Sarcopenia and Bone Mass Loss as Risks during Aging on Female Elderly with Light Activity

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Introduction

Aging is a normal physiological process. The aspect of aging can be delayed by a measurable activity that is carried out early and regularly also intake health nutrition. Measurement of body composition is needed to analyze physiological changes due to aging so it can be used to compile a program of activities also diet to delay the aging process.

BACKGROUND: Aging is a normal physiological process. The aspect of aging can be delayed by a measurable activity that is carried out early and regularly also intake health nutrition. Measurement of body composition is needed to analyze physiological changes due to aging so it can be used to compile a program of activities also diet to delay the aging process.

AIM: The aim of this study is to address the potential risks during aging process in people with light physical activity in Gamping, Patukan.

METHODS: Method of this research is the cross-sectional method. Subjects were 190 females with light physical activity that divided into Group 1 (70 females) with an average age 43.71 ± 5.37 years old and Group 2 (120 females) with an average age 61.72 ± 6.82 years old. Body composition was measured by the whole body composition diagnostic scale BG21.

RESULTS: The result showed that t-test between Group 1 and Group 2 was significant differences p < 0.05, CI = 0.95 in weight body, body mass index (BMI), muscle mass, bone mass, and active metabolism rate (AMR). The percentage decreasing number for body composition was 13.5%, 12.5%, 8.9%, 4.2%, 25.9%, and 12.8% on weight, BMI, muscle mass, bone mass, and AMR, respectively.

CONCLUSION: Female with light activity has a risk as sarcopenia and bone loss during aging. The future programme of this community need to encourage of increasing the physical activity and improving lifestyle to slow the bone loss and muscle loss.
body composition to predict potential risk factors in the elderly with light activity.

Methods

Subjects were 190 females with mild physical activity based on questionnaire that divided into Group 1 (70 females) with an average age 43.71 ± 5.37 years old and Group 2 (120 females) with an average age 61.72 ± 6.82 years old. Body composition measurement using whole body composition diagnostic scale BG21 series from Beurer Germany. The scale is working based on bioelectric impedance analysis, which is predict body fat (%), body fluid (%), basal metabolic rate (BMR), body mass index (BMI), muscle mass (%), bone mass (%), and active metabolism rate (AMR). Blood glucose detected by easy touch equipment, systole and diastole also heart rate detect by TensiOne OneMed.

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Results

Body composition of the subject is shown in Table 1 for Group 1 (age <50 years old).

Table 1: Characteristic and body composition Group 1 (n=70)

| Type of measurement | Average   | No. of measurement | Average |
|---------------------|-----------|--------------------|---------|
| Age (years)         | 43.71 ± 5.37  | 8                  | 31.31 ± 1.45 |
| Height (cm)         | 154.53 ± 5.60 | 9                  | 158.54 ± 1.35 |
| Weight (kg)         | 65.12 ± 9.79 | 10                 | 18.43 ± 1.43 |
| Body fat (%)        | 35.47 ± 3.84 | 11                 | 139.12 ± 3.27 |
| Body fluid (%)      | 46.72 ± 3.27 | 12                 | 87.76 ± 1.46 |
| BMR (Calorie)       | 1353.24 ± 1.01| 13                 | 85.65 ± 9.73 |
| BMI (kg/m²)         | 26.84 ± 3.31 | 14                 | 112.41 ± 4.16 |

Table 2: Characteristic and body composition Group 2 (n=120)

| Type of measurement | Average   | No. of measurement | Average |
|---------------------|-----------|--------------------|---------|
| Age (years)         | 61.72 ± 6.82 | 8                  | 30.00 ± 5.52 |
| Height (cm)         | 152.19 ± 5.83| 9                  | 48.36 ± 1.17 |
| Weight (kg)         | 56.32 ± 1.09 | 10                 | 16.08 ± 1.85 |
| Body fat (%)        | 35.67 ± 4.05 | 11                 | 148.39 ± 2.57 |
| Body fluid (%)      | 45.94 ± 3.51 | 12                 | 83.78 ± 9.36 |
| BMR (Calorie)       | 1183.56 ± 1.26| 13                 | 85.31 ± 1.07 |
| BMI (kg/M)          | 24.44 ± 5.07 | 14                 | 137.17 ± 7.81 |

Table 3: The decreasing percentage number of body composition

| Body composition | Decreasing percentage number |
|------------------|-------------------------------|
| Weight (Kg)      | 13.5                          |
| BMR (Calorie)    | 12.5                          |
| BMI (kg/m²)      | 8.9                           |
| Muscle mass (%)  | 4.2                           |
| Bone mass (%)    | 12.9                          |
| AMR (%)          | 8.9                           |

As shown in Table 4, there was still normal value on body fat, body fluid, heartbead, and blood glucose level both in Groups 1 and 2.

Figure 1: The t-test of weight (kg), body mass index (kg/m²), muscle mass (%), bone mass (%), and active metabolism rate between Group 1 and Group 2. p < 0.05, significant difference (*), CI = 0.95

Systole and diastole were high since the aging process of the endothelium composition.

Discussion

The degenerative process during aging is common in human, but to delay or to slow the aging is possible to apply. In this research we found the difference of body composition in group 1 and group 2. Based on manual of the BIA (bioelectric impendansi analyze) that the use to measure body composition, in group 1 shows that body fat (%) was bad (because the value > 30.1), body fluid (%) was good (because in range 45-65 %), BMR (Basal Metabolic Rate) that reflect the total energy for rest to maintain basic function was normal, BMI (Body Mass Index) that reflect a value to evaluate body weight due to find the categories of body weight was overweight or obesity (because in range 25-40), Muscle Mass (%) was normal (because in range 31-36 %), Bone Mass (%) that reflect as total weight of bone (contain of organic substances, an anorganic substances also water) was normal and AMR (Active Metabolism Rate) was normal.
Mechanism of estrogen reduction may have a negative effect on muscle mass although the mechanism is not well understood. However, it may be related to an increase in pro-inflammatory cytokines such as tumor necrosis factor-α and IL-6, which to be implicated in the mechanism of sarcopenia [14]. The bone-muscle unit influenced by some factors such as sex, nutrition, weight, age, and physical activity [15], [16]. Osteosarcopenia induced by low physical activity and inadequate nutrition [17]. Physical fitness has an important effect on bone density in postmenopausal women even though relatively small significant. Exercise is able to affect bone mass density, for example, is done with the neck of the femur. This exercise is a progressive resistance strength exercise for the lower leg [18]. Postmenopausal women have shown that physical activity can slow the rate of bone loss in weight-bearing areas of the body with an effect of about 1%/year. This has been proven strongly in research on the effect of daily walking on femoral cervical mass in postmenopausal women [19]. Exercise can be considered as a physical activity a promising therapeutic strategy for inhibiting the loss of bone and muscle mass due to osteosarcopenia. The type of exercise that can stimulate osteogenic effects to increase bone mass, bone tissue, namely exercise that have a mechanical load that exceeds daily activities such as Resistance Exercise (RE). RE stimulates MPS by activating the PI3K-Akt-mTORC1 signal, thus applying a mechanical load to the bone causes increased bone strength [20], [21].

Conclusion

This research found that female during aging with light activity has a risk to loss the muscle mass also the bone mass. The next program for female elderly should increase the physical activity.

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