THE OSTEOPOROSIS SITUATION OF ELDERS IN SAMUT SONGKHRAM, THAILAND.

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ABSTRACT

This study was aimed to survey the bone mineral density (BMD) of Thai elders in Samut Songkhram province which were measured with 352 elders by using calcaneal ultrasound bone densitometers (Sonost 2000, OsteoSys, Korea). According with BMD level, bone status of elders was characterized as osteoporosis, osteopenia and normal BMD, which were 113 (32.1%), 160 (45.5%) and 79 (22.4%), respectively. Over three-fourths of elders had abnormal BMD, however, they were well behaviors in osteoporosis protection. Moreover, we cannot guarantee that elders with normal BMD of heel bone had normal BMD in other bone, such as, hip bone and lumbar spine. Long-term education and calcium supplement should be act as osteoporosis intervention program. Constantly screening and monitoring of osteoporosis in risk elders were also necessary to reduce chance of fracture and accident in elders.

Keywords: Osteoporosis, Elders, bone mineral density (BMD), Samut Songkhram province

INTRODUCTION

Osteoporosis is a reduction of bone mass condition, which is changing in micro-level of bone structure and can compromise to cause bone fracture. The common bone fractures in osteoporosis patients including vertebral bodies, distal radius and proximal femur. Osteoporosis are divided to primary osteoporosis, which is common occurring in menopausal women with low estrogen level; and secondary osteoporosis, which is rarely happen by various factors, such as some of diseases and some of medication i.e. corticosteroids use [1], [2]. Samut Songkhram Education Center, Suan Sunandha Rajabhat University, Thailand is providing academic and health service for student and personnel in local area; and one of problem is osteoporosis among elder group [3].

Elevating of Thai aging population is trend to increase with the number of osteoporosis in elderly [4] and will be fast increase along with common chronic diseases, such as, diabetic mellitus and cardiovascular diseases [5, 6]. From Thai nation-wide survey (during 2000-2001), the age-adjusted prevalence of osteoporosis in Thai women ranging in age from 40-80 years was 13.6% and 19.8% for femoral neck and lumbar spine, respectively. For men, the age-adjusted prevalence of osteoporosis was 12.6, 4.6 and 3.9% at the femoral neck, lumbar spine and both sites, respectively. The Asian osteoporosis study (AOS) was multi-national research surveillance, which had documented the incidence of hip fracture in Thailand. The report of age-adjusted rates (per 100,000) was 114 and 289, in men and women, respectively [4, 7]. Vitamin D insufficiencies of Thai elderly women in urban area were higher than in rural area because of the difference in life style [8,9,10]. Thai premenopausal women were commonly hypovitaminosis D and low level of 25-(OH)D and

risk will be increased in elderly women who living in the rural area[9]. The prevalence of vitamin D insufficiency among elderly males was 13.6%, while the bone turnover marker (P-CTX, and PINP) levels were in the normal Thai reference range [10].

As, previous studies, the numbers of elders in Sumut Songkhram province are trend to increase; and approximately 16.7% of elders were home and bed bounded elders, which were difficult to medical service due to the limitations of medical staff and equipment. Early diagnoses of osteoporosis before fractures occurring and early assessment of bone mineral density with osteoporosis treatment can be providing better clinical outcome. The hypertension and dyslipidemia were also usually occurred in this coastal area including Samut Songkhram province due to high salt and lipid food consumption, especially seafood intake [11,12].

The study to evaluate the association of osteoporosis status and prehypertension in elders, who were indicated by bone related- and cardiovascular risked- biochemical markers. Showed that BMD was significantly correlated to calcium, phosphorus, and triglyceride in high, low, and very low levels, respectively. Inversely correlations of BMD with CTX and hs-CRP were significant in medium level. Risk of prehypertension was increased 1.12-fold with a decrement of T-score < -1.0. Increment of CTX, hs-CRP, and LDL-C was increased 1.93, 1.94, and 1.31-fold of prehypertension risks, respectively. Prehypertension was associated with osteoporosis, which indicated by inversely correlation of hs-CRP and CTX to BMD; and correlation of serum calcium, phosphorus, and triglyceride to BMD [13].

Health education and literacy of elders in osteoporosis prevention is interesting point in our public health service. Therefore, the incidence of osteoporosis of elders with the practice of preventing disease incorrectly may affect the problems of oneself. For this reason, the research team considers that it is necessary to conduct research on self-protection behaviors in osteoporosis of the elders of Sumut Songkhram province, in order to know the relationship of factors that cause osteoporosis, such as obesity, hypertension and various risk behaviors, to take the results of this research to be used as basic information to find ways to create knowledge, understanding and prevention about osteoporosis, and to enhance the behavior of self-care in elders.

OBJECTIVE

To determine the bone mineral density (BMD) and health behaviors of Thai elders in Samut Songkhram.

METHODOLOGY

Populations and samples
A. Population scope: The target population used in this research is to study in the elders of Sumut Songkhram province, totaling 352 people during September - October 2019.

B. Sample group: In this research, the researcher defined the sample group as the target population group, which is the elders of Sumut Songkhram province, totaling 352 people during September - October 2019 who have activity with elderly festival of Sumut Songkhram province.

Research materials
1. The measurement of BMD in elders is equipped by calcaneal ultrasound bone densitometers (Sonost 2000, OsteoSys, Korea) (Fig. 1) and protocol was done following instruction of manufacturer.

Figure 1
**BMD measurement by calcaneal ultrasound bone densitometers**

Interpretation of bone mass density measurement results: BMD is measured in mass / bone area (gm / sq cm, gram / square centimeter). From this value, it is still not possible to determine whether the bone is thin or not. We must compare this to the normal value in the same age group, the same race or similar race (called the Z value), such as the Asian people, then calculated as a statistical variance called T-score (T) which is used as a diagnosis of BMD (Fig. 2) as below [14]:

T score greater than -1 is considered normal bone density
T score that is between -1.1 to -2.4 is considered osteopenia
T score that is less than -2.5 is osteoporosis

In addition, if we need to repeat the examination to see changes in bone mass density, the same detector should be used because each detector has different variations in itself which could make the results different.

Figure 2
Example of BMD measurement is representing as T-score
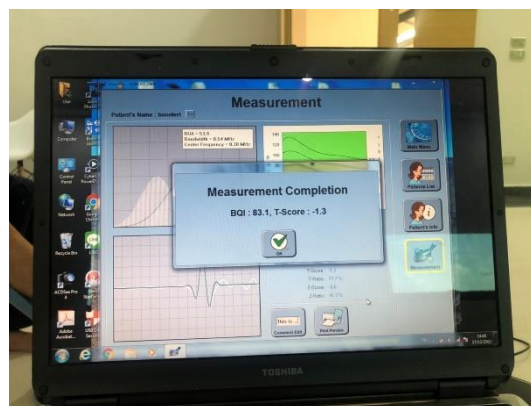
2. The questionnaire of personal data and self-protection behaviors in elders with osteoporosis

Adopt the tools that are modified and improved to 3 experts to check the accuracy and validity by using the Index of Item-Objective Congruence (IOC), then propose the questions that the researcher has created to the experts for considering and giving opinions with the criteria for scoring as follows [15]:

Rate +1 when experts are sure that the question is consistent with the objectives

Rate 0 when the expert is not sure whether the question is consistent with the objectives or not

Rate -1 when experts are sure that the question is inconsistent with the objectives

Quality of Research Materials
Data analysis

Data was collected from all target sample groups. The researcher analyzed and processed by using a software package for research using statistical analysis in each section. Used statistics to analyze frequencies and percentages of personal information, gender, age and bone density level.

RESULTS

Gender showed in all 352 people found 37 people are males, 315 people are females, accounting for 10.5 % of males and 89.5% of females. Average of age in elder is 68 years old (Table 1).

Table 1
Genders of elders in this study

Gender	Amount (percent)
male	37(10.5)
female	315(89.5)
Total	352(100.0)

Bone mass values classified by bone mass level were found that most had osteopenia 160 (45.5), normal condition 79 (22.4) and osteoporosis 113 (32.1) respectively, with an average bone mass -1.379 (thin bones) Found the most osteoporosis mass. -3.5 (Table 2).

Table 2
Number of different BMD status in elders

Bone mass	Amount (percent)
Normal bone density	79 (22.4)
Osteopenia	160 (45.5)
Osteoporosis	113 (32.1)

Gender and bone mass in Table 3 showed that 113 elders had osteoporosis, representing 32.1%. Females with osteoporosis found 105 people, accounting for 33.4% of all females. Males with osteoporosis found 8 people, accounting for 21.7% of all males. In osteopenia, showed that 160 elders had osteopenia, representing 45.5%. Females with osteopenia found 143 people, accounting for 45.3% of all females. Males with osteopenia found 17 people, accounting for 45.9% of all males.

Normal bone density level showed that 79 elders had normal bone density level, representing 22.4%. Females with normal bone density level found 67 people, accounting for 21.3% of all females. Males with normal bone density level found 12 people, accounting for 32.4% of all males (Table 3).

Table 3
Comparison of BMD status between gender

Gender	Bone mass / amount (percent)			Total
	Normal bone	Osteopenia	Osteoporosis	
male	12 (32.4)	17(45.9)	8(21.7)	37(100.0)
female	67(21.3)	143(45.3)	105(33.4)	315(100.0)
total	79 (22.4)	160 (45.5)	113 (32.1)	352(100.0)

CONCLUSION AND FUTURE WORK

The study of bone density level of 352 elders in Samut Songkhram province showed that 113 elders had osteoporosis, representing 32.1%, 160 elders had osteopenia, representing 45.5% only 79 elders had normal bone density level, representing 22.4%. This is a critical situation of health prevention of osteoporosis in Samut Songkhram province. The researcher found that elders in Samut Songkhram province have incorrectly preventing knowledge in osteoporosis. Such as they drink soy milk for replacement of osteoporosis but in actually milk have high level of calcium than soy milk. They drink coffee and soft drink to many days per week. Lack of calcium supplement is a major cause of osteoporosis.

Based on a research study on bone density level of 352 elders in Samut Songkhram province, the researcher suggests that the Samut Songkhram provincial health office, Samut Songkhram Education Center, Suan Sunandha Rajabhat University and College of Allied Health Sciences, Suan Sunandha Rajabhat University, should provide training to educate elders about enhancing self-protection behaviors in students' osteoporosis to aim for this group of elders to have knowledge in order to be able to use to change and strengthen self-protection behaviors in osteoporosis, and to understand the causes of osteoporosis, to avoid and prevent what causes osteoporosis, and to be able to initially treat osteoporosis that occurs. The institute should support the training on holistic health care regularly, at least once a month, for students in order to increase awareness and attention in preventing disease or enhancing health both physically and mentally, and to reduce illness and the use of drugs that are a public health burden. Short-term supplement was increased rate of bone formation in normal group and decreased bone resorption in osteoporotic groups.

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REFERENCES

[1]   Ten-Mu N. (2009.) Pharmacology. Bangkok: Holistic Folding Company Limited.
[2]   Sinsuwan T, Piaem N. (2016). Factors predicting osteoporosis prevention behavior of nursing students. Rama Nurs J, Vol. 21 No. 2, Pp. 224-258.

[3]   Thongmuang P, Sudjaroen Y. (2015). Behavior of pesticide use and pesticide control among farmers in Samut Songkhram province The 6th National and International Research Conference and Presentation "Toward Global Research". 28-28 April 2015. Suan Sunandha Rajabhat University.

[4]   Pongchaiyakul C, Songpattanasilp T, Taechakraichana N. (2008). Burden of osteoporosis in Thailand. *J Med Assoc Thai,* Vol. 91 No. 2, Pp. 261-7.

[5]   Maghbooli Z, Emamgholipour S, Hossein-Nezhad A, Shirzad M, Gorgani Firuzjaee S. (2016). Suitable bone markers assessing bone status in patients with both coronary artery disease and diabetes. *J Diabetes Metab Disord*, Vol. 15 No. 1, Pp. 35.

[6]   Maghbooli Z, Shabani P, Gorgani-Firuzjaee S, Hossein-Nezhad A. (2016). The association between bone turnover markers and microvascular complications of type 2 diabetes. *J Diabetes Metab Disord*, Vol. 15, Pp. 51.

[7]   Lau EM, Lee JK, Suriwongpaisal P, Saw SM, Das DS, Khir A, et al. (2001). The incidence of hip fracture in four Asian countries: the Asian Osteoporosis Study (AOS). *Osteoporos Int*, Vol. 12, Pp. 239-43.

[8]   Soontrapa S, Soontrapa S, Bunyaratavej N, Rojanasthien S, Kittimanon N, Lektrakul S. (2009). Vitamin D status of Thai premenopausal women. *J Med Assoc Thai*, Vol. 92(Suppl 5), Pp. 17-20.

[9]   Soontrapa S, Soontrapa S, Chailurkit LO. (2009). Hypovitaminosis D in Thailand. *J Med Assoc Thai*, Vol. 92(Suppl 5), Pp. 26-9.

[10]   Soontrapa S, Soontrapa S, Chaikitpinyo S. (2015). Prevalence of Vitamin D Insufficiency among Elderly Males Living in Rural Khon Kaen Province, Northeast Thailand. *J Med Assoc Thai*, Vol. 98 (Suppl 8), Pp. 21-5.

[11]   Sudjaroen Y. (2015). Biochemical and hematological status of pesticide sprayers in Samut Songkram, Thailand. *Ann Trop Med Public Health*, Vol. 8 No. 5, Pp. 186-90.

[12]   Sudjaroen Y. (2016). Lipoprotein(a) and biochemical parameters in elderly. *Ann Trop Med Public Health*, Vol. 9 No. 5, Pp. 312-5.

[13]   Sudjaroen Y, Thongmuang P. (2018), Association of Bone-related Biochemical Markers and Risk of Prehypertension in Osteoporotic Elders, *Asian Journal of Pharmaceutics*, Vol. 12 No. 1, Pp. 277-283.

[14]   W. Pengsawat. (2008). Research methodology. Bangkok: Suviriyasarn.

[15]   Sukanya Kanokphanavanich. (2016). Know to prevent osteoporosis. Annual health care and health examination guide. (June, 9) (Online). Available URL ; http: //www.ams.cmu.ac.th/th/images/stories/your_health/13.pdf