

**Body composition of Myanmar elderly people from home
for the aged (Hninsigone), Yangon**

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To find out body composition of Myanmar elderly people, the study was conducted on 154 (67 males and 87 females) apparently healthy elderly people, age ranged from 70 to 103 years at the home for the aged (Hninsigone), Yangon. Body composition was measured using skin-fold thickness. Body fat percent was calculated by equation described by Durnin and Rahamen (1967). Mean and SD of Body Mass Index (BMI) of elderly males and females were 19.18 ± 2.75 and 20.48 ± 4.03 respectively. 22.38 % of males and 19.54 % of females were found to have BMI less than 17, and 6.2 % of females had BMI more than 25. The older the age, the higher the reduction was observed in body fat percent, fat mass and fat free mass. Significant difference was evident in fat percent and fat mass of females and fat percent of males. However, elderly people with low BMI (BMI <17) had significantly lower body weight, fat percent, fat mass and fat free mass than those of their counterparts with normal BMI.

INTRODUCTION

In many Southeast Asian countries, continuous economic growth in recent decades has led to improved living condition for large proportion of the population. Partly this improvement has resulted in increased life expectancy and the proportion of elderly in the population has increased. Therefore, the health care of elderly people takes an important part in the national health program.

Changes in body composition such as increase in fatness especially in central region increase the risk of atherosclerosis, hypertension, hypercholesterolemia and insulin resistant diabetes mellitus and conversely, changes in body composition are secondary to many diseases such as acromegaly, postmenopausal osteoporosis.

Paget's disease etc. [1] Furthermore, change in body composition is an indicator for the assessment of nutritional status. A Body Mass Index (BMI) of less than 18.5 has been proposed to indicate chronic energy malnutrition (CEM) in adults whereas those with BMI lower than 17 have added health risk and reduction in physical work capacity [2]. On the other hand, a BMI of more than 25 is regarded as obesity.

In elderly people, there are many controversies regarding changes in body composition. It is generally accepted that age-related changes in body composition such as loss of fat free mass with increase in total and central fatness occur in elderly people [3]. Reduction in fat free mass and increase in fat mass have considerable health have implication by contributing to frailty and functional impairment [4].

However, the two longitudinal studies of changes in FFM suggested lower rate of changes than observed in the cross-sectional studies [5, 6]. Furthermore, changes in body composition that are associated with increasing age may not be age related and the levels of physical activity are important in determining body fat accumulation [5]. In addition, the body composition (the mixture of FM and FFM on the frame) can differ by ethno-geographic situation e.g. for height-matched Asians and Caucasians, the latter have higher body mass indices but the former have more total body fat [1].

Since little information is available on the body composition of Myanmar elderly people, the present study is a preliminary one aimed at finding out the body composition of Myanmar elderly people.

MATERIALS AND METHODS

Subjects

The study was conducted on 154 (67 males and 87 females) apparently healthy elderly people, age ranged from 70 to 103 years at the home for the aged (Hninsigone), Yangon. None of the subjects was suffering from overt diseases and all were able to walk and dress unaided.

Anthropometric and body composition assessment

Body weight was measured with bathroom scale weighing machine, calibrated with standardized weight. Subjects were weighed barefoot with minimum clothing. Measurements were taken two hours after breakfast and the weight was recorded to the nearest 0.1 kg.

Standing height was measured to the nearest 0.1 cm using a stadiometer. Subjects stood barefoot on a flat horizontal surface, their heads held in the Frankfurt plane and with their heels, buttocks and shoulders touching the wall.

Body Mass Index (BMI) was calculated as weight/height² (kg/m²)

Body composition was assessed through measurements of skin-fold thickness. Skin-fold thickness at sites of biceps, triceps, subscapular and supra iliac was measured on the left side of the body using a Harpenden caliper by a well-trained technician. Body fat percent was calculated by using the formula described by Durnin and Rahaman, 1967 [7].

$$\text{Body fat \%} = (4.95/Y - 4.5) \times 100$$

$$Y = 1.1610 - 0.0632 X \text{ in men}$$

$$Y = 1.1581 - 0.0720 X \text{ in women.}$$

(Y is body density and X is the log of the sum of skin-fold thickness at all four sites in mm)

Statistical analysis

Data were expressed as mean \pm SD. Comparison were made using Student 't' test for unpaired samples (two tailed). Differences were considered significant if $p < 0.05$.

RESULTS

Table 1 shows comparison of body composition of elderly people with that of middle-aged people [8]. Old-age people had lesser height, weight, and body fat percent, fat mass and fat free mass than the middle-aged people.

Table 2 shows body composition of elderly males at different ages. The older the age, the higher the reduction was observed in body fat percent, fat mass and fat free mass. Significant difference was evident in fat percent.

Table 3 shows body composition of elderly females at different ages. The changes were similar to those of the males but significant difference was evident in fat percent and fat mass.

Table 1. Comparison of body composition of elderly people with that of middle-aged people

Sex	No.	Age (yr.)	Height (cm.)	Weight (kg.)	Fat (%)	Fat mass (kg)	Fat free mass (kg)	Body Mass Index
Male	294	49.92	162.35	57.32	14.18	9.10	48.25	21.70
		± 6.06	± 5.73	± 12.24	± 6.10	± 5.90	± 8.35	± 4.18
	67	81.03	157.64	47.82	18.93	9.42	38.70	19.18
		± 5.05	± 6.30	± 8.05	± 4.37	± 3.50	± 5.10	± 2.75
Female	329	48.99	151.48	52.44	27.77	15.41	37.02	22.75
		± 5.65	± 5.67	± 12.39	± 6.56	± 7.11	± 6.66	± 4.74
	87	80.15	145.52	43.29	29.80	13.19	30.10	20.48
		± 5.55	± 5.63	± 8.63	± 4.53	± 4.31	± 4.67	± 4.03

Table 2. Body composition of elderly males at different ages

Age groups	All	70 - 79 yrs	80 -- 89 yrs	90- above
No. of subjects	67	27	37	3
Height (cm)	157.64 \pm 6.30	159.01 \pm 6.36	156.62 \pm 6.25	157.9 \pm 3.15
Weight (kg)	47.82 \pm 8.05	50.14 \pm 6.89	46.45 \pm 4.83	43.83 \pm 3.70
Body Mass Index	19.18 \pm 2.75	19.85 \pm 2.66	18.83 \pm 2.77	17.58 \pm 1.49
Body Fat Percent	18.93 \pm 4.37	20.51 \pm 3.88	18.21 \pm 4.33	15.27 \pm 2.67
Fat Mass (kg)	9.42 \pm 3.50	10.43 \pm 3.11	8.89 \pm 3.65	6.77 \pm 1.54
Fat Free Mass (kg)	38.7 \pm 5.10	39.71 \pm 4.71	37.82 \pm 5.40	37.07 \pm 2.33

Table 3. Body composition of elderly females at different ages

Age groups	All	70 - 79 yrs	80 -- 89 yrs	90- above
No. of subjects	87	39	46	2
Height (cm)	145.52 \pm 5.63	147.51 \pm 5.16	143.92 \pm 5.54	143.65 \pm 3.55
Weight (kg)	43.29 \pm 8.63	45.52 \pm 8.79	41.77 \pm 8.10	34.75 \pm 0.75
Body Mass Index	20.48 \pm 4.03	20.97 \pm 4.18	20.22 \pm 3.88	16.89 \pm 1.20
Body Fat Percent	29.80 \pm 4.53	31.33 \pm 3.90	28.81 \pm 4.56	22.69 \pm 0.54
Fat Mass (kg)	13.19 \pm 4.31	14.35 \pm 4.34	12.33 \pm 4.17	7.88 \pm 0.02
Fat Free Mass (kg)	30.10 \pm 4.67	31.05 \pm 5.03	29.44 \pm 4.25	26.87 \pm 0.77

Table 4. Incidence of elderly people with BMI <16, 16 - 16.9 and 17 - 18.4 in different age groups

Age (yr)	70 - 79	80 -- 89	90 and above
BMI (Male)			
17 - 18.4	18.52%	21.62%	
16 - 16.9	3.70%	10.81%	66.67%
<16	3.70%	18.92%	
BMI (Female)			
17 - 18.4	15.39%	13.04%	50%
16 - 16.9	7.69%	8.70%	
< 16	5.13%	15.20%	50%
> 25 - < 30	7.69%	6.52%	
> 30	5.13%	2.17%	

Table 5. Comparison of body composition of elderly from different ethnic groups

Ethnic groups	No. of subjects	Age (Yr)	Weight (kg)	Body fat (%)	Fat mass (kg)	Fat free mass (kg)
Male						
Caucasian(11)	15	65 - 72	75.40 ± 2.50	28.00 ± 1.50	21.50 ± 1.70	53.90 ± 1.30
Chinese (10)	64	70 - 74	55.61	29.31	16.30 ± 5.30	39.31 ± 5.83
Myanmar	67	71 - 92	47.82 ± 8.05	18.93 ± 4.37	9.42 ± 3.50	38.70 ± 5.10
Female						
Caucasian(12)	10	68 - 79	60.00 ± 7.22	21.70 ± 3.90	21.70 ± 3.90	38.30 ± 4.40
Chinese	95	70 - 74	49.86	34.61	17.26 ± 6.24	32.60 ± 4.67
Myanmar	87	70 - 103	43.29 ± 8.63	29.80 ± 4.53	13.19 ± 4.31	30.10 ± 4.67

Table 4 shows incidence of elderly people with BMI 17 to 18.4, 16 to 16.9, <16, >25 and >30 in different age groups. Some elderly women, not elderly men, had BMI >25 and >30.

Table 5 shows comparison of body composition of elderly from different ethnic groups. Although height, weight, fat mass and fat free mass were lower in Chinese and Myanmar elderly than those of Caucasians, body fat % was higher in Chinese and Myanmar elderly women than that of Caucasians.

DISCUSSION

It was found that Myanmar elderly people had lower body weight, height, and fat free mass but higher body fat percent when compared with those of middle-aged people. This finding was in agreement with the concept that age related changes in body composition were loss of fat free mass with increase in total and central fat. However, when the subjects were divided into three groups (i.e. 70-79 years, 80-89 years and Their 90 years & above) and compared their body weight, fat percent, fat mass and fat free mass, all reduced with increasing age.

BMI is an early measurable nutritional status indicator for adult and BMI of <8.5 has been proposed to indicate chronic

energy malnutrition (CEM). In the present study, 41.79% had a BMI <18.5 and 22.38% had a BMI <17. These findings were a little higher than those found in Indonesian urban elderly where 33% had a BMI <18.5 and 15% had a BMI <17 [9]. Considering high prevalence of low BMI individuals, CEM may be a public health problem among elderly or alternatively, the BMI cut-off point to define CEM may not be valid for elderly in Myanmar. Woo *et al.* reported that the BMI of elderly Chinese was lower than that of other elderly with different ethnic backgrounds, namely Caucasian, Maori and Scandinavian. The fiftieth percentile of BMI values for the Chinese elderly fell on the twenty-fifth percentile BMI values for the Caucasian elderly in United Kingdom [10]. Therefore, many researchers recommended conducting further investigation of general applicability of the BMI classification for different populations.

Wang *et al.* reported that, despite lower BMI values, Asians had higher body fat percent than did Caucasians [6]. In the present study, Myanmar elderly women also had higher body fat percentage than Caucasians but Myanmar elderly men had lower body fat percentage.

When comparison was done between elderly with normal BMI and elderly with

BMI less than 18.5, body weight, body fat percent, fat mass and fat free mass of normal elderly were significantly greater than those of elderly with low BMI value.

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