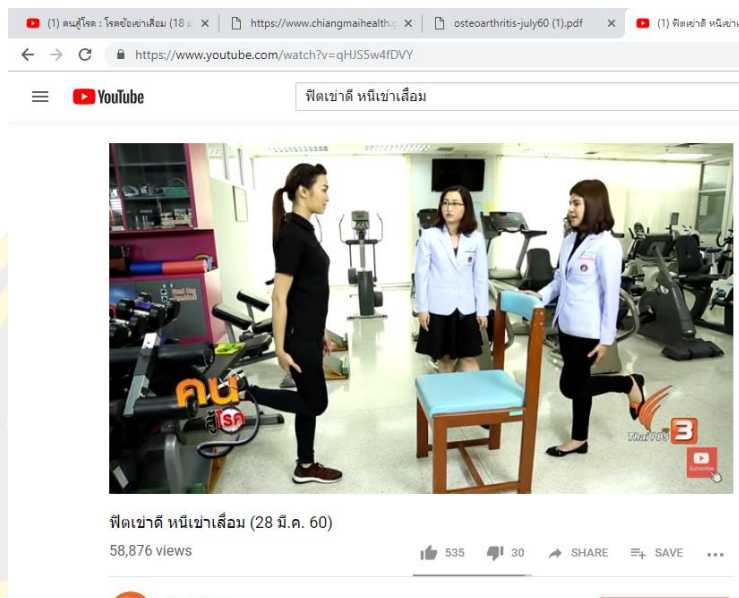
เอกสารบันทึกรายบุคคล

ใบงานที่ 1
แบบบันทึกปัญหาที่เกิดขึ้นจากโรคข้อเข่าเสื่อม

ระบุปัญหาที่เกิดจากโรคข้อเข่าเสื่อม	ความคาดหวังจากการร่วมวิจัย	สิ่งที่ต้องการให้การสนับสนุน

ใบงานที่ 2
แบบบันทึกการจัดการบริหารข้อเข่า

วัน	วิธีการ	ระยะเวลา	ระดับความปวด	การประเมินผล
จันทร์				
อังคาร				
พุธ				
พฤหัสบดี				
ศุกร์				
เสาร์				
อาทิตย์				

ใบงานที่ 3
การจัดการความปวด

วัน	วิธีการ	ระดับความปวด	การประเมินผล
จันทร์			
อังคาร			
พุธ			
พฤหัสบดี			
ศุกร์			
....			

ใบงานที่ 4
แบบบันทึกภาวะโภชนาการและการควบคุมน้ำหนัก

วัน	ปริมาณพลังงานที่ได้รับ (โดยประมาณ)	น้ำหนัก	การประเมินผล
จันทร์			
อังคาร			
พุธ			
พฤหัสบดี			
ศุกร์			
....			

แบบสอบถามข้อมูลพื้นฐาน

คำอธิบาย: โปรดทำเครื่องหมาย ✓ ลงหน้าตัวเลือกที่เป็นคำตอบ และเขียนข้อความเพิ่มเติม
ตามความเป็นจริงของท่าน

....

1. อายุ...................ปี   2. น้ำหนัก.....................กก.   3. ส่วนสูง.........................ซม.

4. ระดับการศึกษา

☐ ไม่รู้หนังสือ   ☐ ระดับประถมศึกษา

☐ ระดับมัธยมศึกษาต้นหรือเทียบเท่า   ☐ ระดับมัธยมศึกษาปลายหรือเทียบเท่า

☐ ระดับปริญญาตรี   ☐ สูงกว่าปริญญาตรี

5. อาชีพในปัจจุบันของท่านคือ

☐ แม่บ้าน/ ทำงานบ้าน   ☐ ทำไร่/ ทำนา/ ทำสวน

☐ ค้าขาย/ ทำธุรกิจส่วนตัว   ☐ รับจ้างทั่วไป/ กรรมกร

☐ ข้าราชการ/ พนักงานรัฐวิสาหกิจ   ☐ ไม่ได้ประกอบอาชีพ/ ว่างงาน

☐ ลูกจ้างบริษัท/ ห้างร้านเอกชน   ☐ อื่น ๆ...

6. ท่านมีโรคประจำตัวหรือไม่ สามารถตอบได้มากกว่า 1 ข้อ หรือเขียนข้อความเพิ่มเติม
ตามความเป็นจริง

☐ ไม่มีโรคประจำตัว   ☐ โรความดันโลหิตสูง

☐ โรคเบาหวาน   ☐ อื่น ๆ โปรดระบุ

....

7. ท่านมีสถานภาพสมรสเป็นแบบใด

☐ โสด   ☐ คู่   ☐ หม้าย   ☐ หย่า   ☐ แยกกันอยู่

8. รายได้ส่วนตัวโดยเฉลี่ยต่อเดือน ของท่านคือ.................................บาท

9. ระยะเวลาการเป็นข้อเข่าเสื่อม...ปี

แบบประเมินข้อเข่าเสื่อม

แบบสอบถาม Modified WOMAC (Westerm Ontario and MacMaster University)

ประกอบด้วยคำถาม 3 ส่วน คือ คำถามระดับความปวด ระดับอาการข้อฝืด และระดับความสามารถในการใช้งานข้อ

โปรดกาเครื่องหมาย ✕ หรือวงกลมล้อมรอบตัวเลขให้ตรงกับอาการของท่านมากที่สุด

ระดับความปวด (0-10)

โดย 0 หมายถึง ไม่ปวดเลย และ 10 หมายถึง ปวดมากจนทนไม่ได้

1. ปวดขณะเดิน

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

ไม่ปวดเลย   ปวดมากจนทนไม่ได้

2. ปวดขณะขึ้นลงบันได

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

ไม่ปวดเลย   ปวดมากจนทนไม่ได้

3. ปวดข้อตอนกลางคืน

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

ไม่ปวดเลย   ปวดมากจนทนไม่ได้

4. ปวดข้อขณะอยู่เฉย ๆ

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

ไม่ปวดเลย   ปวดมากจนทนไม่ได้

5. ปวดข้อขณะยืนลงน้ำหนัก (ขาข้างนั้นรับน้ำหนักตัว)

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

ไม่ปวดเลย   ปวดมากจนทนไม่ได้

ระดับอาการข้อฝืด, ข้อยึด (0-10)

โดย 0 หมายถึง ไม่มีอาการฝืดเลย และ 10 หมายถึง มีอาการฝืดมากที่สุด

1. ข้อฝืดช่วงเช้า (ขณะตื่นนอน)

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

ไม่ฝืดเลย   ฝืดมากที่สุด

2. ข้อฝืดในช่วงระหว่างกัน

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

ไม่ฝืดเลย   ฝืดมากที่สุด

ระดับความสามารถในการใช้งานข้อ (0-10)

โดย 0 หมายถึง ทำกิจกรรมได้ดีมาก และ 10 หมายถึง ไม่สามารถทำกิจกรรมนั้น ๆ ได้

1. การลงบันได

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

ทำได้ดีมาก   เป็นปัญหามากที่สุด (ไม่สามารถทำได้)

2. การขึ้นบันได

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

ทำได้ดีมาก   เป็นปัญหามากที่สุด (ไม่สามารถทำได้)

3. การลุกยืนจากท่านั่ง

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

ทำได้ดีมาก   เป็นปัญหามากที่สุด (ไม่สามารถทำได้)

4. การยืน

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

ทำได้ดีมาก   เป็นปัญหามากที่สุด (ไม่สามารถทำได้)

5. การเดินบนพื้นราบ

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

ทำได้ดีมาก   เป็นปัญหามากที่สุด (ไม่สามารถทำได้)

6. การขึ้นลงรถยนต์

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

ทำได้ดีมาก   เป็นปัญหามากที่สุด (ไม่สามารถทำได้)

7. การไปซื้อของนอกบ้าน หรือการไปจ่ายตลาด

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

ทำได้ดีมาก   เป็นปัญหามากที่สุด (ไม่สามารถทำได้)

8. การใส่กางเกง

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

ทำได้ดีมาก   เป็นปัญหามากที่สุด (ไม่สามารถทำได้)

9. การลุกจากเตียง

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

ทำได้ดีมาก   เป็นปัญหามากที่สุด (ไม่สามารถทำได้)

10. การถอดกางเกง

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

ทำได้ดีมาก   เป็นปัญหามากที่สุด (ไม่สามารถทำได้)

11. การเข้าออกจากห้องอาบน้ำ

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

ทำได้ดีมาก   เป็นปัญหามากที่สุด (ไม่สามารถทำได้)

12. การนั่ง

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

ทำได้ดีมาก   เป็นปัญหามากที่สุด (ไม่สามารถทำได้)

13. การเข้า-ออกจากส้วม

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

ทำได้ดีมาก   เป็นปัญหามากที่สุด (ไม่สามารถทำได้)

14. การทำงานบ้านหนัก ๆ

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

ทำได้ดีมาก   เป็นปัญหามากที่สุด (ไม่สามารถทำได้)

15. การทำงานบ้านเบา ๆ

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

ทำได้ดีมาก   เป็นปัญหามากที่สุด (ไม่สามารถทำได้)

แบบสำรวจสุขภาพ SF-36

คำชี้แจง แบบสอบถามฉบับนี้สำรวจความเห็นของคุณเกี่ยวกับสุขภาพคุณเอง ข้อมูลนี้จะช่วย
ติดตามดูว่าคุณรู้สึกอย่างไร และคุณสามารถทำกิจกรรมปกติต่าง ๆ ของคุณได้ดีเพียงใด

โปรดตอบคำถามทุกคำถามโดยกาเครื่องหมาย ✕ หรือวงกลม ตัวเลือกในแต่ละข้อ หากไม่แน่ใจว่า
จะตอบอย่างไรดี ให้เลือกคำตอบที่คุณคิดว่าใกล้เคียงที่สุด

1. โดยทั่วไป คุณพูดได้ว่า สุขภาพของคุณเป็นอย่างไร

ดีเลิศ	1
ดีมาก	2
ดี	3
พอใช้ได้	4
ไม่ดี	5

2. <u>เปรียบเทียบกับเมื่อหนึ่งปีที่แล้ว</u> คุณพูดได้ว่าสุขภาพของคุณ โดยทั่วไปตอนนี้เป็นอย่างไร

ตอนนี้ดีกว่าเมื่อหนึ่งปีที่แล้วมาก	1
ตอนนี้ดีกว่าเมื่อหนึ่งปีที่แล้วบ้าง	2
พอ ๆ กันกับเมื่อหนึ่งปีที่แล้ว	3
ตอนนี้แย่กว่าเมื่อหนึ่งปีที่แล้วบ้าง	4
ตอนนี้แย่กว่าเมื่อหนึ่งปีที่แล้ว	5

3. คำถามต่อไปนี้เป็นคำถามเกี่ยวกับกิจกรรมที่คุณปฏิบัติในแต่ละวัน คุณคิดว่า<u>สุขภาพของคุณ</u> <u>ในตอนนี้ มีผลทำให้คุณไม่สามารถทำกิจกรรมต่อไปนี้ได้อย่างเต็มที่</u> หรือไม่ ถ้ามี มีแค่ไหน?

(วงกลมเลือกคำตอบในแต่ละบรรทัด)

กิจกรรม	ทำได้ น้อยลงมาก	ทำได้ บ้าง	ทำได้ เต็มที่
1. กิจกรรมที่ต้องใช้แรงมาก เช่น การวิ่ง ยกของหนัก การร่วมเล่นกีฬาที่ต้องออกแรงมาก	1	2	3
2. กิจกรรมที่ต้องใช้แรงพอสมควร เช่น ย้ายโต๊ะ ถูบ้านด้วยไม้ถูพื้น เดินเร็ว ๆ หรือเดินเล่นไกล ๆ	1	2	3
3. ยกหรือถือของเมื่อไปจ่ายตลาด	1	2	3
4. ขึ้นบันไดหลาย ๆ ชั้น	1	2	3
5. ขึ้นบันไดชั้นเดียว	1	2	3
6. ก้ม คุกเข่า หรือโก้งโค้ง	1	2	3
7. เดินมากกว่าหนึ่งกิโลเมตร	1	2	3
8. เดินครึ่งกิโลเมตร	1	2	3
9. เดินหนึ่งร้อยเมตร	1	2	3
10. อาบน้ำหรือแต่งตัวสวมเสื้อผ้าเอง	1	2	3

4. ในช่วง<u>หนึ่งเดือน</u>ที่ผ่านมาก <u>สุขภาพกายของคุณ</u>ทำให้คุณมีปัญหาต่อไปนี้ ในการทำงานหรือ กิจวัตรประจำวันต่าง ๆ ของคุณ หรือไม่ (วงกลมเลือกคำตอบ ในแต่ละบรรทัด)

	มี	ไม่มี
1. ทำงานหรือทำกิจกรรมต่าง ๆ ได้ไม่นานเท่าที่เคย	1	2
2. ทำงานเสร็จได้น้อยกว่าที่อยากจะทำ	1	2
3. ไม่สามารถทำงานหรือกิจกรรมบางอย่างได้อย่างที่เคยทำ	1	2
4. ทำงานหรือทำกิจกรรมต่าง ๆ ได้ด้วยความลำบาก (เช่น ต้องใช้ความพยายามมากขึ้น)	1	2

5. ในช่วง<u>หนึ่งเดือน</u>ที่ผ่านมา <u>ปัญหาทางอารมณ์ของคุณ</u> (เช่น รู้สึกหดหู่ หรือวิตกกังวล) ทำให้คุณ
มีปัญหาในการทำงานหรือกิจกรรมปกติประจำวัน หรือไม่?

(วงกลมเลือกคำตอบในแต่ละบรรทัด)

	มี	ไม่มี
1. ทำงานหรือกิจกรรมต่าง ๆ ได้ไม่นานเท่าที่เคย	1	2
2. ทำงานเสร็จได้น้อยกว่าที่อยากจะทำ	1	2
3. ทำงานหรือกิจกรรมต่าง ๆ โดยไม่ระมัดระวังอย่างที่เคย	1	2

6. ในช่วง<u>หนึ่งเดือน</u>ที่ผ่านมา สุขภาพกายหรือปัญหาทางอารมณ์ของคุณ รบกวนการทำกิจกรรม
ทางสังคมตามปกติของคุณ เช่น การพบปะสังสรรค์กับครอบครัว เพื่อนฝูง หรือเพื่อนบ้าน
มากน้อยเพียงใด

ไม่เคย	1
เล็กน้อย	2
ปานกลาง	3
ค่อนข้างมาก	4
มากอย่างยิ่ง	5

7. ในช่วง<u>หนึ่งเดือน</u>ที่ผ่านมา คุณมีอาการปวดตามร่างกาย รุนแรงเพียงใด

ไม่มีอาการเลย	1
มีอาการเล็กน้อยมาก	2
มีอาการเล็กน้อย	3
มีอาการปานกลาง	4
มีอาการมาก	5

8. ในช่วง<u>หนึ่งเดือน</u>ที่ผ่านมา <u>อาการปวด</u>ตามร่างกายของคุณ รบกวนการทำงานตามปกติของคุณ (ทั้งงานที่ทำงานและงานบ้าน) เพียงใด

ไม่เคย	1
เล็กน้อย	2
ปานกลาง	3
ค่อนข้างมาก	4
มากอย่างยิ่ง	5

9. คำถามต่อไปนี้เกี่ยวกับว่า คุณรู้สึกอย่างไร และคุณเป็นอย่างไรในช่วงหนึ่งเดือนที่ผ่านมา โปรดตอบคำถามแต่ละข้อ โดยให้คำตอบที่ใกล้เคียงกับความรู้สึกของคุณมากที่สุด
- ในช่วง<u>หนึ่งเดือน</u>ที่ผ่านมา คุณมีความรู้สึกต่อไปนี้ บ่อยแค่ไหน

	ตลอดเวลา	เกือบตลอดเวลา	บ่อย ๆ	บางครั้ง	นาน ๆ ครั้ง	ไม่เคย
1. คุณรู้สึกมีชีวิตชีวา กระปรี้กระเปร่าหรือไม่	1	2	3	4	5	6
2. คุณรู้สึกวิตกกังวลหรือไม่	1	2	3	4	5	6
3. คุณรู้สึกหดหู่เศร้าซึมมากจนไม่มีอะไรทำให้คุณรู้สึกดีขึ้นได้หรือไม่	1	2	3	4	5	6
4. คุณรู้สึกสงบสบายหรือไม่	1	2	3	4	5	6
5. คุณมีพลังมากมายหรือไม่	1	2	3	4	5	6
6. คุณรู้สึกท้อแท้ และหดหู่ใจหรือไม่	1	2	3	4	5	6
7. คุณรู้สึกหมดเรี่ยวแรงหรือไม่	1	2	3	4	5	6
8. คุณเป็นคนดีที่มีความสุขหรือไม่	1	2	3	4	5	6
9. คุณรู้สึกเหนื่อยหรือไม่	1	2	3	4	5	6

10. ในช่วง<u>หนึ่งเดือน</u>ที่ผ่านมาก สุขภาพกายหรือปัญหาทางอารมณ์ของคุณ รบกวนการทำกิจกรรม
ทางสังคมตามปกติของคุณ เช่น การพบปะสังสรรค์กับครอบครัว เพื่อนฝูง หรือเพื่อนบ้านบ่อยครั้ง
แค่ไหน

ตลอดเวลา	1
เกือบตลอดเวลา	2
บางครั้ง	3
นาน ๆ ครั้ง	4
ไม่เลย	5

11. ข้อความแต่ละข้อความต่อไปนี้ ถูกต้องหรือไม่ถูกต้อง มากน้อยแค่ไหนสำหรับคุณ

(วงกลมเลือกคำตอบในแต่ละบรรทัด)

	ถูกต้องอย่างยิ่ง	ค่อนข้างถูกต้อง	ไม่ทราบ	ค่อนข้างจะไม่ถูกต้อง	ไม่ถูกต้องเลย
1. ฉันดูเหมือนจะไม่สบายง่ายกว่าคนอื่น	1	2	3	4	5
2. ฉันมีสุขภาพแข็งแรงดีพอ ๆ กับคนอื่น ๆ ที่ฉันรู้จัก	1	2	3	4	5
3. ฉันคิดว่าสุขภาพของตัวเองจะแย่งลง	1	2	3	4	5
4. สุขภาพของฉันดีเยี่ยม	1	2	3	4	5

ขอบคุณที่กรุณาให้ความร่วมมือตอบแบบสอบถาม
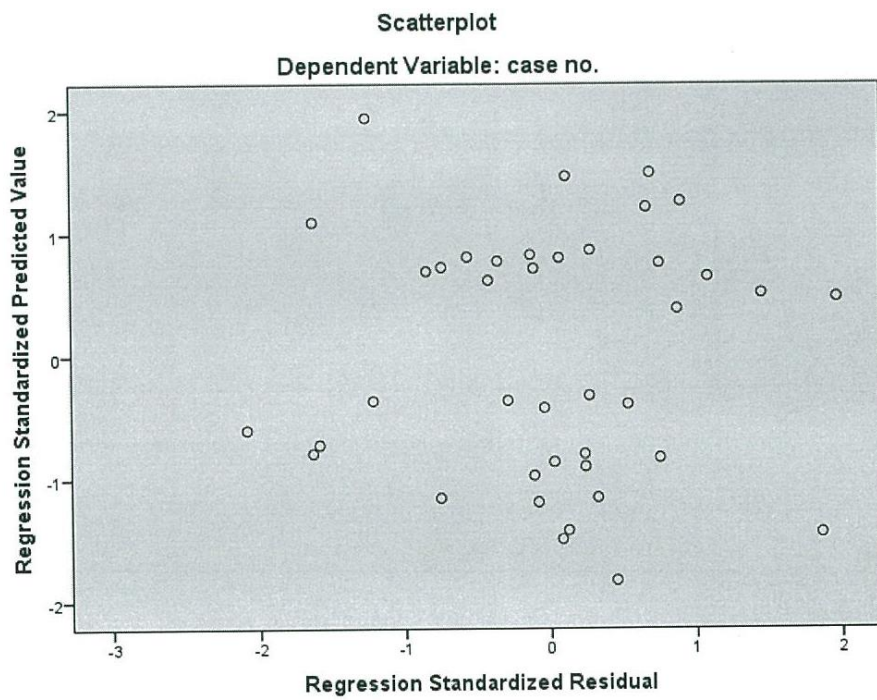
APPENDIX D

Evaluation of assumptions

Test assumption

1. **Univariate outlier of the variables**

    1.1 Univariate outlier was tested by Box-plot

    1.2 Multivariate outlier was tested by Mahalanobis distance

Scatterplot
Dependent Variable: case no.

2. Normality of distribution

2.1 Test of univariate normality

Table Appendix D-1 Test of univariate normality

Variables	Gr.	Kolmogorov-smirnov[a]			Shapiro-wilk			graph
		Statistic	df	Sig.	Statistic	df	Sig.	
WOMAC_T1	1	.169	20	.138	.897	20	.037	Test
	2	1.62	20	.179	.871	20	.012	Test
WOMAC_T2	1	.274	20	.000	.800	20	.001	Test
	2	.206	20	.026	.879	20	.017	Test
WOMAC_T3	1	.259	20	.001	.817	20	.002	Test
	2	.149	20	.200	.903	20	.046	Test
HRQOL_T1	1	.175	20	.109	.903	20	.046	Test
	2	.179	20	.094	.910	20	.063	Normality
HRQOL_T2	1	.124	20	.200	.919	20	.094	Normality
	2	.192	20	.051	.862	20	.009	Normality
HRQOL_T3	1	.121	20	.200	.905	20	.050	Normality
	2	.152	20	.200	.920	20	.098	Normality

1 = intervention group   2 = control group

a. Lilliefors Significance Correction

* This is a lower bound of the true significance

2.2 Test of skewness coefficient and kurtosis coefficient

Table Appendix D-2 Test of skewness coefficient and kurtosis coefficient

Variables	group	Skewness coefficient	Kurtosis coefficient	graph
Total score of WOMAC				
WOMAC_T1	1	.722/.512 = 1.41	-.781/.992 = -.79	Normality
	2	.828/.512 = 1.61	-.541/.992 = -.55	Normality
WOMAC_T2	1	1.249/.512 = 2.44	.298/.992 = .32	Positive skewed
	2	1.053/.512 = 2.06	.618/.992 = .62	Positive skewed
WOMAC_T3	1	.828/.512 = 1.61	-.852/.992 = .86	Normality
	2	.709/.512 = 1.38	-.654/.992 = .66	Normality
Total score HRQOL				
HRQOL_T1	1	.446/.512 = .910	-1.182/.992 = 1.19	Normality

3. Homogeneity

Levene's test of equality of error variances[a]

Table Appendix D-3 Levene's test of equality of error variances[a]

	F	df1	df2	Sig.
WOMAC_T1 (week 0)	.507	1	38	.481
WOMAC_T2 (week 4)	.962	1	38	.333
WOMAC_T3 (week 8)	.005	1	38	.946
HRQOL_T (week 0)	.957	1	38	.334
HRQOL_T (week 4)	.910	1	38	.346
HRQOL_T (week 8)	.199	1	38	.658

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a Design: Intercept + Group

Within subjects design: Times

4. Assumption of sphericity (within-subject)

Mauchly's test of sphericity[a]

Table Appendix D-4 Mauchly's test of sphericity[a]

| Dependent variable and subscales	Mauchly's W	Approx. Chi-Square	df	Sig.
Total scores of WOMAC	.607	18.463	2	0.00
Total scores of HRQOL	.668	14.949	2	.001

There, Greenhouse-Geisser was selected to report the results of repeated measure ANOVA.

5. Randomness

Randomness was test by Runs test showed that probability sampling more than .05 ($p > .05$), it could be interpreted that the data of the dependent variables was random sampling. The results showed that probability sampling of variables more than .05 ($p > .05$).

6. Test of outlier
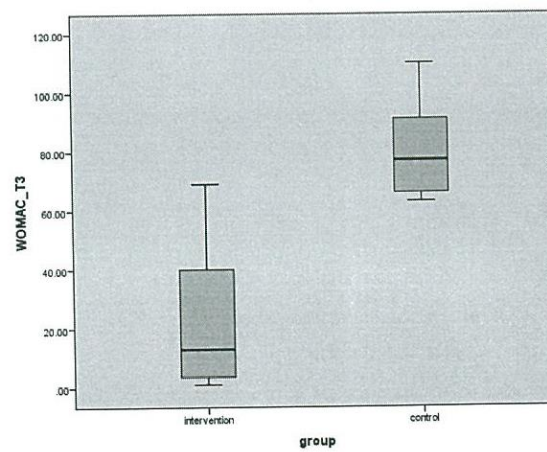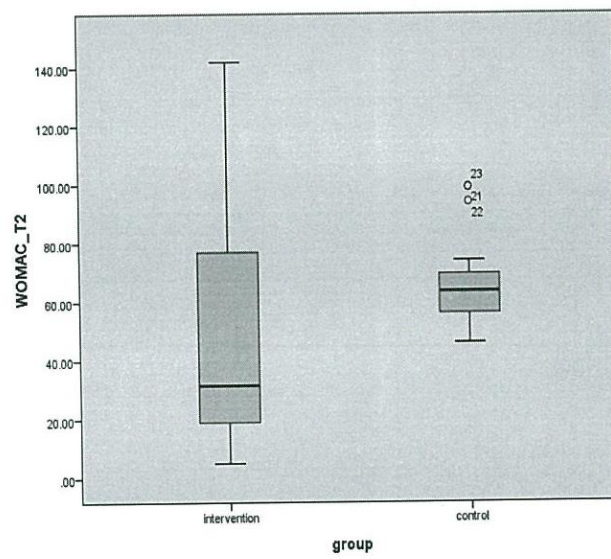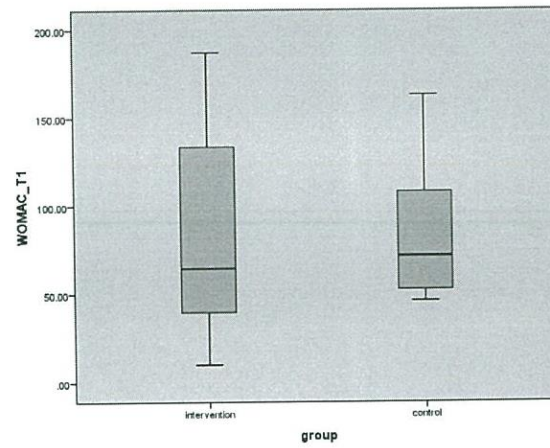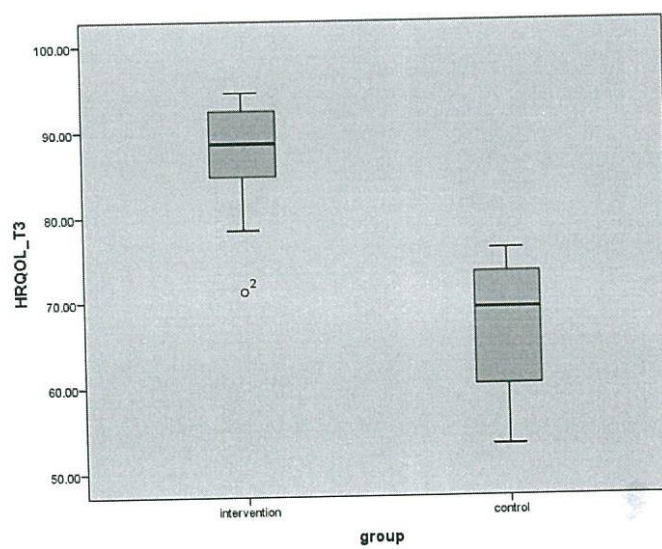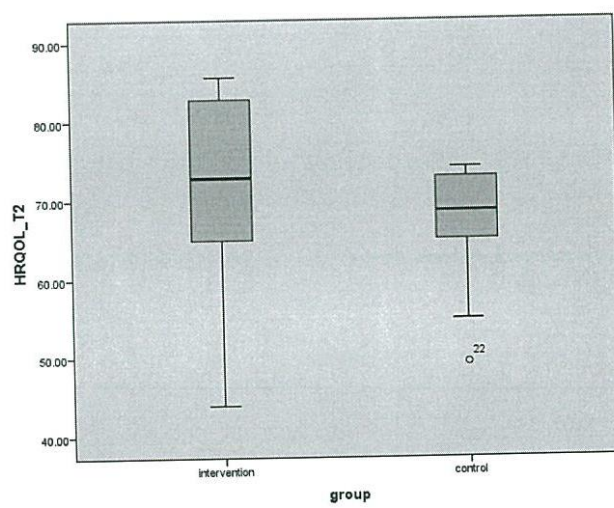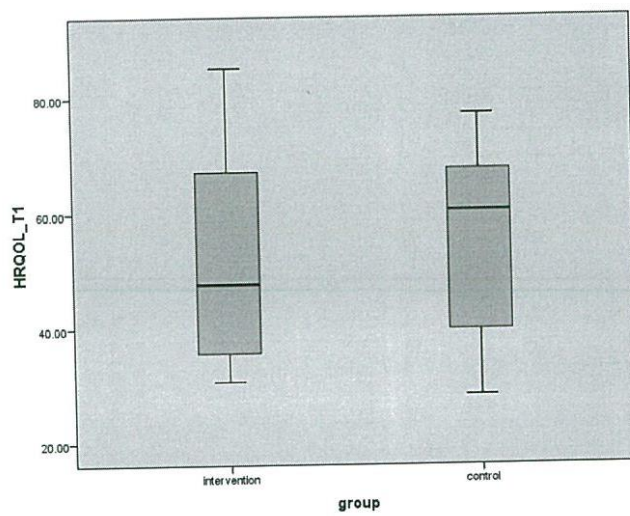
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