การศึกษาเกี่ยวกับโปรแกรมสุขศึกษาในการเพิ่มความรู้เรื่องโรค
กระดูกพรุนด้วยการวิจัยแบบสุ่มโดยใช้กลุ่มควบคุม

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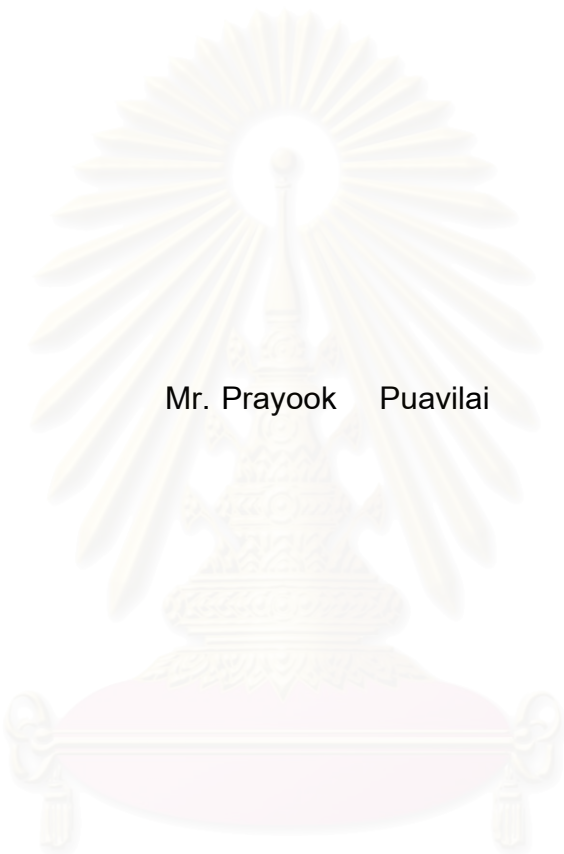
A RANDOMIZED CONTROLLED TRIAL OF HEALTH EDUCATION PROGRAM IN INCREASING KNOWLEDGE OF OSTEOPOROSIS

Mr. Prayook   Puavilai

Thesis Title　　　　　: A randomized controlled trial of health education program in

　　　　　　　　　　increasing knowledge of osteoporosis

By　　　　　　　　: Prayook Puavilai

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ประยุกต์ พัววิไล : การศึกษาเกี่ยวกับโปรแกรมสุขศึกษาในการเพิ่มความรู้เรื่องโรคกระดูกพรุนด้วย การวิจัยแบบสุ่มโดยใช้กลุ่มควบคุม (A Randomized Controlled Trial of Health Education Program in Increasing Knowledge of Osteoporosis) อ. ที่ปรึกษา : รศ.นพ.สมภพ ลิ้มพงศานุรักษ์, อ. ที่ปรึกษาร่วม : อ.วีนัส อุดมประเสริฐกุล ; 83 หน้า. ISBN 974-17-1716-4

วัตถุประสงค์ : เพื่อเปรียบเทียบโปรแกรมสุขศึกษา 2 วิธี ในการเพิ่มความรู้เรื่องโรคกระดูกพรุนและวิธีป้องกันโรคให้ผู้ป่วยนรีเวชอายุ 40-50 ปี ที่ห้องตรวจนรีเวชของโรงพยาบาลเลิดสิน โดยโปรแกรมแรกประกอบด้วยการบรรยายและการศึกษาด้วยตนเองจากหนังสือคู่มือพร้อมแผ่นพับ ส่วนโปรแกรมที่ 2 ประกอบด้วยการศึกษาด้วยตนเองจากหนังสือคู่มือพร้อมแผ่นพับเท่านั้น

รูปแบบการวิจัย : การวิจัยเชิงทดลอง แบบสุ่มและมีกลุ่มควบคุม

สถานที่ทำวิจัย : โรงพยาบาลเลิดสิน กรมการแพทย์ กระทรวงสาธารณสุข

ระเบียบวิธีวิจัย : ผู้ป่วยนรีเวช วัยก่อนหมดประจำเดือน อายุระหว่าง 40-50 ปี ที่ห้องตรวจนรีเวช ผู้ผ่านเกณฑ์การคัดเลือก ได้รับเลือกแบบเป็นระบบจำนวน 38 ราย โดยใช้ขั้นตอนการสุ่มแบบบล็อก แบ่งผู้ป่วยออกเป็น 2 กลุ่ม กลุ่มที่ 1 ได้รับฟังการบรรยาย และได้หนังสือคู่มือพร้อมแผ่นพับ เกี่ยวกับโรคกระดูกพรุนและวิธีการป้องกันโรคไปศึกษาด้วยตนเองเป็นเวลา 7 วัน(โปรแกรมที่ I) ส่วนกลุ่มที่ 2 ได้รับแต่หนังสือคู่มือพร้อมแผ่นพับ เกี่ยวกับโรคกระดูกพรุนและวิธีการป้องกันโรคไปศึกษาด้วยตนเองเป็นเวลา 7 วันเท่านั้น(โปรแกรมที่ II) ทั้ง 2 กลุ่มได้รับการประเมินความรู้โดยใช้แบบทดสอบก่อนและหลังการศึกษา

ผลการศึกษา : ลักษณะพื้นฐานของผู้ป่วยทั้ง 2 กลุ่ม ไม่แตกต่างกันทั้งในด้านอายุ สถานภาพสมรส ระดับการศึกษา อาชีพ รายได้ โรคประจำตัว ประวัติสุขภาพ อายุที่เริ่มมีประจำเดือน จำนวนวันของประจำเดือน จำนวนครั้งของการตั้งครรภ์ และจำนวนครั้งของการคลอดบุตรครบกำหนด

ค่าเฉลี่ยของผลรวมคะแนนจากแบบทดสอบก่อนการศึกษา จากทั้ง 2 กลุ่ม ไม่แตกต่างกันอย่างมีนัยสำคัญ (p=0.942, 95%CI=-2.801,3.011) แต่ค่าเฉลี่ยของผลรวมคะแนนจากแบบทดสอบหลังการศึกษา จากทั้งสองกลุ่มแตกต่างกันอย่างมีนัยสำคัญทางสถิติ (p<0.001, 95%CI=4.682,12.791) และกลุ่มที่ 1 มีคะแนนสูงกว่ากลุ่มที่ 2 เมื่อเปรียบเทียบค่าเฉลี่ยของผลรวมคะแนนก่อนศึกษากับหลังการศึกษาพบว่าแตกต่างกันอย่างมีนัยสำคัญทั้ง 2 กลุ่ม (p<0.001, 95%CI=-16.056,-12.049 และ p<0.001,95%CI=-6.730,-4.112) หมายความว่า ทั้ง 2 โปรแกรมสามารถสร้างความรู้เพิ่มขึ้นให้แก่ผู้ป่วยทั้ง 2 กลุ่ม โดยโปรแกรมที่ 1 สร้างความรู้เพิ่มขึ้นได้สูงกว่าโปรแกรมที่ 2

เมื่อเปรียบเทียบสัมฤทธิ์ผลของทั้ง 2 โปรแกรม พบว่าโปรแกรมที่ 1 สามารถเพิ่มความรู้ให้ผู้ป่วยจนถึงระดับปานกลางและสูงได้ถึง 78.95% ของผู้ป่วย ในขณะที่โปรแกรมที่ 2 เพิ่มความรู้ให้ผู้ป่วยจนถึงระดับปานกลางและสูงได้เพียง 36.84% เท่านั้น โปรแกรมที่ 1 แตกต่างจากโปรแกรมที่ 2 อย่างมีนัยสำคัญทางสถิติ ($Z = 3$, p <0.05)

สรุป : โปรแกรมสุขศึกษาทั้ง 2 โปรแกรม สามารถเพิ่มความรู้เรื่องโรคกระดูกพรุนและวิธีป้องกันโรคให้ผู้ป่วยได้ โดยโปรแกรมสุขศึกษาแบบ1 สามารถเพิ่มความรู้ได้ดีกว่าโปรแกรมที่2 และยังสามารถเพิ่มความรู้ในระดับปานกลางและสูงให้ผู้ป่วยได้ถึง 78.95% ของผู้ป่วยกลุ่มนี้ทั้งหมด

ภาควิชา   การพัฒนาสุขภาพ   ลายมือชื่อนิสิต..
สาขาวิชา   การพัฒนาสุขภาพ   ลายมือชื่ออาจารย์ที่ปรึกษา...
ปีการศึกษา   2545   ลายมือชื่ออาจารย์ที่ปรึกษาร่วม...

Objectives : To compare the 2 modules of health education program, first is composed of lecture and self-study from handbook and leaflet, second is composed of only self-study from handbook and leaflet, in conducting the knowledge about osteoporosis and its prevention in gynecologic patients 40-50 years of age at gynecology clinic of Lerdsin Hospital.

Study design : Randomized controlled trial design (RCT)

Setting : Lerdsin Hospital, Department of Medical Service, Ministry of Public Health.

Research methodology : Thirty eight cases of premenopausal gynecologic patients 40-50 years of age at gynecology clinic who fulfilled eligible criteria was enrolled by systemic random sampling. By block randomization process, the patients were divided into 2 groups, first group received lecture and handbook with leaflet about osteoporosis and its prevention for self-study for 7 days (program I), second group received only handbook with leaflet about osteoporosis and its prevention for self-study for 7 days (program II). Both groups were evaluated for knowledge by pretest and posttest.

Results : Basic characteristics of these 2 groups were not different in term of age, marital status, education level, occupation, income, underlying disease, past history of the health, menarche, duration of menstruation, gravidity, parity.

Mean of the total pretest scores from both programs were not significantly different (p=0.942, 95%CI= - 2.801,3.011), but mean of the total posttest scores from both programs were significantly different (p<0.001, 95%CI=4.682,12.791) and first group had higher scores than second groups. When compared between mean of the total pretest and posttest scores, there were statistical significantly different in both groups (p<0.001, 95%CI=-16.056,-12.049 and p<0.001,95%CI=-6.730,-4.112). Its mean that both programs could conduct the knowledge in both groups of the patients, program I could conduct more knowledge outcome than program II. When compared between the efficacy of these 2 programs, program I could conduct the patients to have moderate and high level of knowledge for 78.95% from all patients, while program II could conduct the patients to have moderate and high level of knowledge for only 36.84%. Program I was statistical significantly different from program II. (Z = 3 , p<0.05)

Conclusion: Both health education programs could conduct the knowledge about osteoporosis and its prevention in the patients. Program I could conduct more knowledge than program II and could conduct the patients to have moderate and high level of knowledge for 78.95% from all patients.

Program	Health Development	Student's signature…………………….........…………...
Field of Study	Health Development	Advisor's signature…………………….........…………...
Academic Year	2002	Co-advisor's signature…………………….........…………...

ACKNOWLEDGEMENTS

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CHAPTER 1

BACKGROUND AND RATIONALE

Osteoporosis is a major cause of illness and death in the elderly. It is characterized by low bone mass leading to an increased risk of fracture, particularly of the spine, hip and wrist. Bone loss with aging is a universal phenomenon, resulting in low skeletal mass and loss of bone architecture, leading in turn to an increase in fracture risk. However, osteoporosis can be prevented by appropriate intervention.

No precise longitudinal data of bone loss are reported, but it is a realistic estimate that during the course of a woman's lifetime she will loss half of bone from her spine and about 30% of her cortical bone, whereas a man will loss about 30% and 20% respectively[1,2]. Adult women have less bone than men at all ages and experience a sharp acceleration, 3-5% per annum, of bone loss during the 5 years following menopause[3]. The result of this bone loss is a high prevalence of fractures, since bone mass accounts for 75-85% of the variance in ultimate strength of bone tissue. It has been calculated that a white American woman of age 50 is at a risk of approximately 16% of forearm fracture, 32% of vertebral fracture and 15% of hip fracture during the rest of her lifetime. Furthermore, one in three women and one in five men surviving to 80 years of age will suffer a hip fracture. These so called "fragility" fractures result in annual costs estimated at 50 million pound in the UK and $ 10 billion in the USA. Besides morbidity from osteoporosis, it can increase mortality too. After a hip fracture, 50% can not walk and 20% die resulting in the problem of health status and quality of life[4].

The strength of bone in the elderly is mainly determined by the quantity of bone mass. Bone mass increases during childhood and adolescence. The acquisition of peak bone mass occurs between 20-30 years of age. Genetic profile, calcium intake and physical activity appear to have a profound influence on peak bone mass and they can be modified by both hormonal and environmental factors too.

Adequate and timely secretion of sex steroids, supplemental calcium intake and balanced physical activity can optimize bone mineral density even in a people with a genetic predisposition to low bone mass.

In adult, bone mass at any given time is the sum of two factors: peak bone mass and the rate of current and past bone loss. Although the persistent bone loss is a feature in most patients with osteoporosis, impaired acquisition of peak bone mass is responsible for 60-70% of the variance in bone mass at any age. Hormonal and environmental factors remain the strongest determinants of bone loss after the fourth decade in both men and women, whereas heritable influences, sex hormone status and dietary calcium are the principal regulators of peak bone mass. Several risk factors are associated with osteoporosis such as hypogonadism, high caffeine intake, cigarette smoking, excess alcohol consumption, low dietary calcium intake, vitamin D deficiency, physical inactivity, late menarche, hormonal influences, age-associated bone loss, etc. Each of these risk factors may influence the rate of acquisition of peak bone mass and the rate of bone loss, resulting in reduced bone mass.

Although a bone mass measurement can predict the risk of fracture more accurately than the calculation of risk factor scores, in the view of prevention, diminishing of the risk factors is more important.

Osteoporosis is a preventable condition and this can be achieved by this two factors:
1. Educating the lay community about the importance of developing maximal bone mass before menopause.
2. Introducing into the health-care system an easy, accessible and reimbursable means of identifying women at risk for osteoporosis.

Education should start in young women. The primary goal is to recognize low bone mass (osteopenia) early, with the objective of achieving a high peak bone mass prior to the natural menopause and the subsequent age-related years of bone mineral loss. Since osteopenia can be related as a precondition to osteoporosis, the following steps can help prevent osteoporosis:

- Premenopause : acquire maximum bone mass

- Perimenopause : screen for osteopenia

    - Postmenopause : control bone mineral loss

Because of advances in technology and in our understanding of the pathogenesis and treatment of osteoporosis, we now recognize that it is never too early to start prevention nor too late to treat established osteopenia and osteoporosis. The knowledge of the patients is useful in the prevention and treatment of osteoporosis in all ages even in cases where fracture has already happened.

Lerdsin General Hospital is under Department of Medical Service which is the Academic Unit of the Ministry of Public Health of Thailand, undertaking a project on health promotion and prevention of osteoporosis in Thai people. The project has 2 phases

Phase I is between 2000-2001 A.C. Epidemiologic survey will be done by collecting knowledge, information, data from every source, criticizing them and developing proper strategy for prevention and treatment of osteoporosis in Thailand. Health promotion program for the people to receive knowledge about osteoporosis will be developed too.

Phase II is between 2002-2006 A.C. corresponding with the national health policy number 9. The aim of this phase is to change the behavior of Thai people into the true way of lifestyle, exercise, nutrition and awareness of the osteoporotic risk factors and change the behavior of health personnel into the proper way of health promotion, prevention and treatment of osteoporosis.

So in this situation, preparation and development of health education program which can promote the proper knowledge for the Thai people about osteoporosis is the important process. The researcher is interested to study the comparison of 2 health education modules for teaching the Thai people to have knowledge regarding osteoporosis and prevention of this disease. The first module uses lecture by researcher and nurse plus self-study of the hand book and leaflet. The second module uses only the self-study of the handbook and leaflet. The proper module will be applied or if necessary do further study and then use it in general Thai population.

CHAPTER 2

REVIEW OF RELATED LITERATURE

2.1 OSTEOPOROSIS

    2.1.1 INTRODUCTION

Osteoporosis is a skeletal disease characterized by low bone mass and microarchitectural deterioration of bone tissue, leading to enhanced bone fragility and a consequent increase in fracture risk particularly of the spine, hip and wrist[5]. It is different from osteopenia which is a reduced bone mass due to inadequate osteoid synthesis, and carries no implication about causality. Osteopenia is a risk factor but osteoporosis is the disorder[6]. However, osteoporosis is a preventable condition.

    2.1.2 INCIDENCE

Osteoporosis causes much higher incidence in women than in men. The path to osteoporosis begins with the first menstrual period and occurs primarily after the menopause. It has a formidable impact on the lives and well-being of 15 to 20 million women in the United States. It is also more common in Caucasian and Asian than in black women. This may partly be explained by racial differences in skeletal size[7].

The incidence of osteoporotic fracture increases markedly with age. In women, this increase is seen after age of 45 years and is mainly due to forearm fractures up to the age of 65, after which the incidence of hip fractures rises exponentially. In men, the incidence of fragility fractures increase after the age of 75 years and, in both sexes, the hip is the most common fracture site after the age of 85. The incidence of vertebral fractures is less well documented, but for clinically diagnosed fractures, there is an exponential increase with age in men, whereas a more linear age-related increase is seen in women[8].

Mortality of the patients in the first year after hip fracture is 20% higher than other people at the same age and half of these patients can not walk normally[9]. Vertebral fracture causes less morbidity and mortality than hip fracture but it can be the most

common cause of back pain and cause of personality change from spine deformity and shortening in height.

2.1.3 PATHOPHYSIOLOGY

Low bone mass is the most important predisposing factor for osteoporotic fractures[10]. Bone mass is affected by peak bone mass and the degree of subsequent bone loss. These two processes are regulated at the level of the bone remodelling units, which in turn are responsive to an interaction between genetic and environment factors. An osteoporotic fracture occurs as a result of trauma to a bone that has a reduced skeletal mass. The lower the bone density, the less the force necessary to produce a fracture. Falls which result in soft tissue and skeletal injury are therefore critical in the pathogenesis of osteoporotic fractures, and therapeutic intervention must aim both to prevent bone loss and to reduce the likelihood of falls.

Peak bone mass occurs between 20 and 30 years of age. During this time, remodelling favours the formation of bone, thereby permitting a significant and critical increase in bone mass. It is evident that several factors interact to regulate peak bone density, the most important of these are genetic determinants which can be modified by both hormonal and environmental factors[11]. The other factors which can optimize bone mineral density are adequate and timely secretion of sex steroids, supplemental calcium intake and balanced physical activity[12].

In adult, bone mass at any given time is the sum of two factors : peak bone mass and the rate of current and past bone loss. Several risk factors for osteoporosis are hypogonadism, glucocorticoid therapy[13], previous fragility fracture, low body weight, cigarette smoking, excess alcohol consumption, low dietary calcium intake, vitamin D deficiency, late menarche, physical inactivity, high caffeine intake, maternal history of hip fracture[14].

Age-associated bone loss in the elderly[15], results from chronic "uncoupling" or an imbalance of resorption and formation. The other factors influencing bone loss include excess thyroid hormone levels, therapeutic use of glucocorticoids, immunosuppressant therapy, chronic anticonvulsant therapy.

2.1.4 CLINICAL MANIFESTATION

Osteoporosis is a silent disease until a fracture is sustained. Prior to this bone loss or failure to attain peak bone mass is not associated with any signs or symptoms. Measuring bone density is the most precise way to determine whether or not bone mass has been compromised. Apart from this, however, the main clinical presentations of osteoporosis are overt fracture, pain, or incidental osteopenia reported during a radiological examination. In patients with these symptoms, the disease process has already progressed significantly.

Fracture of the wrist or spine are the principal presenting signs of postmenopausal osteoporosis, while hip fractures are more common in the end stage of age-related (or senile) osteoporosis[16]. Spinal fractures may present with severe mid-thoracic or lower back pain without a history of trauma. Generally, the lower the bone mass, the less trauma is necessary to incur a fracture. This information is critical for patient management as the patient or career can be given advice about changing the level of physical activity in order to avoid future fractures.

2.1.5 DIAGNOSIS

2.1.5.1 HISTORY AND EXAMINATION

Clinical and historical risk factors should be assessed and evidence of previous fragility fracture sought. Although the physical examination is often normal, the presence of dorsal kyphosis and restricted, painful spinal movements may indicate spinal osteoporosis. Clinical evidence of secondary causes of osteoporosis, such as malignancy, hyperthyroidism and others, should also be sought[17].

2.1.5.2 INVESTIGATION

A) BONE DENSITOMETRY

Bone densitometry , such as dual energy x-ray absorptiometry (DXA), single energy x-ray absorptiometry (SXA), single photon absorptiometry (SPA), quantitative computed tomography (QCT) and broad ultrasound attenuation (BUA), provide the best assessment of fracture risk and have an established role in clinical practice. The values obtained from these measurement represent the BMD (Bone mineral density). If BMD lesser than mean BMD of the young adult or age-matched reference more than 2.5 standard deviation(SD) it represents osteoporosis and a greatly increased risk of fracture. If it is between 1 and 2.5 SD it represents osteopenia[18].

Dual energy x-ray absorptiometry (DXA) is widely regarded as the diagnostic method of choice.

B) RADIOGRAPHY

Conventional radiography is an insensitive method for assessing bone loss but plays a major role in the diagnosis of fracture.

C) BIOCHEMICAL MARKERS OF BONE TURNOVER

A number of products of collagen breakdown or of bone cells have been identified that reflect bone turnover. Example of these methods for diagnosis of bone resorption are serum tartrate-resistant acid phosphatase, urinary collagen cross-links and related peptides, urinary hydroproline and for bone formation are alkaline phosphatase, serum osteocalcin, serum type 1 procollagen peptide. Their use is mainly restricted to research applications[19].

D) ROUTINE (BASELINE) INVESTIGATIONS TO EXCLUDE SECONDARY CAUSES OF OSTEOPOROSIS

It should include a full blood count and ESR, serum calcium, phosphate and alkaline phosphatase, liver function test, etc.

2.1.6 TREATMENT AND PREVENTION

Although we can not resume the loss bone mass back to the normal level , the process can be however slowed down by appropriate method. Prevention is very important than treatment. Process of prevention consists of 2 levels.

2.1.6.1 INCREASING OF PEAK BONE MASS

Calcium supplement starting in young women at the level 1000 mg/day was recommended to increase peak of bone mass[12]. Physical activity (weight bearing) as little as 30 minutes a day for 3 days a week, will increase the mineral content of bone.

2.1.6.2 DECREASING OF BONE LOSS

Bone loss occurs from imbalance of bone formation and bone resorption, it can be decreased by many types of drugs. Most of the drugs used in preventing or treating osteoporosis decrease bone resorption. There is still no conclusion about which drugs can be used to increase the bone mass. Some drugs are effective in both prevention and treatment of osteoporosis but the others are only effective in the prevention.

A) ANTIRESORPTIVE AGENTS SUCH AS ESTROGEN, CALCITONIN , THE GROUP OF BISPHOSPHONATES AND CALCIUM.

(a) ESTROGEN

The role of estrogen deficiency in the pathogenesis of osteoporosis were documented and hormonal replacement therapy (HRT) has become an established treatment for this condition. Estrogen has many types and methods that can be used. In case of non-hysterectomized women, it is necessary to combine using of estrogen with progesterone in order to decrease the risk of endometrial hyperplasia and cancer[20]. Contraindication of estrogen are undiagnosed vaginal bleeding, acute liver disease, acute vascular thrombosis or emboli, past or recent history of breast cancer, recent endometrial cancer and pregnancy.

(b) CALCITONIN

Calcitonin can increase calcium excretion in the kidney and inhibit bone resorption by actively directing at the receptor located on the osteoclast, thereby leading to a secondary increase in BMD[21]. Salmon calcitonin is one of the most potent and readily available peptides. It has been used in almost all clinical trials of calcitonin in osteoporosis[22]. Calcitonin also has an analgesic effect, this is a valuable quality which can be profitably utilised, especially when treating women with vertebral crush fractures.

(c) BISPHOSPHONATES

This belong to a class of compounds that are chemically related to pyrophosphate and are effective antiresorptive agents[23]. It also has some analgesic effect.

(d) CALCIUM WITH OR WITHOUT VITAMIN D

Calcium supplementation is effective as a form of antiresorptive therapy because it suppresses endogenous production of Parathyroid hormone, thereby reducing an important stimulus to bone remodelling. Normal level of vitamin D is necessary for resorption of calcium from the gastrointestinal tract. The effect of vitamin D on osteoporosis is very low and required further study to support this evident[24].

B) BONE-FORMATING STIMULATING AGENT AND METHOD

(a) FLUORIDE

Sodium fluoride has been pescribed for the treatment of osteoporosis for half a century but more safety data will be needed to assess the long-term implications of this therapy[25].

Formation-stimulating agents such as 1-34 parathyroid hormone fragment, growth factors are needed to be studied furthermore.

(b) EXERCISE

Loss of the effect of gravity on the skeleton produces a dramatic reduction in bone mass due to uncoupling of the bone remodelling unit. Bone resorption increases dramatically while bone formation is markedly suppressed. Evidence that exercise can have a positive impact on BMD in older patients[26], is less compelling than data from studies in younger individuals. However, several trials do suggest that, like a calcium, weight-bearing exercise can slow or prevent further bone loss. The mechanisms responsible for this effect have not been well defined, but at least in one study, calcium supplementation plus regular exercise provided better protection against femoral bone loss in older postmenopausal women than placebo or calcium supplementation alone. Therefore, regular weight-bearing exercise is an important component in prevention of osteoporosis.

2.1.7 REVIEW OF STUDY ABOUT EDUCATION PROGRAM IN OSTEOPOROSIS

Sedlak CA et al. [27] from Ohio USA (1998) assessed whether young women who participate in an osteoporosis prevention program based on the health belief (Rosenstock, 1966) and self-efficacy models (Bendura, 1977) demonstrate high levels of knowledge regarding osteoporosis prevention than young women who do not participate in such a program. They used a classic experimental design with one treatment group and one control group to test the efficacy of the osteoporosis prevention program. A convenience sample of 31 young college women were randomly assigned to an experimental group or to a control group to receive an osteoporosis prevention program. The subjects in both groups completed the osteoporosis knowledge test, the osteoporosis health belief scale, and the osteoporosis self-efficacy scale two times. Only the experimental group received an osteoporosis prevention program. They found that subjects in experimental group had significantly higher knowledge and health belief scores after receiving the intervention than their pretest scores while subjects in the control group had no change in scores. They concluded that this osteoporosis program was effective in increasing awareness of osteoporosis prevention in this group of young women.

Gold DT et al.[28] studied about the psychological impact of a medical education program on older patients. Participants in a therapeutic program for osteoporosis were studied to determine if program participation improved psychological outcomes. The

4-day program included intensive education about the disease and its prognosis, physical therapy education, nutritional counseling, and medical evaluation and treatment. All therapeutic patients enrolled in the program over a one-year period (N=38) were interviewed individually in pre- and post-participation. Knowledge of osteoporosis, level of social support, coping styles, and perceptions of the impact of pain and chronicity were assessed. Patients reported improved future outlook despite continued concern about pain and chronicity. Mention of depression was reduced, and knowledge of osteoporosis increased significantly. They concluded that an educational program can have a positive impact on patients coping. Educational efforts may be an important component in the management of chronic disease.

Chow R et al.[29] developed a preventive program in Toronto, Canada, which aims to prevent bone loss and maximize the functional capacity of osteoporotic patients through a program with educational, social and exercise components. This program which showed that 80 percent of patients complied with the requirements of the exercise program, reported improvement in general well being, stamina, mobility and pain tolerance. The exercise group also showed a significant improvement in bone mass after one year of exercise. None of the patients developed fracture as a direct result of the exercise. The exercise prescribed for osteoporosis is safe and beneficial. The program is a social success.

Bravo G et al. [30] developed a randomized controlled trial to describe the effect of a supervised physical activity program on the physical and psychological health of osteopenic women. A total of 124 community-living postmenopausal women, between 50 and 70 years of age, with low bone mass took part in the study. Subjects allocated to the experimental group performed weight-bearing exercises (walking, stepping up and down from benches), aerobic dancing, and flexibility exercises for 60 minutes, three times a week, over period of 12 months. All subjects were invited to attend bi-monthly educational seminars covering topics related to osteoporosis. They concluded that after 12 months, exercising can produce a significant increase above initial level in the functional fitness, well-being, and self-perceived health of osteopenic women. Intensity of back pain can also be lowered by exercise.

Khemapech S[31] developed a quasi-experimental study to determine the effectiveness of health education program applying Self-Efficacy theory and Social Support on health promotion behaviors among menopausal women who attended menopause clinic in Police General Hospital of Thailand. The results revealed that the experimental group (received this program) had statistical significantly better knowledge, perceived self-efficacy, health promotion behavior than at the pretest period and better than the comparison group (did not receive this program). It was also found that knowledge was significantly correlated to health promotion behavior. She concluded that this health education program can improve health promotion behaviors.

There are no researches that directly studied about health educational program of osteoporosis which increased the knowledge of subjects in the group of premenopausal women for prevention of this disease by lecture plus self-study from handbook and leaflet (Program I.). We are interested in this point and decided to develop randomized controlled trial study to compare this program with program composing only self-study from handbook and leaflet   (Program II.).

2.2 TEACHING

Teaching is a process of giving knowledge or setting activity in order to promote or change the knowledge, attitude and practice. It can be divided into 2 methods.

2.2.1 PERSONAL TEACHING is teaching one by one but it takes a lot of time and money.

2.2.2 GROUP TEACHING is teaching more than 2 persons[32]. It can also be divided into 2 groups.

2.2.2.1 LECTURE

Lecture is a type of group teaching which draws large number of students. Main characteristic of the knowledge come from hearing. Its characteristics advantages and disadvantages are as follows:

A) PROCESS OF THE LECTURE

1. Preparation for lecture by the lecturer

2. Introduction to the lecture

3. Lecture

4. Follow up

5. Conclusion

    B) STRENGTHS OF LECTURE

1.Develops student's hearing and thinking skills.

2.Enhances student's understanding power.

3.Covers wider scope in just a short period.

4.Accommodates a large number of students in one time (20-200 persons).

5.Not expensive.

    C) WEAKNESSES OF LECTURE

1.Boring, as it is a passive learning type.

2.It can be used in only some level of the students.

3.Unsuitable to a group with different educational status or level of education.

4.Only having a sole instructor, the teacher.

5.A lot of information of lecture until sometimes passing other development.

6.Not promote the leading idea of the students.

    D) CAUTION IN LECTURE

1.Not take to long time

2.Use easy language or words

3.Adequate loudness speaking and clear speech

4.Not over action during speaking

5.Use the media

6.Belief that the information of the lecture is true

7.Have a question to the student in sometimes

8.Lecturer should describe from the data to the conclusion or the rule which can make the student develop thinking

2.2.2.2 GROUP PROCESS[33]

Knowledge comes from interaction between teacher and students, student and student, every body act as the donor and receiver, the leader of the group act as

consultant and evaluator for evaluating progression of the students. This method has the limitation that each time it can cover only 8-10 students and if the leader has no experience the study may not succeed.

2.3 KNOWLEDGE

It means the truth that person can remember or recall. It can be divided into 6 levels[34].

1. Recall is the ability to remember the information.

2. Comprehensive is ability to describe and compare different ideas and to describe the cause and effect of the event.

3. Application is the ability to use the information or abstract ideas in practice.

4. Analysis is the ability to use the information in grouping and interpreting in practice.

5. Synthesis is the ability to synthesis the information and different ideas into new information.

6. Evaluation is the ability to use the knowledge for classifying the information as the hypothesis and solving the problem.

CHAPTER 3

RESEARCH DESIGN AND METHODOLOGY

3.1 RESEARCH QUESTIONS

3.1.1 PRIMARY RESEARCH QUESTION

Can health education program composing of lecture, self-study from handbook and leaflet (Program I.) make gynecologic patients 40-50 years of age at gynecology clinic of Lerdsin Hospital have more knowledge outcome about osteoporosis and its prevention, compared to the program composing of only self-study from handbook and leaflet alone (Program II.) ?

3.1.2 SECONDARY RESEARCH QUESTIONS

1. Can health education program I. make gynecologic patients 40-50 years of age at gynecology clinic of Lerdsin Hospital have more knowledge outcome about osteoporosis and its prevention, compared to before it was conducted ?

2. Can health education program II. make gynecologic patients 40-50 years of age at gynecology clinic of Lerdsin Hospital have more knowledge outcome about osteoporosis and its prevention, compared to before it was conducted ?

3. Can health education program I conduct gynecologic patients 40 – 50 years of age at gynecology clinic of Lerdsin Hospital to have more moderate and high level of knowledge than 75% of these whole patients ?

3.2 RESEARCH OBJECTIVES :

3.2.1 GENERAL OBJECTIVE

To compare the 2 modules of health education program, first is composed of lecture and self-study from handbook and leaflet, second is composed of only self-study from handbook and leaflet, in conducting the knowledge about osteoporosis and its prevention in gynecologic patients 40-50 years of age at gynecology clinic of Lerdsin Hospital.

3.2.2 SPECIFIC OBJECTIVES FOR THIS RESEARCH

1. To compare whether the health education program I. can make gynecologic patients 40-50 years of age at gynecology clinic of Lerdsin Hospital have more knowledge outcome about osteoporosis and its prevention rather than that of program II.

2. To compare the knowledge outcome about osteoporosis and its prevention in each group which received the 2 modules of health education program before and after its conduction.

3. To evaluate the efficacy of health education program which can conduct more knowledge outcome about osteoporosis and its prevention by studying about the proportion of those who have moderate and high level of knowledge from all patients (subjects) in a particular group.

3.3 HYPOTHESIS :

1. Health education program composing of lecture, self-study from handbook and leaflet (Program I.) can conduct more knowledge outcome about osteoporosis and its prevention rather than that of composing only a self-study from handbook and leaflet (Program II.) in the group of gynecologic patients 40-50 years of age at gynecology clinic of Lerdsin Hospital.

2. Health education program I. can make gynecologic patients 40-50 years of age at gynecology clinic of Lerdsin Hospital have more knowledge outcome about osteoporosis and its prevention compared to before it was conducted.

3. Health education program II. can make gynecologic patients 40-50 years of age at gynecology clinic of Lerdsin Hospital have more knowledge outcome about osteoporosis and its prevention compared to before it was conducted.

4. Health education program I. can conduct gynecologic patients 40-50 years of age at gynecology clinic of Lerdsin Hospital to have more moderate and high level of knowledge than 75% of these whole patients.

3.4 CONCEPTUAL FRAMEWORK :
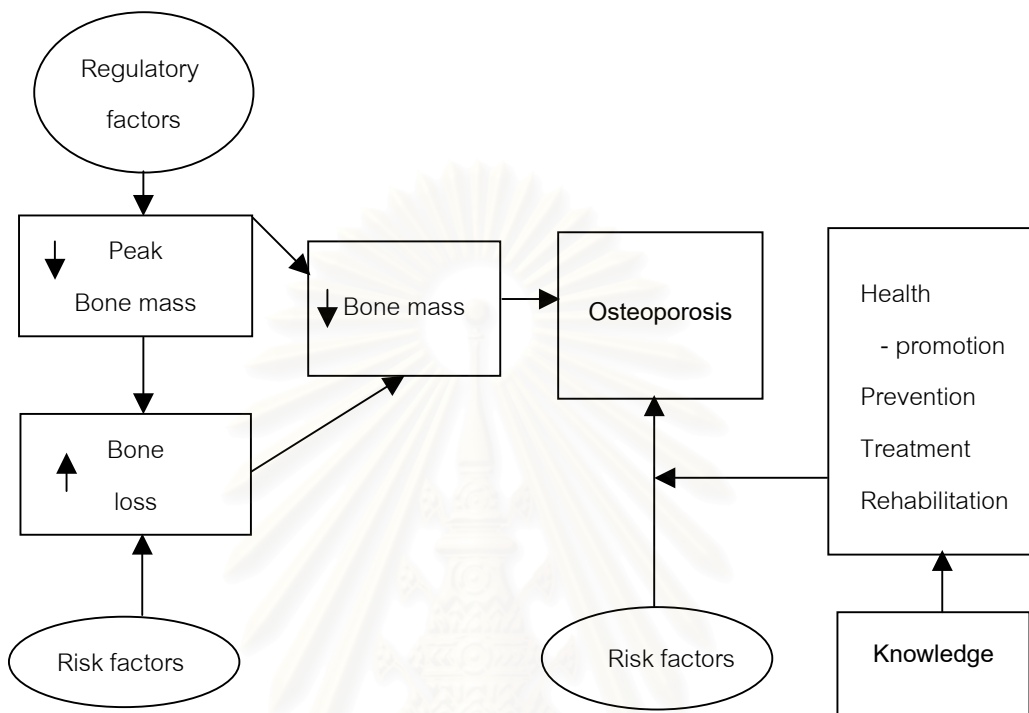
Figure 3.1 Conceptual framework
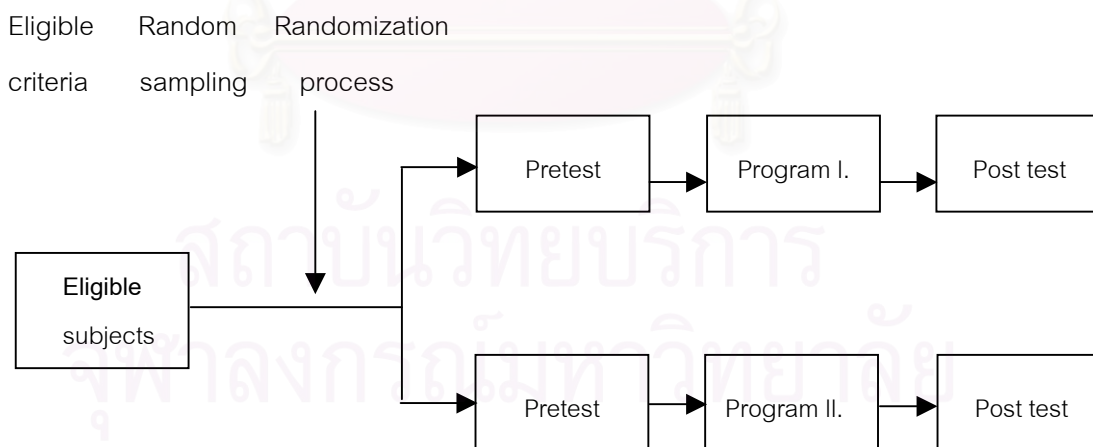
Health education program l.   = Lecture + handbook + leaflet

Health education program ll.   = Handbook + leaflet

Pretest and Post test for knowledge about osteoporosis

Figure 3.2 Schematic diagram

3.5 ASSUMPTIONS : (none)

3.6 KEY WORDS :

Health education program, knowledge, osteoporosis, randomized controlled trial

3.7 OPERATIONAL DEFINITION :

3.7.1 HEALTH EDUCATION PROGRAM

Health education program means the program introduced by the researcher to the patients in order to conduct the knowledge about osteoporosis and its prevention. There are 2 modules of these programs.

1. Lecture combined with self-study from the handbook and leaflet

2. Self-study from the handbook and leaflet only.

3.7.2 EFFICACY

Efficacy means the increasing in the mean of the scores of knowledge or proportion of those who have high and moderate level of knowledge after receiving health education program measured by the test which was developed by the researcher.

3.7.3 KNOWLEDGE ABOUT OSTEOPOROSIS AND ITS PREVENTION.

Knowledge about osteoporosis and its prevention means the knowledge of the patients about osteoporosis which include the meaning, incidence, causes, symptoms and signs, severity, morbidity, risk factors, diagnosis, prevention, treatment and prognosis.

3.7.4 CORRECT ANSWER.

Correct answer means the patient choose true in true answer or choose false in false answer.

3.7.5 INCORRECT ANSWER.

Incorrect answer means the patient choose true or unknown in false answer or choose false or unknown in true answer.

3.8 RESEARCH DESIGN

Randomized controlled trial(RCT) pretest-posttest design

3.8.1 POPULATION

3.8.1.1 TARGET POPULATION

Premenopausal gynecologic patients 40-50 years of age at gynecology clinic of Lerdsin Hospital.

3.8.1.2 SAMPLED POPULATION

Gynecologic patients at gynecology clinic of Lerdsin Hospital who had eligible criteria during March and April 2000 A.C.

3.8.2 ELIGIBLE CRITERIA

3.8.2.1 INCLUSION CRITERIA

1. 40 – 50 years of age

2. Can speak, read and write Thai.

3. Graduate of not higher than Matayomsuksa level 3 (old classification for 10 years study)

4. Still have menstruation (premenopause group).

5. Agreed to participate in the study and signed an informed consent.

3.8.2.2 EXCLUSION CRITERIA

1. History of osteoporosis, osteoporotic fracture.

2. History of hormonal replacement therapy.

3. History of having joined a similar program.

3.8.3 SAMPLE SIZE ESTIMATION

The formula for sample size estimation used in this study is the formula for mean of two independent groups.

$$n = 2\sigma^2[Z_\alpha + Z_\beta]^2/d^2$$

n = Sample size in each group

$\sigma^2 = Sp^2$ = Pooled variance which can be estimated from sample or pilot data by pooling the individual sample variances

$$Sp^2 = \frac{(n_1-1)S_1^2 + (n_2-1)S_2^2}{(n_1-1) + (n_2-1)} = 42.03$$

n_1 and n_2 = Sample size in each group of the pilot study = 15 and 15

S_1^2 and S_2^2 = Individual sample variances = 7.35^2 and 5.48^2

d = Difference of mean of knowledge between two groups

Because we had no variances of the samples , we had to develop the pilot study. Researcher developed the pilot study in the group of 30 gynecologic patients , 40 – 50 years of age who can speak , read and write Thai language and has fulfilled the criteria as sample in this research at Lerdsin Hospital. These 30 subjects were divided by block randomization into 2 groups , first group (n_1 = 15 subjects) received lecture plus self-study from handbook and leaflet , second group (n_2 = 15 subjects) received only self-study from handbook and leaflet , then this pilot study was done in the same methodology as this research. From these pilot data we found that the variance of program I group (S^2_1) was 7.35^2 and that of program II (S^2_2) was 5.48^2 and knowledge (mean of the total posttest score) of program II group was equal to 17.87 and from content expert suggestion we estimated that knowledge of program I group was equal to knowledge of program II group plus 40% of knowledge of program II. Then the difference of mean of knowledge between 2 groups (d) was $= \left[17.87+40\% \times 17.87 \right] - 17.87 = 7.15$

Z = Statistical value of the standard normal distribution cutting off probability

α = Type I error probability = 0.05 $\qquad Z_\alpha$ = 1.64 (one-tailed)

β = Type II error probability = 0.1 $\qquad Z_\beta$ = 1.282

n = sample size in each group $\approx$ 15

If drop out = 20%

n with drop out = $\dfrac{15}{1-0.2}$ patients per group

$\approx$ 19 patients per group

3.8.4 EXPERIMENTAL MANEUVER

3.8.4.1 SAMPLE COLLECTION

The gynecologic patients 40-50 years of age from gynecology clinic who had the eligible criteria would be invited to participate in this study and be informed about its benefits and weak points. If they agree to join, they had to sign an informed consent form. Systemic random sampling (probability sampling) would be done by collecting every alternative subjects to enroll the sample population and block randomization process would be done to divide the patients into 2 groups.

The group that would receive only handbook with leaflet to study (Program II.) would undergo testing for pretest and would be scheduled for posttest 7 days later. This group and the target group would be provided with lecture, upon request, after the other group had finished the 1 day posttest.

In the group that would receive lecture and handbook with leaflet (Program I.) they would be scheduled for lecture. The pretest would be done just before the lecture starts. While the handbook with leaflet would be distributed after the lecture and their posttest schedule in 7 days later, would also be announced.

The above process would decrease the opportunity of co-intervention and contamination from each other or both groups. The lecture set later for the group that have only self-study is for ethical reason.

3.8.4.2 PROCESS OF RANDOMIZATION

From the gynecologic patients 40-50 years of age who fulfill eligible criteria during March until April 2000 A.C., the researcher would enroll this group of samples, by sampling technique then by using block of four randomization. The samples would be divided into 2 groups and balanced in the number of each groups. One group would receive lecture and handbook with leaflet for self-study and the other would receive only handbook with leaflet for study.

3.8.4.3 DROP OUT

The estimated drop out was approximately 20% and this estimation had already been adjusted in the sample size calculation. The patients were clearly informed about the research prior to their agreement to join this study. The duration of study was intended to be finished in about 2 weeks to decrease the chances for drop out.

3.8.5 INTERVENTION

Program I. = Lecture plus self-study from handbook and leaflet

Program II. = Self-study from handbook and leaflet

3.8.5.1 LECTURE SCRIPT

A lecture script was created by researcher from the medical text books and journals and simplified until it became understandable to the sample population with the same level of education and the general public as well. The researcher and nurse would conduct this lecture session.(same lecturers for every times of lectures) It covers all important points about osteoporosis and its prevention such as definition, incidence,

causes, symptoms and signs, severity, morbidity, risk factors, diagnosis, prevention, treatment and prognosis and uses easy Thai language with direct meaning.

3.8.5.2 HANDBOOK

The handbook was a simplified short hand book for the general public describing about osteoporosis and its prevention. It was in easy Thai language, explaining direct meanings and illustrating pictures and cartoons making it interesting. It was produced by the metabolic bone disease group and the Thai Orthopaedic association.

3.8.5.3 LEAFLET

The leaflet was a sheet of paper which describes short and easy information about osteoporosis and its prevention in Thai language with pictures and cartoons. It was produced by the metabolic bone disease group and the Royal Thai college of Orthopaedist.

3.8.6 OBSERVATION AND OUTCOME MEASUREMENT

3.8.6.1 VARIABLES TO BE MEASURED

1. Administration variables

   Name, Hospital number

2. Baseline variables

   Age, Marital status, Education level, Occupation, Income of the family, Underlying disease, Past history, History of menstruation, Gravidity & Parity

3. Intervention variable

   Health education program I (Lecture + Handbook + Leaflet)

   Health education program II (Handbook + Leaflet)

   (Handbook and leaflet have the same description in both programs.)

4. Primary outcome variable

   Pretest knowledge scores

   Posttest knowledge scores

   (Pretest and posttest have the same description)

3.8.6.2 TOOLS TO BE USED IN COLLECTING THE GENERAL INFORMATION OF THE SAMPLE AND TESTING THE KNOWLEDGE OF THE SAMPLE such as pretest and posttest (Questionnaire).

a) TOOL FOR COLLECTING THE GENERAL INFORMATION OF THE SAMPLE

This information was about age, marital status, education level, occupation, income, underlying disease, past history , history of menstruation, gravidity and parity.

b) TOOL FOR TESTING THE KNOWLEDGE

Pretest was the same as posttest. This tool was developed by the researcher from literature review. It composed of 40 questions with 33 true answers and 7 wrong answers.

Each question had 3 choices (True, False, Unknown) and would be interpreted into score, as follow :

Correct answer (true in true answer or false in false answer) received 1 score.

Incorrect answer (true or unknown in false answer or false or unknown in true answer) received 0 score.

The result from summation of the score varied from 0 to 40 scores. They could be divided into 3 levels which would be calculated from the proportion 3 in 4 of the total scores(correct all questions).

High level of the knowledge meant scores more than 75% (31-40 scores)

Moderate level of the knowledge meant scores between 50-75% (20-30 scores)

Low level of the knowledge meant scores less than 50% (0-19 scores)

Test for validity and reliability

Content validity for Lecture script, Handbook, Leaflet, Tests for knowledge (pretest and posttest) :

Researcher sent these tools to 3 experts for testing the content validity and after they were corrected as per suggested way, the pretest study for testing the reliability then started.

Reliability

Researcher developed the pretest study for testing the reliability in the group of   15 gynecologic patients 40-50 years of age who can speak, read and write Thai

language and has fulfilled the criteria as sample in this research at gynecology clinic of Lerdsin Hospital.

The reliability of the test for knowledge could be calculated from the formula of KR 20 (Kuder-Richardson formula 20) which could be used in the test for each item having or not having equal hard and easy level.

$$R_{KR-20} \text{ or } R_{tt} = [K / (K-1)] [1-\Sigma pq /S^2]$$

If R_{tt} = Reliability of the test

K = Total numbers of items of the test = 40

p = Proportion of the numbers of the patients with true answer from

the total patients

q = 1-p

S^2 = Variance of the total scores

$= [\Sigma x^2/n] - [\Sigma x /n]^2 = 27.93$

x = Total scores of each patient

n = Numbers of the patients = 15

The Reliability of the test for knowledge $\approx$ 0.75

3.9 DATA COLLECTION :

3.9.1 MANEUVER

3.9.1.1 PREPARATORY PERIOD

a) After proposal approval was received from the ethical committee of Faculty of Medicine, Chulalongkorn University and Lerdsin Hospital, the researcher must bring the recommendation letter from Chulalongkorn University to the Director and Head of the Department of Obstetrics and Gynecology of Lerdsin Hospital.

b) Preparing the measurement tools and place.

c) Preparing the assistant (nurse) who take part in assisting the process of pretest, posttest, lecture, giving the handbook and leaflet to the sample population and collecting of data.

3.9.1.2 STUDY AND DATA COLLECTION PERIOD

a) Enrolled the sample population who fulfilled the eligible criteria and sign the informed consent, schedule the pretest or pretest plus lecture.

b) Collected general information, pretest , give handbook and leaflet for self-study to one group and schedule the day of posttest (7 days later).

c) One day after posttest was done in the first group, the general information for another group would be collected, tested for pretest, given lecture, given handbook with leaflet and scheduled for post test (7 days later too).

d) In the first group who had no lecture, should they request for a lecture, it would be set for them later after the posttest of the lecture group was done.

3.9.2 DATA GATHERING TECHNIQUES

All data would be recorded in the data collection form, pretest, posttest form composing of administration data, baseline data and primary outcome data.

3.10 DATA ANALYSIS :

Baseline data and outcome data would be collected, described and analyzed by computer statistical program (SPSS version 7.5).

Statistical hypothesis for primary research question was

$$H_o :\ \mu_1 \leq \mu_2$$
$$H_a :\ \mu_1 > \mu_2$$

μ_1 = mean of scores (posttest) after health education program I
(Lecture + Handbook + Leaflet)

μ_2 = mean of scores (posttest) after health education program II
(Handbook + Leaflet)

Table 3.1 Data analysis

Variables	Types of Variables	Statistics

1. Baseline variable
 	
    Age
 	
    Marital status
 	
    Education level
 	
    Occupation
 	
    Income
 	
    Underlying disease
 	
    Past history of the health
 	
    Menarche
 	
    Gravidity & Parity
	
	Ratio scale (Cont.)
	
	Nominal scale(Categ.)
	
	Nominal scale(Categ.)
	
	Nominal scale(Categ.)
	
	Ratio scale (Discrete)
	
	Nominal scale(Categ.)
	
	Nominal scale(Categ.)
	
	Ratio scale (Cont.)
	
	Ratio scale (Discrete)
		Descriptive
		$\%$, $\bar{X}$, SD
		
		$\%$
		
		$\%$
		
		$\%$
		
		$\%$
		
		$\%$
		
		$\%$
		
		$\%$, $\bar{X}$, Median , SD
		
		$\%$

2. Knowledge scores from the test	Ratio scale (Cont.)	$\%$, $\bar{X}$, SD

3. Comparison of outcome
 	
    Mean scores after intervention between 2 modules of health education program
 	
    Mean scores after and before intervention module I. (with lecture)
 	
    Mean scores after and before intervention module II (no lecture)
 	
    If module I. Is better , is proportion of the patients who has moderate to high scores after intervention more than 75% of these whole patients
	
	Independent
	Ratio scale (Cont.)
	
	Dependent
	Ratio Scale (Cont.)
	
	Dependent
	Ratio scale (Cont.)
	
	Proportion
	Nominal scale(Categ.)
		Analytical
		Unpaired t-test, 95%CI
		
		Paired t-test,95% CI
		
		Paired t-test,95% CI.
		
		$\%$, Nonparametric
		Binomial Test , Z-test

3.11 ETHICAL CONSIDERATIONS

1. The research proposal was approved by the ethical committee of Faculty of Medicine , Chulalongkorn University and Lerdsin Hospital.

2. The details of this study would be clearly described and answered when questions arose from the participants.

3. Every patient signed the informed consent and was completely free to withdraw from the study without any prejudge to her further treatment.

4. The group with no lecture would also be provided with lecture upon request.

3.12 LIMITATIONS

The study was limited to the gynecologic patients 40-50 years of age who could speak, read, write Thai language and still had menstruation.

Co-intervention

It was difficult to prevent co-intervention in this study because the subject might receive information regarding osteoporosis from other sources e.g. television, radio, nieghbour.

Contamination

The names and hospital numbers of all samples were recorded so they could not cross to join the other group especially from no lecture group to lecture group.

Compliance

All patients willing to join to this study would be informed regarding the benefits and weak points of the research. They would be asked to sign an informed consent form without force. Hence, getting good cooperation and compliance from these samples, would not be a problem.

3.13 BENEFITS OF THE STUDY

Health education program which can conduct the patients to have moderate and high level of knowledge at high proportion may be used, applied or developed further in future researches. The result may be the goal program that can be generally implemented.

CHAPTER 4

RESULTS

During March 2000 and April 2000, 38 gynecologic patients 40-50 years of age from gynecology clinic of Lerdsin Hospital who passed the eligible criteria and were recruited into the study. Sampling technique was done to enroll the sample population and block randomization process was done to divide them into 2 groups.

First group, 19 patients, received lecture and handbook with leaflet (Program l.) and second group, another 19 patients, received only handbook with leaflet (Program ll.) to study.

The pretest and posttest were done before and after study in both groups.

4.1 BASELINE CHARACTERISTICS

There were no significant differences in baseline characteristics of the study population among program l and program ll groups as shown in the table 4.1.

Table 4.1   Baseline characteristics of the study population

Baseline characteristics	Program I	Program II
Number of patients	19	19
1. Age (year , case , %)		
40-41	5(26.3)	6(31.6)
42-43	8(42.1)	6(31.6)
44-45	3(15.8)	3(15.8)
46-47	2(10.5)	2(10.5)
48-49	1(5.3)	2(10.5)
mean	42.89	43.21
SD	2.31	2.68
2. Marital status (case,%)		
single	2(10.5)	3(15.8)
married	15(78.9)	14(73.7)
widow/divorced/separated	2(10.5)	2(10.5)

Table 4.1   Baseline characteristics of the study population (Cont.)

Baseline characteristics	Program I	Program II
3. Education level (case,%)		
primary school	10(52.6)	10(52.6)
secondary school	6(31.6)	7(36.8)
primary level of high school	3(15.8)	2(10.5)
4. Occupation (case,%)		
housewife	1(5.3)	2(10.5)
labour	2(10.5)	2(10.5)
trade	4(21.1)	3(15.8)
agriculture	1(5.3)	1(5.3)
company	2(10.5)	3(15.8)
industry	9(47.4)	8(42.1)
5. Income (Baht,case,%)		
3001-6000	5(26.3)	5(26.3)
6001-9000	10(52.6)	11(57.9)
9001-12000	3(15.8)	2(10.5)
>12000	1(5.3)	1(5.3)
6. Underlying disease (case,%)		
no	15(78.9)	15(78.9)
yes	4(21.1)	4(21.1)
7. Past history of the health (case,%)		
no	12(63.2)	10(52.6)
yes	7(36.8)	9(47.4)

Table 4.1   Baseline characteristics of the study population (Cont.)

Baseline characteristics	Program I	Program II
8. Menarche (year,case,%)		
12	7(36.8)	8(42.1)
13	9(47.4)	6(31.6)
14	2(10.5)	4(21.1)
15	1(5.3)	1(5.3)
mean	12.84	12.89
SD	.83	.94
median	13	13
9. Duration of menstruation (day,case%)		
3	1(5.3)	2(10.5)
4	0(0)	3(15.8)
5	4(21.1)	4(21.1)
6	8(42.1)	5(26.3)
7	4(21.1)	5(26.3)
8	2(10.5)	0(0)
mean	6.05	5.42
SD	1.18	1.34
median	6	6
10. Gravidity (case,%)		
0	2(10.5)	4(21.4)
1	1(5.3)	1(5.3)
2	5(26.3)	5(26.3)
3	9(47.4)	4(21.1)
4	1(5.3)	3(15.8)
5	1(5.3)	2(10.5)
mean	2.47	2.37
SD	1.22	1.64
median	3	2

Table 4.1   Baseline characteristics of the study population (Cont.)

Baseline characteristics	Program I	Program II
11. Parity (case,%)		
0	3(15.8)	4(21.1)
1	6(31.6)	1(5.3)
2	7(36.8)	8(42.1)
3	3(15.8)	5(26.3)
4	0(0)	1(5.3)
Mean	1.53	1.89
SD	.96	1.20
Median	2	2

4.2 THE ANSWER FROM EACH QUESTION OF PRETEST AND POSTTEST

Result of the answers in each questions of the pretest and posttest done by the patients in program I group and program II group were reported below and shown in the table 4.2-4.7. From these results we also could show cross tabulation between pretest and posttest in program I and program II (shown in Appendix E) and the summary of the cross tabulation was reported after the table 4.7.

4.2.1   Definition

Question 1: Bone is a viable organ and it can transform every time.

From pretest, most of the patients in both programs chose incorrect answers but from posttest, most of them chose correct answers.

Question 2: Osteoporosis is a chronic disease caused by loss of bone mass. The bone density is decreased until collapsing and fracture of the bone happens.

From pretest and posttest, most of them in both programs chose correct answers.

Table 4.2　　　　Numbers of the patients from program I group and program II group who chose the correct and incorrect answers in each question of definition from pretest and posttest.

		Program I		Program II	
		Pretest	Posttest	Pretest	Posttest
Incidence					
Question 1	Incorrect	16 (84.2)	1 (5.3)	16 (84.2)	8 (42.1)
	Correct	3 (15.8)	18 (94.7)	3 (15.8)	11 (57.9)
Question 2	Incorrect	1 (5.3)	0 (0)	1 (5.3)	1 (5.3)
	Correct	18 (94.7)	19 (100.0)	18 (94.7)	18 (94.7)

Numbers of the patients, (%)

4.2.2. Incidence

Question 1: In general, thinness of the bone starts slowly at the age of 40 years.

From pretest, most of the patients in both programs chose incorrect answers but from posttest, most of them chose correct answers.

Question 2: Thai women have the rate of osteoporosis about 20% at 55 years of age and increase to be 60% at 65 years of age.

From pretest, most of the patients in both programs chose incorrect answers. From posttest, most of them in program I chose correct answers but most of them in program II chose incorrect answers.

Question 3: Osteoporosis can happen only in women.

From pretest, most of the patients in both programs chose incorrect answers. From posttest, most of them in program I chose correct answers but most of them in program II chose incorrect answers.

Question 4: The level of thinness of bone in women is faster than in men at the same age.

From pretest, most of the patients in program I chose correct answers but most of them in program II chose incorrect answers. From posttest, most of them in program I chose correct answers but most of them in program II chose incorrect answers.

Table 4.3   Numbers of the patients from program I group and program II group who chose the correct and incorrect answers in each question of incidence from pretest and posttest.

		Program I		Program II	
		Pretest	Posttest	Pretest	Posttest
Incidence					
Question 1	Incorrect	10 (52.6)	2 (10.5)	10 (52.6)	8 (42.1)
	Correct	9 (47.4)	17 (89.5)	9 (47.4)	11 (57.9)
Question 2	Incorrect	18 (94.7)	8 (42.1)	18 (94.7)	17 (89.5)
	Correct	1 (5.3)	11 (57.9)	1 (5.3)	2 (10.5)
Question 3	Incorrect	13 (68.4)	2 (10.5)	17 (89.5)	13 (68.4)
	Correct	6 (31.6)	17 (89.5)	2 (10.5)	6 (31.6)
Question 4	Incorrect	9 (47.4)	2 (10.5)	16 (84.2)	13 (68.4)
	Correct	10 (52.6)	17 (89.5)	3 (15.8)	6 (31.6)

Numbers of the patients, (%)

4.2.3. Causes and risk factors

Question 1: The major cause of osteoporosis is a decrease of the level of female sex hormone.

From pretest, most of the patients in program I chose incorrect answers but most of them in program II chose correct answers. From posttest, most of them chose correct answers.

Question 2: Decrease of the level of female sex hormone causes increasing bone resorption.

From pretest, most of the patients in program I chose incorrect answers but most of them in program II chose correct answers. From posttest, most of them chose correct answers.

Question 3: Calcium deficiency causes malfunction of natural growth and development of bone.

From pretest and posttest, most of them in both programs chose correct answers.

Question 4: Postmenopausal women has higher tendency to have osteoporosis than adolescent.

From pretest and posttest, most of them in both programs chose correct answers.

Question 5: Obese women has higher tendency to have osteoporosis than slimmer ones.

From pretest and posttest, most of them in both programs chose incorrect answers.

Question 6: The patients with thyrotoxicosis, diabetes mellitus, renal failure have tendency to be osteoporosis.

From pretest, all of the patients in both programs chose incorrect answers. From posttest, most of them in program I chose correct answers but most of them in program II chose incorrect answers.

Question 7: Caucasian and Asian have lower tendency to have osteoporosis than African.

From pretest and posttest, most of them in both programs chose incorrect answers.

Question 8: If the mother was osteoporotic patient the daughter has high tendency to be osteoporosis too.

From pretest, most of the patients in program I chose incorrect answers but most of them in program II chose correct answers. From posttest, most of them chose correct answers.

Question 9: Alcohol consumption increases the risk for osteoporosis.

From pretest, most of the patients in both programs chose incorrect answers but from posttest, most of them chose correct answers.

Question 10: Cigarette smoking increases the risk for osteoporosis.

From pretest, most of the patients in both programs chose incorrect answers but from posttest, most of them chose correct answers.

Question 11: Coffee and tea intake increase the risk for osteoporosis.

From pretest, most of the patients in both programs chose incorrect answers. From posttest, most of them in program I chose correct answers but most of them in program II chose incorrect answers.

Question 12: Using some drugs for a long time may produce osteoporosis such as thyroid hormone, steroid.

From pretest, most of the patients in both programs chose incorrect answers. From posttest, most of them in program I chose correct answers but most of them in program II chose incorrect answers.

Table 4.4   Numbers of the patients from program I group and program II group who chose the correct and incorrect answers in each question of causes and risk factors from pretest and posttest.

		Program I		Program II	
		Pretest	Posttest	Pretest	Posttest
Causes and risk factors					
Question 1	Incorrect	10 (52.6)	1 (5.3)	4 (21.1)	3 (15.8)
	Correct	9 (42.4)	18 (94.7)	15 (78.9)	16 (84.2)
Question 2	Incorrect	13 (68.4)	4 (21.1)	7 (36.8)	6 (31.6)
	Correct	6 (31.6)	15 (78.9)	12 (63.2)	13 (68.4)
Question 3	Incorrect	3 (15.8)	0 (0)	2 (10.5)	1 (5.3)
	Correct	16 (84.2)	19 (100.0)	17 (89.5)	18 (94.7)
Question 4	Incorrect	9 (47.4)	1 (5.3)	5 (26.3)	2 (10.5)
	Correct	10 (52.6)	18 (94.7)	14 (73.7)	17 (89.5)
Question 5	Incorrect	19 (100.0)	11 (57.9)	17 (89.5)	17 (89.5)
	Correct	0 (0)	8 (42.1)	2 (10.5)	2 (10.5)
Question 6	Incorrect	19 (100.0)	7 (36.8)	19 (100.0)	17 (89.5)
	Correct	0 (0)	12 (63.2)	0 (0)	2 (10.5)
Question 7	Incorrect	19 (100.0)	13 (68.4)	17 (89.5)	18 (94.7)
	Correct	0 (0)	6 (31.6)	2 (10.5)	1 (5.3)
Question 8	Incorrect	10 (52.6)	7 (36.8)	8 (42.1)	7 (36.8)
	Correct	9 (17.4)	12 (63.2)	11 (57.9)	12 (63.2)
Question 9	Incorrect	13 (68.4)	0 (0)	10 (52.6)	1 (5.3)
	Correct	6 (31.6)	19 (100.0)	9 (47.4)	18 (94.7)

Table 4.4   Numbers of the patients from program I group and program II group who chose the correct and incorrect answers in each question of causes and risk factors from pretest and posttest. (Cont.)

		Program I		Program II	
		Pretest	Posttest	Pretest	Posttest
Causes and risk factors					
Question 10	Incorrect	19 (100.0)	4 (21.1)	17 (89.5)	8 (42.1)
	Correct	0 (0)	15 (78.9)	2 (10.5)	11 (57.9)
Question 11	Incorrect	19 (100.0)	7 (36.8)	19 (100.0)	17 (89.5)
	Correct	0 (0)	12 (63.2)	0 (0)	2 (10.5)
Question 12	Incorrect	13 (68.4)	4 (21.1)	18 (94.7)	13 (68.4)
	Correct	6 (31.6)	15 (78.9)	1 (5.3)	6 (31.6)

Numbers of the patients, (%)

4.2.4. Symptoms and signs

Question 1:   In early stage of osteoporosis, it may have no specific symptom and sign.

From pretest, most of the patients in both programs chose incorrect answers. From posttest, most of them in program I chose correct answers but most of them in program II chose incorrect answers.

Question 2:   In the long term of osteoporosis, it can cause bone pain and decrease bone density.

From pretest, most of the patients in program I chose correct answers but most of them in program II chose incorrect answers. From posttest, most of them in program I chose correct answers but most of them in program II chose incorrect answers.

Question 3:   In elderly, if someone have back pain it may have fracture of vertebra already.

From pretest and posttest, most of them in both programs chose incorrect answers.

Question 4:   In postmenopausal women, if they fell down, the bone may fracture easier than in teenagers.

From pretest and posttest, most of them in both programs chose correct answers.

Question 5:   Common sites of fracture in osteoporosis are vertebral column, hip, wrist.

From pretest, most of the patients in program I chose incorrect answers but most of them in program II chose correct answers. From posttest, most of them chose correct answers.

Question 6:   Osteoporosis make vertebral column bending. It causes poor personality and produces psychophysical problem.

From pretest and posttest, most of them in both programs chose incorrect answers.

Question 7:   Osteoporosis easily fractures the bone and requires a long time to recover. It causes complications that influenced body, mind and economy.

From pretest, most of the patients in program I chose correct answers but most of them in program II chose incorrect answers. From posttest, most of them in program I chose correct answers but most of them in program II chose incorrect answers.

Table 4.5   Numbers of the patients from program I group and program II group who chose the correct and incorrect answers in each question of symptoms and signs from pretest and posttest.

		Program I		Program II	
		Pretest	Posttest	Pretest	Posttest
Symptoms and signs					
Question 1	Incorrect	15 (78.9)	8 (42.1)	17 (89.5)	15 (68.4)
	Correct	4 (21.1)	11 (78.9)	2 (10.5)	4 (31.6)
Question 2	Incorrect	8 (42.1)	3 (15.8)	15 (78.9)	13 (68.4)
	Correct	11 (57.9)	16 (84.2)	4 (21.1)	6 (31.6)
Question 3	Incorrect	19 (100.0)	11 (57.9)	16 (84.2)	16 (84.2)
	Correct	0 (0)	8 (42.1)	3 (15.8)	3 (15.8)
Question 4	Incorrect	1 (5.3)	0 (0)	1 (5.3)	1 (5.3)
	Correct	18 (94.7)	19 (100.0)	18 (94.7)	18 (94.7)

Table 4.5   Numbers of the patients from program I group and program II group who chose the correct and incorrect answers in each question of symptoms and signs from pretest and posttest. (Cont.)

		Program I		Program II	
		Pretest	Posttest	Pretest	Posttest
Question 5	Incorrect	13 (68.4)	3 (47.4)	9 (18.5)	6 (31.6)
	Correct	6 (31.6)	16 (52.6)	10 (84.2)	13 (68.4)
Question 6	Incorrect	14 (73.7)	10 (52.6)	19 (100.0)	17 (89.5)
	Correct	5 (26.3)	9 (47.4)	0 (0)	2 (10.5)
Question 7	Incorrect	9 (47.4)	4 (21.1)	18 (94.7)	16 (84.2)
	Correct	10 (52.6)	15 (78.9)	1 (5.3)	3 (15.8)

Numbers of the patients, (%)

4.2.5. Diagnosis

Question 1 :Most popular diagnostic tool for osteoporosis is bone density investigation.

From pretest and posttest, most of them in both programs chose correct answers.

Question 2 : Osteoporosis can not be detected by x-ray investigation.

From pretest and posttest, most of them in both programs chose incorrect answers.

Table 4.6   Numbers of the patients from program I group and program II group who chose the correct and incorrect answers in each question of diagnosis from pretest and posttest.

		Program I		Program II	
		Pretest	Posttest	Pretest	Posttest
Diagnosis					
Question 1	Incorrect	2 (10.5)	1 (5.3)	3 (15.8)	0 (0)
	Correct	17 (89.5)	18 (94.7)	16 (84.2)	19 (100.0)
Question 2	Incorrect	19 (100.0)	15 (78.9)	16 (84.2)	17 (89.5)
	Correct	0 (0)	4 (21.1)	3 (15.8)	2 (10.5)

Numbers of the patients, (%)

4.2.6. Prevention and treatment

      Question 1 : Prevention of osteoporosis must be started early in young age to get a good result.

      From pretest, most of the patients in program I chose correct answers but most of them in program II chose incorrect answers. From posttest, most of them in both programs chose correct answers.

      Question 2 : Ginseng, Bird's nest can prevent osteoporosis.

      From pretest and posttest, most of them in both programs chose incorrect answers.

      Question 3 : If we have much bone mass the tendency to have osteoporosis is lesser than the others.

      From pretest, most of the patients in both programs chose incorrect answers but from posttest, most of them chose correct answers.

      Question 4 : Diet that has high level of calcium are milk, small fish, bean, green vegetable.

      From pretest and posttest, most of them in both programs chose correct answers.

      Question 5 : Everyday, Thai people eat enough diet that already has calcium.

      From pretest and posttest, most of them in both programs chose incorrect answers.

      Question 6 : Over eating of protein can produce calcium deficiency.

      From pretest and posttest, most of them in both programs chose incorrect answers.

      Question 7 : Salted food can produce calcium deficiency.

      From pretest and posttest, most of them in both programs chose incorrect answers.

      Question 8 : Getting regular light sunshine can increase calcium absorption.

      From pretest and posttest, most of them in both programs chose incorrect answers.

Question 9 :   Diet that has high level of vitamin D is milk.

From pretest, most of the patients in both programs chose incorrect answers. From posttest, most of them in program I chose correct answers but most of them in program II chose incorrect answers.

Question 10 :   Regular weight bearing exercise can prevent osteoporosis.

From pretest and posttest, most of them in both programs chose correct answers.

Question 11 : Exercise should be performed at least 30 minutes for 2 to 3 times a week.

From pretest, most of the patients in both programs chose incorrect answers but from posttest, most of them chose correct answers.

Question 12 :   Thai women work hard everyday , so it is not necessary to do any other exercises.

From pretest and posttest, most of them in both programs chose incorrect answers.

Question 13 :   Treatment of osteoporosis with the drugs must be under supervision and regular follow-up by the physician.

From pretest and posttest, most of them in both programs chose correct answers.

Table 4.7 Numbers of the patients from program I group and program II group who chose the correct and incorrect answers in each question of prevention and treatment from pretest and posttest.

		Program I		Program II	
		Pretest	Posttest	Pretest	Posttest
Prevention and treatment					
Question 1	Incorrect	8 (42.1)	4 (21.1)	14 (73.7)	8 (42.1)
	Correct	11 (57.9)	15 (78.9)	5 (26.3)	11 (57.9)
Question 2	Incorrect	19 (100.0)	11 (57.9)	16 (84.2)	17 (89.5)
	Correct	0 (0)	8 (42.1)	3 (15.8)	2 (10.5)

Table 4.7   Numbers of the patients from program I group and program II group who chose the correct and incorrect answers in each question of prevention and treatment from pretest and posttest. (Cont.)

		Program I		Program II	
		Pretest	Posttest	Pretest	Posttest
Question 3	Incorrect	10 (52.6)	6 (31.6)	14 (73.7)	7 (36.8)
	Correct	9 (47.4)	13 (68.4)	5 (26.3)	12 (63.2)
Question 4	Incorrect	4 (21.1)	1 (5.3)	0 (0)	1 (5.3)
	Correct	15 (78.9)	18 (94.7)	19 (100.0)	18 (94.7)
Question 5	Incorrect	17 (89.5)	11 (57.9)	16 (84.2)	18 (94.7)
	Correct	2 (10.5)	8 (42.1)	3 (15.8)	1 (5.3)
Question 6	Incorrect	19 (100)	16 (84.2)	19 (100.0)	19 (100.0)
	Correct	0 (0)	3 (15.8)	0 (0)	0 (0)
Question 7	Incorrect	19 (100.0)	16 (84.2)	19 (100.0)	19 (100.0)
	Correct	0 (0)	3 (15.8)	0 (0)	0 (0)
Question 8	Incorrect	19 (100.0)	15 (78.9)	18 (94.7)	16 (84.2)
	Correct	0 (0)	4 (21.1)	1(5.3)	3 (15.8)
Question 9	Incorrect	17 (89.5)	8 (42.1)	17(89.5)	11 (57.9)
	Correct	2 (10.5)	11 (57.9)	2 (10.5)	8 (42.1)
Question 10	Incorrect	8 (42.1)	2 (10.5)	8 (42.1)	0 (0)
	Correct	11 (57.9)	17 (89.5)	11 (957.9)	19 (100.0)
Question 11	Incorrect	18 (94.7)	8 (42.1)	18 (94.7)	5 (26.3)
	Correct	1 (5.3)	11 (57.9)	1(5.3)	14 (73.7)
Question 12	Incorrect	18 (94.7)	16 (84.2)	18(94.7)	18 (94.7)
	Correct	1 (5.3)	3 (15.8)	1 (5.3)	1 (5.3)
Question 13	Incorrect	3 (15.8)	2 (10.5)	2 (10.5)	1 (5.3)
	Correct	16 (84.2)	17 (89.5)	17 (89.5)	18 (94.7)

Numbers of the patients, (%)

We could summary the answer of each question from pretest and posttest of the patients from program I and program II that most of them had increased percentage of the number of the patients who chose correct answers or decreased percentage of the number of those who chose incorrect answers after having studied their program I or program II.

We also could summary the results from crosstabulation tables (in Appendix E) that some patients who previously chose false answers in pretest still chose false answers again in posttest but most of them changed to chose correct answers. Most of the patients who previously chose correct answers in pretest still chose correct answers in posttest but there were some patients that changed to chose incorrect answers in posttest.

4.3 TOTAL PRETEST AND POSTTEST SCORES OF PROGRAM I AND PROGRAM II

The total pretest scores done by the patients in both groups, program I and program II, were range 7-21 scores, the total posttest scores done by the patients in program I were range 14-37 scores and the total posttest scores done by the patients in program II were range 10-28 scores as shown in the table 4.8

Table 4.8   Total pretest and posttest scores from program I and program II

Total Score	Program I (cases)	Program II (cases)
Total pretest score		
≤ 9	7	5
10-19	10	13
≥ 20	2	1
Total 40	19	19
Range	7-21	7-21
Total posttest score		
≤ 19	4	12
20-29	6	7
≥ 30	9	0
Total 40	19	19
Range	14-37	10-28

4.4 COMPARISON BETWEEN PROGRAM I AND PROGRAM II

When compared the total pretest score of the patients in program I (Mean = 13.053, SD = 4.636) with the total pretest score of the patients in program II (Mean = 12.947, SD = 4.183), there was no statistical difference (p <0.001, 95%CI = 4.682,12.791).

Main outcome of this study was to compared the total posttest score done by the patients in program I (Mean = 27.105, SD = 7.370) with program II (Mean = 18.368, SD = 4.645), there was statistical difference (p =<0.001, 95%CI = 4.682, 12.791). The total posttest score from program I was higher than that from program II as shown in the table 4.9.

Table 4.9   Comparing of the total pretest score between program I and program II and comparing of the total posttest score between program I and program II

	Program I	Program II	P Value	95%CI
Total pretest score	13.053± 4.636	12.947±4.183	0.942	- 2.801,3.011
Total posttest score	27.105±7.370	18.368±4.645	<0.001	4.682,12.791

When comparing the mean of the total pretest score in each group of the questions between program I and program II, it showed that the mean of the total pretest score from the group of the questions about causes and risk factors had statistical difference between these two programs. The other mean of the total pretest scores from the other groups had no statistical difference between these two programs as shown in the table 4.10

Table 4.10   Comparing the total pretest score in each group of the questions between
program I and program II

Group of the questions	Total score	Program I	Program II	P value	95%CI
1. Definition	2	1.105±0.459	1.105±0.459	1.000	- 0.302,0.302
2. Incidence	4	1.368±1.116	0.790±0.787	0.073	- 0.057, 1.215
3. Causes and risk factors	12	3.263±1.593	4.474±1.954	0.043	- 2.384, -0.037
4. Symptoms and signs	7	2.842±1.573	2.000±0.943	0.053	- 0.011, 1.695
5. Diagnosis	2	0.895±0.315	1.000±0.577	0.490	- 0.411, 0.201
6.Prevention and treatment	13	3.579±1.465	3.579±1.644	1.000	- 1.025, 1.025

When comparing the mean of the total posttest score in each group of the questions between program I and program II, it showed that the mean of the total posttest score from the group of the questions about definition, incidence, causes and risk factors, symptoms and signs had statistical difference between these two programs. The other mean of the total posttest scores from the group of the questions about diagnosis, prevention and treatment had no statistical difference between these two programs as shown in the table 4.11

Table 4.11 Comparing the total posttest score in each group of the questions between
program I and program II

Group of the questions	Total score	Program I	Program II	P value	95%CI
1. Definition	2	1.947±0.229	1.526±0.612	0.008	0.117, 0.725
2. Incidence	4	3.263±1.098	1.316±0.885	<0.001	1.291, 2.604
3. Causes and risk factors	12	8.895±2.706	6.211±1.988	0.001	1.122, 4.247
4. Symptoms and signs	7	4.948±1.840	2.579±1.346	<0.001	1.307, 3.430
5. Diagnosis	2	1.158±0.501	1.105±0.315	0.701	-0.223, 0.328
6.Prevention and treatment	13	6.895±2.747	5.632±1.832	0.104	-0.273, 2.800

4.5 COMPARISON BETWEEN PRETEST AND POSTTEST OF PROGRAM I

When comparing the mean of the total pretest score with the mean of the total posttest score of the answers from the patients in program I, it showed that there had statistical difference between these scores as shown in the table 4.12.

Table 4.12   Total score from pretest and posttest of program I

Total score from program I	Mean	SD
Pretest	13.053	4.636
Posttest	27.105	7.370

P <0.001, 95%CI = -16.056, -12.049

When comparing the mean of the total pretest score in each group of the questions with the mean of the total posttest score in each group of the questions from the patients in program I, it showed that there had statistical difference between these scores in all groups of the questions as shown in the table 4.13.

Table 4.13   Comparing the total pretest score in each group of the questions with the total posttest score in each group of the questions from the patients in program I

Group of the questions	Total score	Total pretest score	Total posttest score	P value	95%CI
1. Definition	2	1.105±0.459	1.947±0.229	<0.001	- 1.084, -0.600
2. Incidence	4	1.368±1.116	3.263±1.098	<0.001	- 2.400, -1.389
3. Causes and risk factors	12	3.263±1.593	8.895±2.706	<0.001	- 6.625, -4.638
4. Symptoms and signs	7	2.842±1.573	4.947±1.840	<0.001	- 2.725, -1.485
5. Diagnosis	2	0.895±0.315	1.158±0.501	0.021	- 0.481, -0.045
6.Prevention and treatment	13	3.579±1.465	6.895±2.747	<0.001	- 4.508, -2.123

4.6 COMPARISON BETWEEN PRETEST AND POSTTEST OF PROGRAM II

When comparing the mean of the total pretest score with the mean of the total posttest score of the answers from the patients in program II, it showed that there had statistical difference between these scores as shown in the table 4.14.

Table 4.14   Total score from pretest and posttest of program II

Total score from program II	Mean	SD
Pretest	12.947	4.183
Posttest	18.368	4.645

P <0.001, 95%CI = -6.730, -4.112

When comparing the mean of the total pretest score in each group of the questions with the mean of the total posttest score in each group of the questions from the patients in program II, it showed that there had statistical difference between these scores in all groups of the questions except only in the group about diagnosis that had no statistical difference as shown in the table 4.15.

Table 4.15   Comparing the total pretest score in each group of the questions with the total posttest score in each group of the questions from the patients in program II

Group of the questions	Total score	Total pretest score	Total posttest score	P value	95%CI
1. Definition	2	1.105±0.459	1.526±0.612	0.002	-0.666, -0.177
2. Incidence	4	0.790±0.787	1.316±0.885	0.037	-1.018, -0.034
3. Causes and risk factors	12	4.474±1.954	6.211±1.988	<0.001	-2.356, -1.118
4. Symptoms and signs	7	2.000±0.943	2.578±1.346	0.004	-0.949, -0.208
5. Diagnosis	2	1.000±0.577	1.105±0.315	0.331	-0.326, 0.116
6.Prevention and treatment	13	3.579±1.644	5.632±1.832	<0.001	-2.664, -1.441

4.7 EFFICACY OF PROGRAM I AND PROGRAM II

When comparing between Program I and program II, there was no statistical difference in the mean of the total pretest scores but there was statistical difference in the mean of the total posttest scores and the mean of the total posttest scores of program I was higher than program II as shown in the table 4.9.

When considering about the numbers of the patients in program I (table 4.8) who could get moderate and high level of the total posttest scores (20-40 scores), there was 15 patients from total patients (19 patients). It was 78.95% of these whole patients but it was not more than 75% of these whole patients significantly (Nonparametric Binomial Test , p=0.465).

When considering about the numbers of the patients in program II (table 4.8) on who could get moderate and high level of the total posttest scores (20-40 scores), there was only 7 patients from total patients (19 patients). It was 36.84% of these whole patients and it was lower than 75% of these patients significantly (Nonparametric Binomial Test, p<0.001) but it was statistical different from program I (Z = 3 , P<0.05).

CHAPTER 5

DISCUSSION

The objective of this study was to compare the two modules of health education program, first was composed of lecture and self--study from handbook and leaflet, second was composed of only self-study from handbook and leaflet, in conducting the knowledge about osteoporosis and its prevention in gynecologic patients 40-50 years of age at gynecology clinic of Lerdsin Hospital.

The reason we studied these aged group was because they were in premenopausal period, all of them still have menstruation and in the nearest future they all will cease of menstruation to be postmenopausal women and be able to develop osteoporosis. Osteoporosis is a preventable condition and the knowledge of the patients is useful in the prevention and treatment of osteoporosis. Our sample population was different from the other studies, such as the study of Sedlak CA et al [27] which studied in young women and the studies of Gold DT et al[28] and Khemapech S [31] which studied in older patients. Our sample population was also different from the studies of Chow R et al[29] and Bravo G et al[30] which studied in osteoporotic and osteopenic women.

We could collect all 38 patients without any drop out cases because we could contact and recall them by telephone, individually. Sampling technique was done to enroll them and block randomization process was done to divide them into 2 groups to receive those 2 programs. In this study we used randomized controlled trial design which was the most potent design to compare 2 health education programs. This design was different from the other studies. Sedlak CA et al[27] used a classic experimental design with one treatment group and one control group to test the efficacy of the osteoporosis prevention program. Gold DT et al [28] studied in only a group of the patients who participated in a therapeutic program for osteoporosis and determined if program participation improved psychological outcomes. Their study and the study of Chow R et al[29] had no comparing group. The study of Khemapech S[31] was a quasi-experimental study which was less potent than randomized controlled trial design. Only Bravo G et al[30] used, a randomized controlled trial design, same design as our study.

We used pretest and posttest to measure the knowledge outcome of the patients in both groups and compared them. This was the same method as the other studies[27-31]. Our pretest was the same as the posttest and composed of 40 questions and total score was 40. The other study , for example , the study of Sedlak CA et al[27] also had pretest and posttest for testing osteoporosis knowledge but their test composed of 24 questions for a potential perfect knowledge score of 24.

Although our pretest was as same as posttest, we did not show the correct and incorrect answers to the patients after these test were done. So the patients could not know and remember the correct or incorrect answers of these tests and bias could not be occured.

When we considered the answer of each question from pretest and posttest of the patients from program I and program II, for example from question 1 about the definition of osteoporosis (Bone is a viable organ and it can transform every time) , we found that most of the patients in both programs chose incorrect answers (84.2% and 84.2% respectively) when they answered the pretest but when they answered the posttest , most of them chose correct answers (94.7% and 57.9% respectively). When we considered all of the answers of each questions from pretest and posttest of the patients from program I and program II we found that most of them had increased percentage of the number of the patients who chose correct answer or decreased percentage of the number of those who chose incorrect answer after having studied their program I or program II. When we considered these results again we could report the relation of the patients who chose correct or incorrect answers from pretest and posttest by using crosstabulation between pretest and posttest in program I and program II as shown in the Appendix E. For example from question I about the definition in program I group, there was 3 patients who chose correct answers in pretest and still chose correct answer in posttest and there was no patient who chose correct answer in pretest but chose incorrect answer in posttest. There was 15 patients who previously chose incorrect answers and changed to chose correct answers in posttest. There was 1 patient who chose incorrect answer in pretest and posttest. It means that most of the patients who chose correct answers in pretest still chose correct answers in posttest and the patients that increased after receiving this program came from the patients who chose incorrect answers in pretest. Second example was from

question 12 about the causes and risk factors of osteoporosis in program I group. There was 1 patient who chose correct answer in pretest and chose incorrect answer in posttest. This might be come from the problem of the program 1 itself or from the patient herself who misunderstood after receiving this program. Another example was from question 3 about the incidence of osteoporosis in program II group. There was also 1 patient who chose correct answer in pretest and chose incorrect answer in posttest. This also might be come from the problem of the program II itself or from misunderstanding by this patient after receiving her program II. When considered all of these results from all cross tabulation tables most of them showed the similar result as the first example, question 1 about the definition in program I group. Most of the patients who chose correct answers in pretest chose correct answers in posttest and the patients that increased after receiving this program came from the patients who chose incorrect answers in pretest. There was no report about these points from the other studies[27-30].

There were some questions that percentage of the patients from program II who chose correct answer decreased after receiving their program II, for example, question 7 about causes and risk factors and question 2 about diagnosis. These might be happened from the patient's confusion after receiving their program or from the problem of the handbook and leaflet itself. There were also some questions that percentage of the patients from program II who chose correct or incorrect answers did not change after receiving their program II, for example, question 5 about causes and risk factors, question 3 and 4 about symptoms and signs. These might be occurred from program II could not conduct more knowledge outcome about those topics in the patients. These were not occurred in program I. However when we considered the results from some questions such as question 5 and 7 about causes and risk factors, question 2, 5-8, 12 about prevention and treatment, we found that most of the patients chose incorrect answers both in program I and program II.

These might be occurred from these patients' confusion after receiving their program I or program II or from these program I and program II themselves. We necessary to revise these topics in lecture script or handbook and leaflet in order to increase the ability to conduct the knowledge in the future program. In program I we use one way communication for lecture, it might be changed to be two way communication that

the patients and the lecturer could ask and answer their problems in order to improve the ability of this program in conducting the knowledge of the patients in the future.

When we considered our first hypothesis , health education program composing of lecture, self-study from handbook and leaflet (Program I.) can conduct more knowledge outcome about osteoporosis and its prevention rather than that of composing only a self-study from handbook and leaflet (Program II.) in the group of gynecologic patients 40-50 years of age at gynecology clinic of Lerdsin Hospital , we had to considered the total scores from pretest and posttest of program I and program II. The total scores from pretest and posttest of program I were 13.053 ± 4.636 and 27.105 ± 7.370 and the total scores from pretest and posttest of program II were 12.947 ± 4.183 and 18.368 ± 4.645. The result from comparing between program I and program II showed that mean of the pretest scores had no statistical difference (P=0.942 , 95%CI=-2.801,3.011) but mean of the posttest scores had statistical difference (P<0.001 , 95%CI=4.682,12.791) and program I had higher total scores than program II. It means that program I was better than program II in conducting the knowledge about osteoporosis and its prevention. We could not compare with other studies in this topic because they studied only one program with or without comparing group. When compared in each group of the answers from the group of the questions, the mean of the posttest scores in each group were again statistically different between program I and program II except for the groups of diagnosis, prevention and treatment. It might mean that these two programs could have the same ability in conducting the knowledge in those topics.

When we considered our second and third hypothesis , health education program I and II can make gynecologic patients 40-50 years of age at gynecology clinic of Lerdsin Hospital have more knowledge outcome about osteoporosis and its prevention compared to before it was conducted , we had to considered the total scores from pretest and posttest of program I and program II again. The total posttest scores (27.105 ± 7.370 and 18.368 ± 4.645) were statistically different (P<0.001 , 95%CI=-16.056,-12.049 and P<0.001 , 95%CI=-6.730,-4.112) from their pretest scores (13.053 ± 4.636 and 12.947 ± 4.183) of program I and program II , respectively and total posttest scores were higher than total pretest scores in both program I and program II. It means that these two

programs could conduct the patients to increase the knowledge about osteoporosis and its prevention. When we considered the result of the answers from each group of the questions (definition, incidence, causes and risk factors, symptoms and signs, diagnosis, prevention and treatment), most of the mean of the scores from posttest were statistically different from their mean of the pretest scores, and posttest scores were higher than pretest scores in nearly all group of questions both in program I and program II. For example from our study the pretest score from definition group of program I was 1.105 ± 0.459 and the posttest score was $1.947+0.229$.There was statistically difference (P<0.001 , 95%CI=-1.084,-0.600). It means these two programs could conduct the knowledge about osteoporosis and its prevention in the study population to nearly all groups of the questions except for the scores from the groups of the answers of the questions about the diagnosis in pretest and posttest of the patients of program II that had no statistical difference. We might have to revise the description in this topic of the program in order to increase the ability to conduct the knowledge in the other population in the future. These results from our study were corresponded to the other studies. Our study also showed the positive results of health education program in increasing knowledge about osteoporosis and its prevention of the patients but they were more potent than the other studies because we used the most potent design than the others[27-31]. Sedlak CA et al[27] found the similar result as our study. They found that subjects in experimental group (who received an osteoporosis prevention program) had significantly higher knowledge and health belief scores after receiving the intervention than their pretest scores while subjects in the control group had no change in scores. The pretest and posttest scores of their experiment group who received their education program were 15.50 ± 3.03 and 20.83 ± 1.47. The pretest and posttest scores of their control group who did not receive their education program were 14.53 ± 3.31 and 15.77 ± 3.14.They only concluded that subjects in their experiment group displayed a score of over 5 points higher than the pretest and the control group had a score slightly over 1 point higher than the pretest and the intervention group had a significantly greater increase in knowledge than did the control group (F-ratio=15.08 , P<0.001). These results were rather correspond to our study about the positive result of health education program in increasing osteoporosis knowledge. Another study was the study of Gold DT et al[28] , they also reported an increased knowledge of osteoporosis in the study group significantly.

Our health education program were composed of lecture plus self-study from the handbook and leaflet (program I) and self-study from handbook and leaflet alone (program II), these were different from the programs of the other studies, such as the study of Chow R et al[29] which their program was exercise plus educational and social components and the study of Bravo G et al[30] which their program was exercise alone. However they also reported the positive results of these program as our study although there were different in the compositions of the programs from our program.

When we considered our last hypothesis , health education program I can conduct gynecologic patients 40-50 years of age at gynecology clinic of Lerdsin Hospital to have more moderate and high level of knowledge than 75% of these whole patients , we had to considered the efficacy of our 2 programs. We found that both of our health education programs could make these populations have more knowledge about osteoporosis and its prevention compared to the knowledge before these programs were conducted. Having studied the scores from program II, although it could also conduct the knowledge, this program could conduct only 36.84% of the population to get moderate and high level of the knowledge (total scores = 50-100%). If we studied the scores from program I, it could conduct 78.95% of the population to get moderate and high level of knowledge. Although it was higher than 75% of the population ,it was not enough to be significant (Nonparametric Binomial Test , P=0.465) but it was much higher (78.95% vs 36.84%) than and significant different from the program II (Z = 3, p <0.05). There was no result about this point reported in the other studies[27-31].

CHAPTER 6

CONCLUSION AND RECOMMENDATION

Both health education program I (lecture plus self-study from handbook and leaflet) and health education program II (self-study from handbook and leaflet) are effective health education programs that could conduct the knowledge about osteoporosis and its prevention.

Health education program I is more effective than health education program II. Most of the study population in this program got moderate and high level of knowledge. However, the knowledge from this study was only in the level of recall, it might be necessary to develop a new program and new study in the future that will conduct the study population to get the highest level of knowledge, that is; to be capable in classifying the information as the hypothesis and in solving the problem by themselves(evaluation level).

There were some topics that these two programs could not conduct the knowledge about ostoporosis and its prevention in the patients receiving their programs. We necessary to revise the lecture script , handbook , leaflet and lecture - style in order to increase the ability to conduct these knowledge in the future program.

An educational program could have a positive impact on patients coping and educational efforts might be an important component in the management of chronic disease[28]. The knowledge was significantly correlated to health promotion behavior , so that health education program could improve health promotion behaviors[31]. In order to prevent osteoporosis and improve health promotion of the population, we have to develop a program that could conduct the knowledge and change the attitude and practice of the population too. Further study about the new strategy to conduct the knowledge and study in a larger population are recommended to acquire the best module that can be implemented in general Thai population in the future.

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APPENDICES

APPENDIX A

QUESTIONNAIRE

Knowledge about osteoporosis in gynecologic patients 40-50 years of age from gynecology clinic of Lerdsin Hospital.

EXPLANATION

This questionnaire is a part of research project of Dr. Prayook Puavilai. The results of this study will be used to improve knowledge about osteoporosis and its prevention. Please answer this questionnaire faithfully for others to benefit. Your information will be kept confidential and will be expressed as an overview after analysis of the total study sample.

Thank you for your kind co-operation.

(Prayook Puavilai, M.D.)

Principal investigator

Number of record ☐☐ 1,2

DATA COLLECTION FORM

Program…….. ☐ 3

Title : A randomized controlled trial of health education program in increasing knowledge of

o   s   t   e   o   p   o   r   s   i   s

Date of collection …………………….. Month …………………….. Year ……………….

Name ……………………………………… Hospital Number……………………………..

Address …………………………………………………………………………………………

Telephone Number ……………………………………………………………………………

Part 1 General information

Explanation: Please write the symbol ✔ in the blank space in front of the answer or fill the answer in the blank space

1. Age ……………. Year (If more than 6 months, please   ☐☐ 4,5

        estimate as 1 year)

2. Marital status   ☐ 6

    ( ) Single   ( ) Married   ( ) Widow/Divorced/Separated

3. Education   ☐ 7

    ( ) Illiterate

    ( ) Primary school (Prathomsuksa level 1-4)

    ( ) Secondary school (Prathomsuksa level 5-7)

    ( ) Primary level of high school (Matayomsuksa level 1-3)

    ( ) Others (Specify…………………………………….)

4. Main Occupation   ☐ 8

    ( ) Housewife   ( ) Labour   ( ) Trade

    ( ) Agriculture   ( ) Company   ( ) Industry

    ( ) Government / Government Enterprise

    ( ) Others (Specify………………………….)

5. Income of the family per month   ☐☐☐☐☐ 9-13

    Please specify………………………….Bahts

6. Did you have any underlying diseases in the past   ☐ 14

    (Disease as diagnosed by the doctor)?

    ( ) No

    ( ) Yes , please specify

     A. Disease………………..…. Name of Hospital / Clinic………………..

        Treatment ( ) Medication   ( ) Surgery

                    ( ) Others (Specify ……………………….…)

        Result   ( ) Not recovered ( ) Still having treatment   ( ) Recovered

     B. Disease…………………. Name of Hospital / Clinic ……………

        Treatment ( ) Medication   ( ) Surgery

                    ( ) Others (Specify …………………………)

        Result   ( ) Not recovered ( ) Still having treatment   ( ) Recovered

     C. Disease …………………. Name of Hospital / Clinic ………………..

        Treatment ( ) Medication   ( ) Surgery

                    ( ) Others (Specify …………………………)

        Result   ( ) Not recovered ( ) Still having treatment   ( ) Recovered

7. Have you ever been sick during the last 6 months?   ☐15

    ( ) No

    ( ) Yes , please specify

     A. Disease ……………………. Name of Hospital / Clinic ………….

        Treatment ( ) Medication   ( ) Admitted in the Hospital ( ) Surgery

        Result   ( ) Not recovered ( ) Still having treatment   ( ) Recovered

     B. Disease ……………………. Name of Hospital / Clinic ………….

        Treatment ( ) Medication   ( ) Admitted in the Hospital ( ) Surgery

        Result   ( ) Not recovered ( ) Still having treatment   ( ) Recovered

     C. Disease ……………………. Name of Hospital / Clinic ………….

        Treatment ( ) Medication   ( ) Admitted in the Hospital ( ) Surgery

        Result   ( ) Not recovered ( ) Still having treatment   ( ) Recovered

8. How old were you when you had the first   ☐☐16,17

    menstruation (menarche)?

    Specify…………… Years old (If more than 6 months, please estimate as 1 year)

9.   When was your last menstruation?   ☐☐☐☐☐☐ 18-23

From ………………….. (Date / Month / Year) To…………… (Date / Month / Year)

10. How many times have you been pregnant?   ☐ 24

Specify …………………… Times

11. How many times did you give birth to alive baby?   ☐ 25

Specify …………………… Times

12. Have you ever known about osteoporosis before?   ☐ 26

( ) No (Please **pass** the question no.**13, 14, 15, 16**)

( ) Yes

13. From question number12.If **yes**, from whom did you get this knowledge?☐☐☐☐ 27-31

(You can choose more than 1 answer)

( ) Medical doctor

( ) Nurse

( ) Father/Mother/Relatives/Brother/Sister

( ) Friend

( ) Other please specify ………………………

14. From question number 12.If **yes**, from what media did you get this knowledge?

(You can choose more than 1 answer) ?   ☐☐☐☐ 32-36

  ( ) Radio   ( ) Television

  ( ) Newspaper   ( ) Document/leaflet

  ( ) Other please specify…………………..

15. From question number 12. If **yes**, whom do you prefer to get   ☐☐☐ 37-39

the knowledge from?   (Please specify level)

          1 = Mostly preferred   2= Preferredly   3= Least preferred)

  ( ) Medical Doctor

  ( ) Nurse

  ( ) Father/Mother/Relatives/Brother/Sister

  ( ) Other………………………………….

16. From question number 12, If **yes**, from what media do you like to   □□□ 40-42

get the knowledge? (Please specify level)

1 = Mostly preferred   2= Preferredly   3= Least preferred)

( ) Radio   ( ) Television

( ) Newspaper   ( ) Document / Leaflet

( ) Other please specify…………………….

Part 2 Test for the knowledge about osteoporosis

Explanation: Choose the best answer and write the symbol ✔ in the blank space.

1. DEFINITION

	Information	True	False	Unknown	
1	Bone is a viable organ and it can transform every time.				□ 43
2	Osteoporosis is a chronic disease caused by loss of bone mass. The bone density is decreased until collapsing and fracture of the bone happens.				□ 44

2. INCIDENCE

	Information	True	False	Unknown	
1.	In general, thinness of the bone starts slowly at the age of 40 years.				□ 45
2.	Thai women have the rate of osteoporosis about 20% at 55 years of age and increase to be 60% at 65 years of age.				□ 46
3.	Osteoporosis can happen only in women.				□ 47
4.	The level of thinness of bone in women is faster than in men at the same age.				□ 48

3. CAUSES AND RISK FACTORS

	Information	True	False	Unknown	
1.	The major cause of osteoporosis is a decrease of the level of female sex hormone.				☐ 49
2.	Decrease of the level of female sex hormone causes increasing bone resorption.				☐ 50
3.	Calcium deficiency causes malfunction of natural growth and development of bone.				☐ 51
4.	Postmenopausal women has higher tendency to have osteoporosis than adolescent. Information				☐ 52
5.	Obese women has higher tendency to be osteoporosis than slimmer ones.				☐ 53
6.	The patients with thyrotoxicosis, diabetes mellitus, renal failure have tendency to be osteoporosis.				☐ 54
7.	Caucasian and Asian have lower tendency to be osteoporosis than African.				☐ 55
8.	If the mother was osteoporotic patient the daughter has high tendency to be osteoporosis too.				☐ 56
9.	Alcohol consumption increases the risk for osteoporosis				☐ 57
10	Cigarette smoking increases the risk for osteoporosis.				☐ 58
11	Coffee and tea intake increase the risk for osteoporosis.				☐ 59
12	Using some drugs for a long time may produce osteoporosis such as thyroid hormone, steroid.				☐ 60

4.   SYMPTOMS AND SIGNS

	Information	True	False	Unknown	
1.	In early stage of osteoporosis, it may have no specific symptom and sign.				☐ 61
2.	In the long term of osteoporosis, it can cause bone pain and decrease bone density.				☐ 62
3.	In elderly, if someone have back pain it may have fracture of vertebra already.				☐ 63
4.	In postmenopausal women, if they fell down, the bone may fracture easier than in teenagers.				☐ 64
5.	Common sites of fracture in osteoporosis are vertebral column, hip, wrist.				☐ 65
6.	Osteoporosis make vertebral column bending. It causes poor personality and produces psychophysical problem.				☐ 66
7.	Osteoporosis easily fractures the bone and requires a long time to recover. It causes complications that influenced body, mind and economy.				☐ 67

5.   DIAGNOSIS

	Information	True	False	Unknown	
1.	Most popular diagnostic tool of osteoporosis is bone density investigation.				☐ 68
2.	Osteoporosis can not be detected by x-ray investigation.				☐ 69

6. PREVENTION AND TREATMENT

	Information	True	False	Unknown	
1.	Prevention of osteoporosis must be started early in young age to get a good result.				☐ 70
2.	Ginseng, Bird's nest can prevent osteoporosis. Information				☐ 71
3.	If we have much bone mass the tendency have osteoporosis is lesser than the others.				☐ 72
4.	Diet that has high level of calcium are milk, small fish, bean, green vegetable.				☐ 73
5.	Everyday, Thai people eat enough diet that already has calcium.				☐ 74
6.	Over eating of protein can produce calcium deficiency.				☐ 75
7.	Salted food can produce calcium deficiency.				☐ 76
8.	Getting regular light sunshine can increase calcium absorption.				☐ 77
9.	Diet that has high level of vitamin D is milk.				☐ 78
10	Regular weight bearing exercise can prevent osteoporosis.				☐ 79
11	Exercise should be performed at least 30 minutes for 2 to 3 times a week.				☐ 80
12	Thai women work hard everyday yet, so it is not necessary to do any other exercises.				☐ 81
13	Treatment of osteoporosis with the drugs must be under supervision and regular follow-up by the physician.				☐ 82

<div align="right">แบบบันทึกเลขที่ ☐ ☐ 1,2</div>

แบบบันทึกข้อมูลการวิจัย

<div align="right">โปรแกรม.........☐3</div>

เรื่อง   **การศึกษาเกี่ยวกับโปรแกรมสุขศึกษาในการเพิ่มความรู้เรื่องโรคกระดูก พรุนด้วยการวิจัยแบบสุ่มโดยใช้กลุ่มควบคุม**

วันที่เก็บข้อมูล..............เดือน.........................พ.ศ.25........

ชื่อ..เลขที่ผู้ป่วยนอก...........................

ที่อยู่...

โทร...........................

ส่วนที่ 1   แบบบันทึกข้อมูลส่วนบุคคล

คำชี้แจง   ให้ใส่เครื่องหมาย / ลงในช่องว่างที่ท่านคิดว่าเป็นคำตอบหรือเติมข้อความลง

ในช่องว่าง ถ้ามี   ☐ ☐ 4,5

1. อายุ.............ปี (เกิน 6 เดือนนับเป็น 1 ปี)

2. สถานภาพสมรส   ☐6

( )โสด   ( ) คู่   ( ) หม้าย / หย่า / แยก

3. จบการศึกษาระดับ   ☐7

( ) ไม่ได้เรียน   ( ) ประถมศึกษาปีที่ 1-4   ( ) ประถมศึกษาปีที่ 5-7

( ) มัธยมศึกษาปีที่ 1-3   ( ) อื่น ๆ ระบุ.................................

4. อาชีพหลักในปัจจุบันของท่าน   ☐8

( ) แม่บ้านในบ้านตนเอง   ( ) รับจ้างใช้แรงงาน

( ) ค้าขาย   ( ) เกษตรกรรม

( ) บริษัท   ( ) โรงงานอุตสาหกรรม

( ) รับราชการ/รัฐวิสาหกิจ   ( ) อื่น ๆ ระบุ...............................

5. รายได้ของครอบครัวท่านเฉลี่ยเดือนละ   ☐ ☐ ☐ ☐ ☐ 9-13

โปรดระบุ............................บาท

6. ท่านเคยมีโรคประจำตัว (วินิจฉัยโดยแพทย์) หรือไม่ ☐ 14

          ( ) ไม่มี   ( ) มี โปรดระบุ.............................

ก. โรค.. ....สถานที่รักษา...................................

    การรักษา ( ) ได้ยา   ( ) ผ่าตัด   ( ) อื่น ๆ ระบุ.............................

    ผลการรักษา ( ) ไม่หาย   ( ) กำลังรักษา   ( ) หาย

ข. โรค.. ....สถานที่รักษา...................................

    การรักษา ( ) ได้ยา   ( ) ผ่าตัด   ( ) อื่น ๆ ระบุ.........................

    ผลการรักษา ( ) ไม่หาย   ( ) กำลังรักษา   ( ) หาย

ค. โรค.. ....สถานที่รักษา...................................

    การรักษา ( ) ได้ยา   ( ) ผ่าตัด   ( ) อื่น ๆ ระบุ.........................

    ผลการรักษา ( ) ไม่หาย   ( ) กำลังรักษา ( ) หาย

7. ในระยะ 6 เดือน ที่ผ่านมาท่านเจ็บป่วยหรือไม่ ☐ 15

          ( ) ไม่เคยเจ็บป่วย

          ( ) เคยเจ็บป่วย โปรดระบุ...

ก. โรค.. ....สถานที่รักษา...................................

    การรักษา ( ) ได้ยา   ( ) นอนโรงพยาบาล   ( ) ผ่าตัด

    ผลการรักษา ( ) ไม่หาย   ( ) กำลังรักษ   ( ) หาย

ข. โรค.. ....สถานที่รักษา...................................

    การรักษา ( ) ได้ยา   ( ) นอนโรงพยาบาล   ( ) ผ่าตัด

    ผลการรักษา ( ) ไม่หาย   ( ) กำลังรักษา   ( ) หาย

ค. โรค.. ....สถานที่รักษา...................................

    การรักษา ( ) ได้ยา   ( ) นอนโรงพยาบาล   ( ) ผ่าตัด

    ผลการรักษา ( ) ไม่หาย   ( ) กำลังรักษา   ( ) หาย

8. ท่านเริ่มมีประจำเดือนครั้งแรกเมื่ออายุเท่าไร ☐☐ 16,17

        ระบุ.................ปี (เกิน 6 เดือน นับเป็น 1 ปี)

9. ท่านมีประจำเดือนครั้งสุดท้ายเมื่อใด ☐☐☐☐☐ 18-23

      ระบุตั้งแต่......................(วันเดือนปี) ถึง...........................(วันเดือนปี)

10. ท่านเคยตั้งครรภ์ทั้งหมดกี่ครั้ง ระบุ.................. ครั้ง ☐ 24

11. ท่านเคยคลอดบุตรที่มีชีวิตกี่ครั้ง ระบุ................... ครั้ง ☐ 25

12. ท่านเคยได้รับความรู้เรื่องโรคกระดูกพรุนหรือไม่ ☐ 26

    ( ) ไม่เคย   (ถ้าไม่เคยกรุณาข้ามข้อ 13,14,15,16 ไปตอบในส่วนที่ 2)

    ( ) เคย

13. จากข้อ 12 ถ้าเคย ท่านได้รับความรู้จากบุคคลใด ☐☐☐☐☐ 27-31

    (ตอบได้มากกว่า 1 คำตอบ)

    ( ) แพทย์   ( ) พยาบาล

    ( ) บิดา/มารดา/ญาติ/พี่น้อง ( ) เพื่อน

    ( ) อื่น ๆ ระบุ ………………………………………………

14. จากข้อ 12 ถ้าเคย ท่านได้รับความรู้ผ่านทางสื่อใด ☐☐☐☐☐ 32-36

    (ตอบได้มากกว่า 1 คำตอบ)

    ( ) วิทยุ   ( ) โทรทัศน์

    ( ) หนังสือพิมพ์   ( ) เอกสาร/แผ่นพับ

    ( ) อื่น ๆ ระบุ ………………………………………………

15. จากข้อ 12 ถ้าเคย ท่านชอบรับความรู้จากบุคคลใด ☐☐☐ 37-39

    (ระบุอันดับที่ชอบ ดังนี้ 1= ชอบที่สุด, 2 = ชอบอันดับที่ 2, 3 =ชอบน้อยที่สุด)

    ( ) แพทย์   ( ) พยาบาล

    ( ) บิดา/มารดา/ญาติ/พี่น้อง ( ) เพื่อน

    ( ) อื่น ๆ ระบุ ………………………………………………

16. จากข้อ 12 ถ้าเคย ท่านชอบรับความรู้ผ่านทางสื่อใด ☐☐☐ 40-42

    (ระบุอันดับที่ชอบ ดังนี้ 1= ชอบที่สุด, 2 = ชอบอันดับที่ 2, 3 =ชอบน้อยที่สุด)

    ( ) วิทยุ   ( ) โทรทัศน์

    ( ) หนังสือพิมพ์   ( ) เอกสาร/แผ่นพับ

    ( ) อื่น ๆ ระบุ ………………………………………………

ส่วนที่ 2   **แบบทดสอบความรู้เกี่ยวกับโรคกระดูกพรุน**

คำชี้แจง   ให้ใส่เครื่องหมาย / ลงในช่องที่ท่านคิดว่าถูกต้องมากที่สุด

1. ความหมาย

	ข้อความ	ถูก	ผิด	ไม่ทราบ	
1.	กระดูกเป็นอวัยวะที่มีชีวิตและมีการเปลี่ยนแปลงอยู่ตลอดเวลา				☐ 43
2.	โรคกระดูกพรุนเป็นโรคเรื้อรังที่เกิดจากภาวะที่มีการสูญเสียเนื้อกระดูก ทำให้ความหนาแน่นของเนื้อกระดูกลดลงทำให้กระดูกบาง เสี่ยงต่อการทรุดตัวและการหักของกระดูก				☐ 44

2. อุบัติการณ์

	ข้อความ	ถูก	ผิด	ไม่ทราบ	
1.	โดยทั่วไปกระดูกจะเริ่มบางลงช้า ๆ ตั้งแต่อายุ 40 ปี เป็นต้นไป				☐ 45
2.	หญิงไทยมีอัตราการเกิดโรคกระดูกพรุนสูงถึงร้อยละ 20 ในวัย 55 ปี และมากขึ้นเป็นร้อยละ 60 ในวัย 65 ปี				☐ 46
3.	โรคกระดูกพรุนเกิดขึ้นได้เฉพาะในเพศหญิง				☐ 47
4.	กระดูกของสตรีบางเร็วกว่ากระดูกของบุรุษในวัยเดียวกัน				☐ 48

3. สาเหตุและปัจจัยเสี่ยง

	ข้อความ	ถูก	ผิด	ไม่ทราบ	
1.	โรคกระดูกพรุนเกิดจากสาเหตุสำคัญคือระดับของฮอร์โมนเพศหญิงในร่างกายลดน้อยลง				☐ 49
2.	การลดลงของฮอร์โมนเพศหญิงในร่างกายทำให้มีการสลายแคลเซียมในกระดูกไปใช้มากกว่าปกติ				☐ 50
3.	การขาดแคลเซียมทำให้กระดูกไม่เจริญเติบโตและไม่พัฒนาตามธรรมชาติ				☐ 51
4.	สตรีวัยหมดประจำเดือนมีโอกาสเป็นโรคกระดูกพรุนมากกว่าวัยสาว				☐ 52
5.	คนรูปร่างอ้วนมีโอกาสเป็นโรคกระดูกพรุนได้ง่ายกว่าคนรูปร่างผอม				☐ 53
6.	ผู้ป่วยโรคคอพอกเป็นพิษ โรคเบาหวาน โรคไตวายเรื้อรัง มีโอกาสเป็นโรคกระดูกพรุนได้ง่าย				☐ 54
7.	ฝรั่งผิวขาวกับคนเอเชียผิวเหลืองมีโอกาสเป็นโรคกระดูกพรุนน้อยกว่าคนแอฟริกันผิวดำ				☐ 55
8.	ถ้ามารดาเป็นโรคกระดูกพรุนลูกสาวมีโอกาสเป็นโรคกระดูกพรุนได้ง่าย				☐ 56
9.	การดื่มสุราทำให้มีโอกาสเป็นโรคกระดูกพรุนได้ง่าย				☐ 57
10.	การสูบบุหรี่ทำให้มีโอกาสเป็นโรคกระดูกพรุนได้ง่าย				☐ 58
11.	การดื่มชา กาแฟ ทำให้มีโอกาสเป็นโรคกระดูกพรุนได้ง่าย				☐ 59
12.	การได้รับยาบางชนิดติดต่อกันเป็นเวลานาน อาจมีผลให้เกิดโรคกระดูกพรุนได้ เช่น ธัยรอยด์ฮอร์โมน, สเตียรอยด์				☐ 60

4. การและอาการแสดง

	ข้อความ	ถูก	ผิด	ไม่ทราบ	
1.	กระดูกพรุนในระยะแรก ๆ จะไม่มีอาการและอาการแสดงที่มีลักษณะเฉพาะโรค				☐ 61
2.	กระดูกพรุนในระยะยาวจะมีอาการปวดกระดูกและตรวจพบว่ากระดูกมีความหนาแน่นต่ำลง				☐ 62
3.	สตรีวัยสูงอายุหากมีอาการปวดหลัง กระดูกสันหลังอาจจะหักไปแล้ว เนื่องจากเป็นโรคกระดูกพรุน				☐ 63
4.	สตรีวัยหมดประจำเดือนหากหกล้มกระดูกจะหักง่ายกว่าวัยหนุ่มสาว				☐ 64
5.	ตำแหน่งของกระดูกหักที่พบบ่อยในผู้ป่วยกระดูกพรุน คือ กระดูกสันหลัง กระดูกสะโพกและกระดูกข้อมือ				☐ 65
6.	กระดูกพรุนทำให้เกิดกระดูกสันหลังโก่งงอ ทำให้เสียบุคลิกภาพและก่อให้เกิดปัญหาทางด้านสุขภาพของร่างกายและจิตใจของบุคคลนั้น				☐ 66
7.	กระดูกพรุนทำให้กระดูกหักง่ายกว่าปกติและใช้เวลานานในการติด ทำให้เกิดปัญหาแทรกซ้อนทางร่างกาย ซึ่งมีผลกระทบต่อจิตใจและเศรษฐกิจตามมา				☐ 67

5. การวินิจฉัย

	ข้อความ	ถูก	ผิด	ไม่ทราบ	
1.	การวินิจฉัยโรคกระดูกพรุนที่นิยมมากที่สุด คือการตรวจหาความหนาแน่นของกระดูก				☐ 68
2.	โรคกระดูกพรุนไม่สามารถตรวจได้โดยวิธีการตรวจทางรังสี				☐ 69

6. การป้องกันและการรักษา

	ข้อความ	ถูก	ผิด	ไม่ทราบ	
1.	การป้องกันโรคกระดูกพรุนควรเริ่มตั้งแต่อายุน้อย ๆ จึงจะได้ผลดี				☐ 70
2.	การรับประทานอาหารเสริม เช่น โสม รังนก ช่วยป้องกันโรคกระดูกพรุนได้				☐ 71
3.	หากเราเป็นผู้ที่มีเนื้อกระดูกมากตั้งแต่แรก ก็จะมีโอกาสเกิดโรคกระดูกพรุนได้น้อยกว่าผู้ที่มีเนื้อกระดูกน้อย				☐ 72
4.	อาหารที่มีแคลเซี่ยมสูงได้แก่ น้ำนม ปลาเล็กปลาน้อย ถั่วและผักใบเขียว				☐ 73
5.	โดยปกติทุก ๆ วัน คนไทยรับประทานอาหารที่มีแคลเซี่ยมในปริมาณที่เพียงพออยู่แล้ว				☐ 74
6.	การรับประทานอาหารประเภทเนื้อสัตว์มากเกินไปทำให้ร่างกายขาดแคลเซี่ยมได้				☐ 75
7.	การรับประทานอาหารเค็มจัด ทำให้ร่างกายขาดแคลเซี่ยมได้				☐ 76
8.	การได้รับแสงแดดอ่อน ๆ เป็นประจำช่วยให้ร่างกายดูดซึมแคลเซียมจากอาหารได้มากขึ้น				☐ 77
9.	อาหารที่มีวิตามินดีปริมาณสูง คือน้ำนม				☐ 78
10.	การออกกำลังกายที่มีการลงน้ำหนักพอสมควรอย่างสม่ำเสมอช่วยป้องกันโรคกระดูกพรุนได้				☐ 79
11.	การออกกำลังกายควรทำเป็นประจำอย่างน้อยสัปดาห์ละ 2-3 ครั้ง ครั้งละประมาณ 30 นาที				☐ 80
12.	สตรีไทยออกแรงทำงานทุกวันอยู่แล้วไม่จำเป็นต้องออกกำลังกายประเภทอื่นอีก				☐ 81
13.	การใช้ยารักษาโรคกระดูกพรุนทุกชนิดต้องอาศัยดุลยพินิจและการดูแลของแพทย์เสมอ				☐ 82

APPENDIX B

Modules of the lecture about osteoporosis plus self-study from handbook and leaflet (Program I.) and self-study from handbook and leaflet alone (Program II.)

The subjects undergone sampling and allocated by randomization process into two groups. They attended the hospital on the separate special appointment days to prevent contamination There were 2 health education programs.

Program I.   Use lecture by the researcher and nurse plus self-study of the handbook and leaflet by the subjects.

Program II.   Use only self-study of the handbook and leaflet by the subjects.

The session covers knowledge about general overview of osteoporosis such as definition, incidence, causes, symptoms and signs, severity, morbidity, risk factors, diagnosis, prevention, treatment and prognosis. The details of program I. and program II. were shown as follows

	Program I.	Program II.
1. Time		
1.1 Lecture (minutes)	60	-
1.2 Self-study from handbook and leaflet (week)	1	1
2. Objective : Able to tell or explain		
2.2 General knowledge of osteoporosis	✔	✔
2.3 Prevention of osteoporosis	✔	✔
3 Contents		
3.2 General knowledge of osteoporosis	✔	✔
3.2.1 Definition	✔	✔
3.2.2 Incidence	✔	✔
3.2.3 Causes and risk factors	✔	✔
3.2.4 Symptoms and signs	✔	✔
3.2.5 Diagnosis	✔	✔
3.2.6 Prevention	✔	✔
3.2.7 Treatment	✔	✔

	Program I.	Program II.
3.3 Prevention of osteoporosis		
3.3.1 Diet	✔	✔
3.3.1.1 Five groups of diet	✔	✔
3.3.1.2 Calcium		
- Source	✔	✔
- Benefit	✔	✔
- Daily requirement	✔	✔
3.3.1.3 Vitamin D		
- Source	✔	✔
- Benefit	✔	✔
- Requirement	✔	✔
3.3.2 Exercise		
3.3.2.1 Benefit	✔	✔
3.3.2.2 Type	✔	✔
3.3.2.3 Requirement	✔	✔
3.3.3 Risk factors to be avoided		
4 Methods		
4.1 Pretest questionnaire	✔	✔
4.2 Teaching media	Lecture, Handbook Leaflet	Handbook Leaflet
4.3 Educator	Researcher (Doctor), Nurse, Self-study	Self-study
4.4 Posttest questionnaire	✔	✔
5. Evaluation Scores from pretest and posttest questionnaire were analyzed by using statistical methods.	✔	✔

APPENDIX C

ข้อมูลที่ผู้ป่วยควรทราบ (Patients Information Sheet)

ชื่อโครงการวิจัย   การศึกษาเกี่ยวกับโปรแกรมสุขศึกษาในการเพิ่มความรู้เรื่องโรคกระดูก
พรุนด้วยการวิจัยแบบสุ่มโดยใช้กลุ่มควบคุม

สถานที่ทำการวิจัย   กลุ่มงานสูติ-นรีเวชกรรม   โรงพยาบาลเลิดสิน   กรมการแพทย์
กระทรวงสาธารณสุข

ผู้ทำการวิจัย   นายแพทย์ประยุกต์ พัววิไล

อาจารย์ที่ปรึกษา   รองศาตราจารย์นายแพทย์สมภพ ลิ้มพงศานุรักษ์

ข้อมูลทั่วไป   โรคกระดูกพรุนเป็นสาเหตุสำคัญประการหนึ่งของการเจ็บป่วยและการเสียชีวิตในผู้
สูงอายุ พบบ่อยในสตรีสูงอายุ โดยเฉพาะวัยหมดประจำเดือน โรคกระดูกพรุนมีลักษณะเฉพาะ คือ
ปริมาณเนื้อกระดูกสูงสุดมีไม่มากพอร่วมกับมีการสูญเสียของเนื้อกระดูก   เป็นผลให้เกิดกระดูกโปร่ง
บางลง เพิ่มความเสี่ยงต่อการหักของกระดูกเนื่องจากการหกล้มหรือได้รับอุบัติเหตุ ก่อให้เกิดปัญหา
ต่อสุขภาพ คุณภาพชีวิตและสูญเสียทางด้านเศรษฐกิจ

อย่างไรก็ดี   โรคกระดูกพรุนสามารถจะป้องกันได้โดยการให้ความรู้ทั้งแก่ประชาชน
เพื่อให้มีการปฏิบัติตัวที่ถูกต้องเพื่อให้มีปริมาณเนื้อกระดูกสูงสุดและลดการสูญเสียของเนื้อกระดูกลง
กับการให้ความรู้แก่เจ้าหน้าที่ทุกระดับ   ให้เห็นความสำคัญในด้านการหาผู้ที่มีความเสี่ยงต่อการเกิด
โรคกระดูกพรุน

นอกจากนี้การให้ความรู้แก่ประชาชนยังมีประโยชน์ต่อการส่งเสริมสุขภาพ   การ
รักษาและการฟื้นฟูสุขภาพจากโรคกระดูกพรุนด้วย

ข้อมูลของโครงการวิจัย   การศึกษานี้เป็นการศึกษาวิจัยเปรียบเทียบโปรแกรมสุขศึกษา 2
โปรแกรม ซึ่งใช้สอนประชาชนเพื่อเพิ่มความรู้เรื่องโรคกระดูกพรุนและการป้องกันโรค โดยโปรแกรมที่
1 ประกอบด้วยการบรรยายร่วมกับการศึกษาด้วยตนเองจากคู่มือและแผ่นพับ ส่วนโปรแกรมที่ 2
ประกอบด้วยการศึกษาด้วยตนเองจากคู่มือและแผ่นพับเท่านั้น โดยมีขั้นตอน ดังนี้

1. สตรีอายุ 40-50 ปี ที่มารับบริการที่คลินิกนรีเวช ซึ่งสามารถอ่านเขียน พูดภาษา
ไทยได้, มีการศึกษาไม่เกินมัธยมศึกษาปีที่ 3 (หรือเทียบเท่า) , ยังมีประจำเดือนแต่ต้องไม่เคยได้รับ
การวินิจฉัยจากแพทย์ว่าเป็นโรคกระดูกพรุน,ไม่เคยได้รับการรักษาด้วยฮอร์โมนเพศหญิงเนื่องจากขาด
ฮอร์โมนเพศหญิงและไม่เคยเข้ารับความรู้จากโปรแกรมสุขศึกษาคล้ายคลึงกันมาก่อน โดยสตรีเหล่านี้
มีความสนใจ แจ้งความจำนง   อาสาและเซ็นชื่อยินยอมเข้ารับการศึกษาวิจัยแล้ว

2. สตรีดังกล่าวจะถูกแบ่งเป็น 2 กลุ่ม เพื่อรับโปรแกรมสุขศึกษาแต่ละโปรแกรม

3. ก่อนได้รับโปรแกรมสุขศึกษา ทั้ง 2 โปรแกรม สตรีแต่ละกลุ่มต้องตอบแบบบันทึก
และแบบทดสอบโดย 7 วันหลังจากนั้นจะกลับมาตอบแบบทดสอบอีกครั้งหนึ่งตามกำหนด

ประโยชน์ของการทำวิจัย   ความรู้เรื่องโรคกระดูกพรุนที่ท่านได้รับจะเป็นประโยชน์ต่อท่านทั้งใน
ด้านการป้องกัน การรักษา การส่งเสริมและฟื้นฟูสุขภาพของท่านจากโรคกระดูกพรุนต่อไป

ความไม่สะดวกที่อาจเกิดจากการวิจัย

1. หากท่านได้รับโปรแกรมสุขศึกษาโปรแกรมที่ 1 ท่านต้องสละเวลาเข้าฟังคำบรรยายกับ
   ศึกษาด้วยตนเองจากคู่มือและแผ่นพับ   ตลอดจนมาตอบแบบบันทึกข้อมูลและแบบ
   ทดสอบก่อนและหลังได้รับโปรแกรม ดังกล่าว

2. หากท่านได้รับโปรแกรมสุขศึกษาโปรแกรมที่ 2 ท่านต้องสละเวลาศึกษาด้วยตนเองจากคู่
   มือและแผ่นพับ กับการตอบแบบบันทึกข้อมูลและแบบทดสอบ เช่นเดียวกัน

ท่านจำเป็นต้องเข้ารับการศึกษาวิจัยนี้หรือไม่

1. ขึ้นอยู่กับท่านเอง ท่านจะได้รับการดูแลและรักษาอย่างดีที่สุดไม่ว่าท่านจะเข้าร่วมในการ
   ศึกษานี้หรือไม่ และท่านสามารถถอนตัวจากการศึกษาได้ทุกเวลาโดยไม่มีผลต่อบริการที่
   ท่านได้รับอยู่

2. ท่านที่อยู่ในกลุ่มศึกษาที่ได้รับโปรแกรมสุขศึกษาโปรแกรมที่ 2 หากท่านต้องการเข้าฟัง
การบรรยายเรื่องโรคกระดูกพรุน   ท่านสามารถแจ้งความจำนงค์และเข้ารับฟังการบรรยายนั้นได้ตาม
กำหนดนัดหมายในภายหลัง

แพทย์ผู้ที่ท่านสามารถติดต่อได้   จากข้อมูลข้างต้นท่านจะเป็นผู้ตัดสินใจเองว่าจะเข้าร่วมในการ
วิจัยนี้หรือไม่ และสามารถสอบถาม   รายละเอียดเพิ่มเติมได้จากนายแพทย์ประยุกต์   พัววิไล
โทร.2350330 ต่อ 2301,2302

APPENDIX D
INFORMED CONSENT

for

A randomized controlled trial of health education program in increasing knowledge of osteoporosis

I know that the researcher was Dr.Prayook Puavilai, his Thai medical license number is 11455 and his telephone number is 2350330#2302.

I am completely informed about the study objectives, the processes and descriptions of the study, the teaching program of osteoporotic education and the benefits which I can gain from this study.

I agree to answer the questions in the questionnaire and participate in the study.

I understand that there will be no harm in the study program and I will receive a lot of knowledge about osteoporosis for prevention of this disease.

PATIENT SIGNATURE ……………………… Date……Month….……Year……

(   )

WITNESS SIGNATURE ……………………

(   )

WITNESS SIGNATURE …………………….

(   )

RESEARCHER SIGNATURE………………………

(Dr. Prayook Puavilai)

DATE OF PARTICIPATION ………………….....

(   )

APPENDIX E

CROSSTABULATION BETWEEN PRETEST AND POSTTEST IN PROGRAM I AND
PROGRAM II

Table E 1   Crosstabulation between pretest and posttest in program I and program II
from each question about definition of osteoporosis.

Pretest		Program I		Program II	
		Posttest		Posttest	
		Incorrect	Correct	Incorrect	Correct
Definition					
Question 1	Incorrect	1	15	8	8
	Correct	0	3	0	3
Question 2	Incorrect	0	1	1	0
	Correct	0	18	0	18

Table E 2   Crosstabulation between pretest and posttest in program I and program II
from each question about incidence of osteoporosis.

Pretest		Program I		Program II	
		Posttest		Posttest	
		Incorrect	Correct	Incorrect	Correct
Incidence					
Question 1	Incorrect	2	8	8	2
	Correct	0	9	0	9
Question 2	Incorrect	8	10	17	1
	Correct	0	1	0	1
Question 3	Incorrect	2	11	12	5
	Correct	0	6	1	1
Question 4	Incorrect	2	7	13	3
	Correct	0	10	0	3

Table E 3   Crosstabulation between pretest and posttest in program I and program
II from each question about causes and risk factors of osteoporosis.

Pretest		Program I		Program II	
		Posttest		Posttest	
		Incorrect	Correct	Incorrect	Correct
Causes and risk factors					
Question 1	Incorrect	1	9	3	1
	Correct	0	9	0	15
Question 2	Incorrect	4	9	6	1
	Correct	0	6	0	12
Question 3	Incorrect	0	3	1	1
	Correct	0	16	0	17
Question 4	Incorrect	1	8	2	3
	Correct	0	10	0	14
Question 5	Incorrect	11	8	16	1
	Correct	0	0	1	1
Question 6	Incorrect	7	12	17	2
	Correct	0	0	0	0
Question 7	Incorrect	13	6	17	0
	Correct	0	0	1	1
Question 8	Incorrect	7	3	7	1
	Correct	0	9	0	11
Question 9	Incorrect	0	13	1	9
	Correct	0	6	0	9
Question 10	Incorrect	4	15	8	9
	Correct	0	0	0	2
Question 11	Incorrect	7	12	17	2
	Correct	0	0	0	0
Question 12	Incorrect	3	10	13	5
	Correct	1	5	0	1

Table E 4   Crosstabulation between pretest and posttest in program I and program II from each question about symptoms and signs of osteoporosis.

Pretest		Program I		Program II	
		Posttest		Posttest	
		Incorrect	Correct	Incorrect	Correct
Symptoms and signs					
Question 1	Incorrect	8	7	15	2
	Correct	0	4	0	2
Question 2	Incorrect	3	5	13	2
	Correct	0	11	0	4
Question 3	Incorrect	11	8	16	0
	Correct	0	0	0	3
Question 4	Incorrect	0	1	1	0
	Correct	0	18	0	18
Question 5	Incorrect	3	10	6	3
	Correct	0	6	0	10
Question 6	Incorrect	10	4	17	2
	Correct	0	5	0	0
Question 7	Incorrect	4	5	16	2
	Correct	0	10	0	1

Table E 5   Crosstabulation between pretest and posttest in program I and program II from each question about diagnosis of osteoporosis.

Pretest		Program I		Program II	
		Posttest		Posttest	
		Incorrect	Correct	Incorrect	Correct
Diagnosis					
Question 1	Incorrect	1	1	0	3
	Correct	0	17	0	16
Question 2	Incorrect	15	4	16	0
	Correct	0	0	1	2

Table E 6　　　　Crosstabulation between pretest and posttest in program I and program
II from each question about prevention and treatment of osteoporosis.

Pretest		Program I		Program II	
		Posttest		Posttest	
		Incorrect	Correct	Incorrect	Correct
Prevention and treatment					
Question 1	Incorrect	4	4	8	6
	Correct	0	11	0	5
Question 2	Incorrect	11	8	14	2
	Correct	0	0	3	0
Question 3	Incorrect	6	4	7	7
	Correct	0	9	0	5
Question 4	Incorrect	1	3	0	0
	Correct	0	15	1	18
Question 5	Incorrect	11	6	16	0
	Correct	0	2	2	1
Question 6	Incorrect	16	3	19	0
	Correct	0	0	0	0
Question 7	Incorrect	16	3	19	0
	Correct	0	0	0	0
Question 8	Incorrect	15	4	16	2
	Correct	0	0	0	1
Question 9	Incorrect	8	9	11	6
	Correct	0	2	0	2
Question 10	Incorrect	2	6	0	8
	Correct	0	11	0	11
Question 11	Incorrect	8	10	5	13
	Correct	0	1	0	1
Question 12	Incorrect	15	3	18	0
	Correct	1	0	0	1
Question 13	Incorrect	1	2	1	1
	Correct	1	15	0	17

VITAE

NAME:	Prayook Puavilai
DATE OF BIRTH:	January 13, 1960
PLACE OF BIRTH:	Pichit, Thailand
CITIZENSHIP:	Thai
MARITAL STATUS:	Single

EDUCATIONS

1978-1984	Chiangmai University,Faculty of Medicine, Chiangmai, Thailand.
1987-1990	Rachavithi Hospital, Department of Medical Service. Ministry of Public Health, Thailand

CERTIFICATIONS

1984	Doctor of Medicine (M.D.)
1990	Diplomat of Thai Board in Obstetrics and gynecology
2002	Diplomat of Thai Board in Family Medicine

PROFESSIONAL BACKGROUND

1984-1987	Generalist; Srisungvorn Hospital, Ministry of Public Health, Sukhothai, Thailand
1987-1990	Resident in Obstetrics and gynecology; Rachavithi Hospital, Department of Medical Service, Bangkok, Thailand
1990-1992	Obstetrician and gynecologist; Srisungvorn Hospital, Ministry of Public Health, Sukhothai, Thailand
1992-1994	Obstetrician and gynecologist; Lumpang Hospital, Ministry of Public Health, Lumpang, Thailand
1994-present	Obstetrician and gynecologist; Lerdsin Hospital, Department of Medical Service, Ministry of Public Health, Bangkok, Thailand