ELSEVIER

Nutrition 25 (2009) 33–39

NUTRITION

www.elsevier.com/locate/nut

Applied nutritional investigation

Anthropometric measurements in the elderly of Havana, Cuba: Age and sex differences

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Manuscript received February 26, 2008; accepted July 8, 2008.

Abstract

Objective: We present selected anthropometric data, specific for sex and age group, from a representative sample of elderly subjects living in Havana, Cuba.

Methods: This was a cross-sectional, population-based household survey. A total of 1905 subjects (1197 women and 708 men, ≥60 y of age) were examined between 1999 and 2000 as selected by probabilistic sampling. Data were presented as means and percentiles for body mass; height or stature; body mass index; waist, arm, and calf circumferences; triceps skinfold thickness; and arm muscle circumference; and differences were described according to age (all variables) and sex (body mass index).

Results: All anthropometric variables showed a decrease in average values with aging in men and women. The age of 70 y appeared to be the decisive moment for the main anthropometric differences observed. The values in the female group were higher than those in the male group for body mass index and triceps skinfold thickness. An important segment of the population studied had a body mass index lower than normal values. Reductions in subcutaneous fat (indicated by triceps skinfold thickness) and muscle mass (verified by arm, arm muscle, and calf circumferences) with advancing age appeared to be greater among women than among men.

Conclusion: The present study provides information that can be used for anthropometric evaluation of elderly people in Havana and other urban areas in Cuba. The observations suggest that there is loss of muscle mass and redistribution and reduction of fat mass with age (that is more severe in women).

Keywords: Anthropometry; Aged; Nutritional status; Sectional studies; Body mass index

Introduction

In Latin American and Caribbean countries, recent age structure changes indicate a reduction of younger segments and an expressive growth of the elderly population [1]. However, information concerning health conditions of the elderly is still scarce in developing countries.

Anthropometric indicators are useful to assess health conditions of the elderly, because many disorders, at this point in life, are associated with dietary and nutritional problems [2–5]. Anthropometric measurements, although limited, are the most practical way for a nutritional assessment of individuals and populations, through nutritional risk monitoring, prognosis of acute and chronic diseases, or clinical actions [6–9].

How useful these indicators are depends on the availability of reference data related to age, sex, and age group, specific to each population. The World Health Organization [10] recommends the development of specific reference values for each country, with availability of means, standard deviations, and percentiles for every measurement or index.

R.d.S.C. received a master's scholarship from the Brazilian National Research Council (Conselho Nacional de Desenvolvimento Científico e Tecnológico, grant 132614/2007-3). The Survey on Health, Aging, and Well-Being in Latin America and the Caribbean (SABE) in Cuba was funded in part by the Population Center of the National Institute of Statistics and the Ministry of Health.

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0899-9007/09/$ – see front matter © 2009 Published by Elsevier Inc.
doi:10.1016/j.nut.2008.07.007

There is some anthropometric information available on the elderly from developed countries, including data of representative samples [6,7,11,12]. Recently, in Latin America, information about the elderly of Mexico City (Mexico) [13], Santiago (Chile) [8], and São Paulo (Brazil) [9] were presented. In Cuba, there are no data that provide anthropometric parameters for the ≥60-y population, whose proportion, in 2007, was 18.7% (approximately 2 107 116 individuals) [14].

The objectives of the present study were 1) to present distribution values for anthropometric characteristics based on a cross-sectional (representative) sample for non-institutionalized older adults residing in the city of Havana, Cuba, and 2) to describe the age and sex differences to identify variations in anthropometric characteristics of the elderly.

Materials and methods

For this epidemiologic cross-sectional, household-based study, data were extracted from the Survey on Health, Aging, and Well-Being in Latin America and the Caribbean (SABE), a multicenter study co-ordinated by the Pan-American Health Organization conducted in seven countries (Argentina, Brazil, Chile, Cuba, Mexico, Uruguay, and Barbados). The SABE is the first survey of its kind in the region and was simultaneously and rigorously comparable for the purpose of compiling information. In Cuba the study was conducted in the city of Havana and co-ordinated by members at the Center of Population and Development Studies, National Statistics Office (Centro de Estudios de Población y Desarrollo, Oficina Nacional de Estadística) [15].

The study population consisted of individuals ≥60 y of age (non-institutionalized), of both sexes, residing in the city of Havana between December 1999 and June 2000. The sample was generated through a multistage process by conglomerates, with stratification of the units at the highest levels of aggregation. Three selection stages were used in Havana. The primary-stage units were conglomerates of independent households within the predetermined geographic areas. Each conglomerate was selected with a probability proportional to the distribution of the households within each stratum. The primary-stage units were, in turn, divided into secondary-stage units, each made up of a conglomerate of households. The secondary-stage units then were divided into third-stage units. The stages of this design make it possible for the researcher to calculate the probability of each individual to be selected. Five thousand households were chosen, of which 4816 were visited. In this process, 1998 eligible persons were identified and complete information was collected from 1905 participants [15,16].

Anthropometry

Anthropometric data were obtained by health professionals who received special training, including a video prepared by the National Institute of Nutrition of the University of Chile, for standardization and better visual presentation of the anthropometric techniques to be used in all countries participating in the SABE [15].

Anthropometric measurements used in this study were body mass (BM); height or stature (ST); circumferences of the waist (WC), arm (AC), and calf (CC); and triceps skinfold thickness (TSF). All measurements (BM, ST, WC, AC, CC, and TSF) were taken three times (at the same visit), and the mean values were used in the analyses.

Body mass index (BMI; kilograms per meter square) was calculated, as was arm muscle circumference (AMC = AC − $p \times$ TSF).

The instruments and procedures used for measuring have been previously published [8,9].

Statistical procedure

Discordant values were individually evaluated by verifying consistency in comparison with other measurements. The occurrence of inconsistency was regarded as a possible error in measuring, compiling, or tabulating, and such values were excluded (e.g., extremely large WC with normal or low BMI and BM).

Data analysis used means, standard deviations, and percentiles (5th, 10th, 25th, 50th, 75th, 90th, and 95th), in accordance with sex and age group (60–64, 65–69, 70–74, 75–79, ≥80 y).

Age group effect was investigated by analysis of variance and Tukey's test for multiple comparisons. Differences between means were determined by Student's *t* test for comparison of sexes in relation to BMI. Statistical significance was defined with 5% confidence intervals ($P < 0.05$). All statistical analyses used SPSS 11.5 (SPSS, Inc., Chicago, IL, USA).

Results

The study sample consisted of 1197 women (62.8%) and 708 men (37.2%). Age varied from 60 to 102 y, with a mean ± SD of 71.0 ± 8.7. Mean ages were 70.5 ± 8.4 y (range 60–96) in men and 72.3 ± 8.7 y in women ($P = 0.000$).

Among the elderly in this study (1882), 98.8% were born in Cuba, with the 1.2% of foreign-born subjects coming mainly from Spain. Although all individuals in the SABE (Havana) were non-institutionalized, they were not necessarily free of comorbidities [16] (not analyzed in the present study).

Anthropometry

All measurements were taken in subjects who were able to stand and walk. The bedridden subjects were excluded ($n = 56$), as were those with conflicting values ($n = 23$). A few measurements were not taken in some of the elderly ($n = 150$) due to their refusal.

Tables 1 and 2 show BM, height, and BMI values (means, standard deviations, and percentiles) distributed by age group for women and men, respectively.

Table 1
BM, height, and BMI in women ≥60 y of age; Survey on Health, Aging, and Well-Being in Latin America and the Caribbean (SABE), Havana, Cuba, 2000

Variable	Age group (y)	*n*	Mean*	SD	Percentile						
					5	10	25	50	75	90	95
BM (kg)†	60–64	234	64.95[a]	13.84	45.00	49.00	55.78	63.50	73.00	83.00	89.00
	65–69	217	62.97[a]	14.81	41.90	45.00	52.08	62.17	71.00	81.00	85.30
	70–74	213	59.19[b]	12.30	38.00	43.22	51.00	58.10	68.00	75.00	78.72
	75–70	181	56.72[b]	12.51	37.00	40.00	47.00	57.50	65.00	71.00	78.15
	≥80	197	53.19[c]	11.56	35.12	37.90	44.58	52.50	60.95	68.36	73.00
Height (m)†	60–64	235	1.55[a]	0.07	1.43	1.46	1.50	1.55	1.60	1.63	1.65
	65–69	218	1.54[a]	0.07	1.43	1.45	1.49	1.54	1.59	1.63	1.65
	70–74	214	1.53[ab]	0.07	1.43	1.45	1.49	1.54	1.58	1.62	1.65
	75–70	180	1.52[b]	0.06	1.41	1.45	1.48	1.52	1.56	1.59	1.64
	≥80	197	1.50[c]	0.07	1.37	1.41	1.45	1.50	1.55	1.59	1.63
BMI (kg/m^2)†	60–64‡	234	27.23[a]	5.59	17.84	20.17	23.28	26.51	30.77	34.21	36.82
	65–69‡	217	26.57[ab]	6.12	17.45	18.83	22.68	26.24	29.79	33.07	37.65
	70–74‡	213	25.15[bc]	4.89	17.29	18.86	21.45	25.36	28.29	31.12	32.98
	75–70§	180	24.53[cd]	5.11	16.04	17.45	20.61	24.44	27.80	31.22	33.13
	≥80‖	196	23.58[d]	4.84	16.07	18.08	20.36	23.31	26.35	29.36	32.44

BM, body mass; BMI, body mass index
* Mean values with different superscript letters were significantly different (Turkey's test).
† $P = 0.000$, statistically significant difference of mean values across age groups (analysis of variance).
‡ $P = 0.000$, statistically significant difference of mean values between sexes (Student's *t* test).
§ $P = 0.001$, statistically significant difference of mean values between sexes (Student's *t* test).
‖ $P = 0.008$, statistically significant difference of mean values between sexes (Student's *t* test).

Body mass was greater ($P = 0.000$) in the youngest as compared with the oldest elderly among men and women. When the oldest age group was compared with the 60- to 64-y group, the reductions in median BM were 17.33% (11 kg) and 13.3% (9.10 kg) for women and men, respectively.

Women featured a difference of 3.2% (5 cm) in mean ST between the 60- to 64-y-old group and the oldest individuals (≥80 y). Multiple comparisons (Tukey's test) revealed a significant difference between the two youngest groups (60–64 and 65–69 y) and the 75- to 79-y-old group and

Table 2
BM, height, and BMI in men ≥60 y of age; Survey on Health, Aging, and Well-Being in Latin America and the Caribbean (SABE), Havana, Cuba, 2000

Variable	Age group (y)	*n*	Mean*	SD	Percentile						
					5	10	25	50	75	90	95
BM (kg)†	60–64	195	68.78[a]	12.05	49.80	52.64	59.90	68.10	77.20	86.00	90.18
	65–69	148	65.02[ab]	12.56	46.45	49.00	55.03	64.00	74.25	82.65	89.10
	70–74	109	63.04[bc]	11.84	43.50	49.00	55.00	64.00	70.65	77.50	83.00
	75–79	85	60.74[bc]	14.69	40.00	44.00	49.00	58.00	72.50	80.20	87.80
	≥80	95	59.26[c]	10.48	43.40	45.60	52.50	59.00	65.50	72.56	79.60
Height (m)†	60–64	195	1.68[a]	0.07	1.57	1.60	1.64	1.68	1.72	1.77	1.80
	65–69	147	1.67[ab]	0.07	1.55	1.58	1.62	1.67	1.71	1.76	1.79
	70–74	109	1.67[ab]	0.06	1.56	1.59	1.63	1.67	1.71	1.74	1.76
	75–79	85	1.65[bc]	0.07	1.53	1.55	1.60	1.66	1.70	1.77	1.78
	≥80	95	1.63[c]	0.08	1.48	1.55	1.59	1.64	1.69	1.73	1.75
BMI (kg/m^2)†	60–64‡	195	24.35[a]	4.04	17.70	18.77	21.27	24.57	26.97	29.35	31.46
	65–69‡	147	23.32[ab]	4.16	16.61	18.11	20.26	23.08	25.80	28.65	30.45
	70–74‡	109	22.70[b]	3.98	16.52	17.80	20.49	22.41	25.42	27.59	29.39
	75–79§	85	22.20[b]	5.09	15.26	16.31	17.97	21.33	25.75	29.15	32.08
	≥80‖	94	22.20[b]	3.76	16.45	17.29	19.92	21.82	24.18	27.96	29.17

BM, body mass; BMI, body mass index
* Mean values with different superscript letters were significantly different (Turkey's test).
† $P = 0.000$, statistically significant difference of mean values across age groups (analysis of variance).
‡ $P = 0.000$, statistically significant difference of mean values between sexes (Student's *t* test).
§ $P = 0.001$, statistically significant difference of mean values between sexes (Student's *t* test).
‖ $P = 0.008$, statistically significant difference of mean values between sexes (Student's *t* test).

between the oldest group (≥80 y) and all other age groups. For men, ST difference was 3.0% (5 cm) between the youngest and oldest groups ($P = 0.000$). Tukey's test revealed a significant difference between the three youngest groups (60–64, 65–69, and 70–74 y) and the oldest group. Mean ST values for men and women were the same as median values in nearly all age groups, which indicates that the measurement presented a symmetric distribution.

Mean BMI was greater ($P < 0.01$) in women than in men in each age group, and it was lower in the oldest than in the youngest individuals ($P = 0.000$). Multiple comparisons showed that, for women, differences were significant between the two youngest groups (60–64 and 65–69 y) and the two oldest groups (75–79 and ≥80 y). For men, differences were significant between the 60- to 64-y-old group and the three oldest groups (70–74, 75–79, and ≥80 y). Mean BMI values were close to median values in all age groups, indicating that those measurements were slightly influenced by extreme values.

Distributions (means, standard deviations, and percentiles) for CC, AC, TSF, AMC, and WC are shown in Tables 3 (women) and 4 (men).

For both sexes, CC, AC, TSF, AMC, and WC values were greater in younger groups compared with older ones ($P < 0.01$). Multiple comparisons showed that, for both sexes, there was no significant difference between the two youngest groups (60–64 and 65–69 y) regarding AC, AMC, TSF, WC and CC.

Mean TSF were slightly above median values for both sexes in all age groups. Differences ranged from 0.38 to 1.96 mm in women, indicating that the distribution is skewed and that mean TSFs are influenced by extreme values; for men, the means exceeded the median values by 0.67 to 1.70 mm, showing the slight influence of extreme values. According to Tukey's test, significant reductions in BM, BMI, AC, AMC, TSF, and CC measurements occur for both sexes from the age of 70 y.

For women, the smallest values of WC ($P = 0.000$) were observed in the three oldest groups (70–74, 75–79, and ≥80 y); for men, significant differences ($P = 0.001$) occurred between the 60- to 64-y-old group and the two oldest groups (75–79 and ≥80 y).

Discussion

This appears to be the first population-, household-based study made with the Cuban elderly to present the distribution of anthropometric values and nutritional indicators as percentiles, specific for sex and age group. The

Table 3
Anthropometric values for women ≥60 y of age; Survey on Health, Aging, and Well-Being in Latin America and the Caribbean (SABE), Havana, Cuba, 2000

Variable	Age group (y)	*n*	Mean*	SD	Percentile						
					5	10	25	50	75	90	95
AC (cm)†	60–64	235	30.28[a]	4.83	22.49	24.04	27.00	30.00	33.40	36.68	38.00
	65–69	218	29.23[ab]	5.19	22.00	22.97	25.87	29.00	32.39	35.94	37.68
	70–74	214	28.43[bc]	4.49	21.75	22.50	24.93	28.35	31.40	34.13	36.00
	75–79	180	27.74[c]	4.61	21.00	21.50	24.00	27.58	31.00	34.00	35.95
	≥80	198	26.32[d]	4.51	19.10	21.00	23.00	26.00	29.02	33.00	34.11
AMC (cm)†	60–64	235	24.48[a]	4.36	18.20	19.54	21.23	23.98	27.03	30.40	32.38
	65–69	218	23.79[ab]	4.36	18.14	19.09	20.50	23.29	26.40	28.88	30.98
	70–74	213	23.37[b]	3.89	17.27	18.72	20.50	23.19	25.62	29.23	30.08
	75–79	180	22.80[bc]	4.07	16.48	17.81	19.54	22.41	25.64	28.43	30.24
	≥80	197	21.87[c]	3.79	16.41	17.35	19.08	21.23	24.02	27.47	29.05
TSF (mm)†	60–64	235	18.45[a]	8.22	7.00	8.00	11.67	18.00	24.00	30.00	33.00
	65–69	218	17.31[ab]	7.17	8.00	9.00	11.00	16.00	22.00	26.00	30.00
	70–74	213	15.91[bc]	7.71	6.00	7.47	10.00	15.00	20.33	25.00	30.00
	75–79	181	15.76[bc]	7.28	6.00	7.00	10.00	15.00	20.00	25.00	29.90
	≥80	197	14.21[c]	6.82	5.00	6.00	9.33	12.00	19.00	24.07	28.07
WC (cm)†	60–64	235	90.32[a]	13.20	68.78	72.12	81.30	90.00	99.00	107.07	111.47
	65–69	218	89.06[ab]	13.71	65.04	70.33	79.28	89.92	99.00	105.02	109.53
	70–74	212	86.62[bc]	12.33	65.61	70.00	77.63	87.00	95.33	101.81	105.35
	75–79	180	86.01[bc]	12.03	67.18	71.00	77.01	86.00	94.03	99.91	105.95
	≥80	197	83.96[c]	11.96	65.45	68.96	75.10	85.00	92.67	99.00	104.10
CC (cm)†	60–64	234	35.63[a]	3.98	29.92	30.82	33.00	35.45	38.00	41.00	42.13
	65–69	218	34.59[ab]	4.18	28.10	29.41	32.00	34.98	37.00	39.00	41.04
	70–74	213	33.82[bc]	3.67	28.00	29.11	31.00	34.00	36.47	38.95	40.00
	75–79	181	33.32[c]	4.23	26.05	28.00	30.68	33.27	36.00	38.63	40.00
	≥80	198	31.89[d]	4.14	25.06	26.48	29.00	31.77	34.33	37.01	40.00

AC, arm circumference; AMC, arm muscle circumference; CC, calf circumference; TSF, triceps skinfold thickness; WC, waist circumference
* Mean values with different superscript letters were significantly different (Turkey's test).
† $P = 0.000$, statistically significant difference of mean values across age groups (analysis of variance).

Table 4
Anthropometric values for men ≥60 y of age; Survey on Health, Aging, and Well-Being in Latin America and the Caribbean (SABE), Havana, Cuba, 2000

Variable	Age group (y)	*n*	Mean*	SD	Percentile						
					5	10	25	50	75	90	95
AC (cm)†	60–64	195	29.42[a]	3.73	23.05	24.56	27.00	29.50	32.00	34.00	36.00
	65–69	146	28.34[ab]	3.82	22.00	23.76	25.68	28.00	31.00	34.02	35.28
	70–74	109	27.53[bc]	3.45	20.97	23.00	25.08	27.50	30.00	32.00	33.25
	75–79	85	26.83[c]	4.39	20.25	21.07	23.75	26.10	29.65	32.40	36.30
	≥80	96	26.35[c]	3.39	21.94	22.00	23.50	26.00	28.98	31.00	32.25
AMC (cm^2)†	60–64	195	24.87[a]	3.30	19.76	20.76	22.74	24.82	26.92	29.18	30.91
	65–69	146	24.34[a]	3.56	19.20	19.83	22.18	23.89	26.74	28.84	31.22
	70–74	109	23.68[ab]	2.97	18.17	19.86	21.80	23.65	25.43	27.33	28.95
	75–79	85	23.14[b]	3.61	17.55	18.64	20.65	22.96	25.41	27.49	29.99
	≥80	96	22.72[b]	3.18	18.39	19.04	20.72	22.13	24.51	26.93	29.25
TSF (mm)†	60–64	195	14.49[a]	7.17	6.00	7.00	9.00	13.00	18.00	24.27	29.47
	65–69	147	12.71[ab]	5.91	5.00	6.00	8.00	12.00	15.00	22.00	25.00
	70–74	109	12.24[b]	5.74	5.33	6.00	8.33	10.67	15.00	20.00	23.33
	75–79	85	11.76[b]	5.95	4.30	5.20	7.00	10.00	16.00	20.40	23.70
	≥80	96	11.56[b]	5.49	5.00	5.00	8.00	10.33	14.00	20.30	23.30
WC (cm)†	60–64	195	92.20[a]	11.06	73.92	77.00	84.00	92.47	100.00	107.00	109.60
	65–69	146	89.88[ab]	10.80	74.00	76.94	81.88	88.07	96.00	105.00	108.72
	70–74	109	89.09[ab]	10.85	69.00	74.40	82.17	90.00	97.00	102.00	105.50
	75–79	84	87.36[b]	13.59	71.00	71.67	77.00	83.75	97.21	106.70	112.63
	≥80	96	87.10[b]	10.43	71.00	73.41	79.25	86.32	94.08	100.30	105.00
CC (cm)†	60–64	195	34.51[a]	3.60	28.87	29.97	32.00	35.00	37.00	39.00	40.51
	65–69	147	34.02[ab]	3.48	29.00	30.00	32.00	33.50	36.00	38.47	40.28
	70–74	109	33.03[bc]	3.56	27.03	29.00	30.90	33.13	35.00	37.33	39.67
	75–79	85	32.31[c]	3.84	25.65	28.00	29.33	32.00	35.00	37.70	38.47
	≥80	96	32.38[c]	3.86	26.00	27.74	30.00	32.38	35.00	38.00	39.00

AC, arm circumference; AMC, arm muscle circumference; CC, calf circumference; TSF, triceps skinfold thickness; WC, waist circumference
* Mean values with different superscript letters were significantly different (Turkey's test).
† $P = 0.000$, statistically significant difference of mean values across age groups (analysis of variance).

study was provided with representative samples from individuals ≥60 y old, which suggests that the results found can be extrapolated to the overall elderly population in the city of Havana. Otherwise, because they are part of an international multicenter study, the anthropometric comparisons with data from countries that took part in the SABE [8,9] have the advantage of using the same protocol and instruments for the measurements.

The BMI is the nutritional status indicator that is most frequently used in surveys [3,5] and is also an important mortality indicator for adults of all ages [2,4]. The AMC and CC estimate muscle tissue reserve and are considered sensitive to muscle alterations, whereas the TSF is an important adiposity measurement. The WC has been used to identify risk of cardiovascular diseases and metabolic disorders [17]. All of those indicators are recommended [18] and used to assess the nutritional status of the elderly.

Results have shown greater BM and height values for men and younger age groups, according to what was expected and observed in other cross-sectional and longitudinal studies [6–9,12,13,17,19].

Factors such as loss of muscle tone and greater muscle contraction, compression, and alterations in intervertebral discs and vertebral bodies can present as height reduction, along with postural alterations as a result of osteoporosis [18], whose referred prevalence in the elderly of Cuba was 3.4% (data not presented).

Cohort effect and secular trend could also explain the fact that age and height were inversely related, as pointed out by other researchers [9]. However, if different environmental conditions affected ST throughout life, then that effect should also be reflected in the knee height of the elderly. Because this remained relatively constant among the age groups (data not presented), the occurrence of a secular trend seems unlikely, as observed by Santos et al. [8].

As for BM, it is believed that the reductions in total body water [18], muscle mass [20], cohort effect, and selection bias, due to institutionalization or earlier death of overweight and obese persons (a relation that is impossible to assess in a household survey), can contribute to the lower values of this measurement in older individuals.

It is worth noting that in the present study, age-related BM reduction happened differently for each sex. For women, the difference in mean values was 11.76 kg (18.1%) between extreme age groups (60–64 and ≥80 y), and for men, the observed difference was 9.52 kg (13.8%) between the same age groups.

This difference regarding BM, between sexes, was observed in the elderly from Mexico City [13] who took part

in the SABE [8,9] and in Mexican Americans (racial/ethnic group) examined in the Third National Health and Nutrition Examination Survey [6]. Data from the Third National Health and Nutrition Examination Survey for all Americans (all racial/ethnic groups) [6] and of Italian elderly [7] showed a similarity, between sexes, in the different BM values with increasing age. According to the World Bank [21], in poor countries women are predominant among the oldest individuals, report more chronic, non-transmittable diseases, and are more adversely affected in nutritional conditions. Possibly, living conditions (past and present) of the Mexican-American elderly do not match those of other racial/ethnic groups of the United States and are closer to those of developing countries.

Body mass index was higher in women than men in all age groups and was lower in the oldest than in the youngest individuals, as shown in other studies in elderly populations [6–9,13,22]. Mean BMIs were lower for the elderly in Havana for both sexes and the same age groups as compared with results from other studies in Latin America [8,9,13]. Differences were more expressive when data were compared with those of developed countries [6,7,12]. Although a lower BMI provides evidence of less obesity among Cubans, it may be a sign of greater nutritional vulnerability. This concern becomes apparent when, for instance, one uses the cutoff point of Troiano et al. [23], which identifies low weight (BMI <23 kg/m^2) in approximately 25% and 50% of women and men, respectively, in all age groups.

In the present study, results showed more subcutaneous fat in women (greater TSF values), whereas muscle mass indicators (AMC and CC) were slightly greater for men. Differences in mean AC, TSF, AMC, and CC values between the 60- to 64-y-old and ≥80-y-old groups were greater for women (in percentage), which suggests that elderly women undergo slightly more intense reductions in subcutaneous fat and muscle mass when compared with men, as observed in Mexican elderly individuals [13].

As for abdominal fat (WC), data from the present study showed lower values from ages older than 70 and 75 y (in women and men, respectively). Data from Velazquez-Alva et al. [13], Santos et al. [8], and Barbosa et al. [9] reported that lower values were observed in more advanced age groups (≥80 or ≥85 y). Although risk values for metabolic disorders and cardiovascular diseases in the elderly are not established, when the cutoff points proposed by Lean et al. [24] (WCs ≥88 and 102 mm for women and men, respectively) are considered, it can be observed that approximately 50% of the 60- to 69-y-old women and 25% of the other age groups are at risk, as are 10% of men 60 to 74 y of age.

Results from the present study have shown that the elderly of Havana have a dissimilar nutritional status than the one featured in other cities of Latin America and developed countries. Such differences can be related to political, social, economic, and lifestyle issues, among other factors. It is widely known that Cuba has a government system that diverges from the other countries that were mentioned for comparison and has been functioning under an economic embargo for some time. However, the nature of the present study does not allow a measurement of how far such conditions can affect (positively or negatively) the nutritional status of these individuals.

Anthropometric differences related to age and sex shown in the present study should take into consideration the cross-sectional nature of the survey, which restricts the inferences related to body alterations with advancing age. However, the results are consistent with longitudinal findings [17].

The present study provides information that can be used for the anthropometric assessment of elderly people in Havana and other Cuban urban areas. The data may be used for comparison, evaluation, and surveillance of the nutritional status in the elderly, whether in clinical practice or in epidemiologic studies. Additional studies covering the elderly from other areas of Cuba, in addition to longitudinal surveys, are necessary to quantify, determine, and characterize the nutritional profile.

Conclusion

The observations derived from this study suggest the occurrence of alterations in body dimensions with advancing age, differentiated by sex. There is loss of muscle mass and redistribution and reduction of fat mass that is more severe in women. Many of the anthropometric differences are more remarkably noticed from the age of 70 y.

Acknowledgments

The authors acknowledge the Pan-American Health Organization and the older people who participated in the SABE.

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