ANTHROPOMETRIC AND BIOCHEMICAL STUDIES AMONG RESIDENTS OF OLD PEOPLE'S HOMES IN SINGAPORE

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SYNOPSIS

442 apparently healthy residents of five old people's homes in Singapore were studied for their heights, weights, skinfold thickness, blood pressure, haematological picture, serum cholesterol, serum urea, blood sugar and blood urea. Females had significantly higher blood pressure and serum cholesterol but lower haemoglobin levels than males. The blood urea levels were higher than the usually accepted norms for young healthy adults. Leucocytes ranged from 3,0000 to 13,000 per cu mm. There was no significant difference in the mean values of skinfold thickness between age groups, but proportionately more non-Chinese females had a skinfold thickness of 1.6 cm or greater than Chinese females.

INTRODUCTION

Many studies had been carried out in the West concerning the physiological and biochemical changes in people as they grew old. However, relatively few such studies have been carried out in developing or non-Caucasian countries outside Japan. This present study concerns a study of 442 apparently healthy residents of five old people's homes in Singapore. The minimum age at entry into the homes was 60 years. There was a total of 605 such persons. The rest were either not available for examination as they were in hospital or declined to be examined. They constituted all such homes run by voluntary organizations under the Council of Social Services, Singapore at the time of study. The

findings could not be interpreted as necessarily representative of the old people of similar age groups in Singapore, as the sample was not a random one chosen from the "universe" of all such persons. However, it was felt that recording of certain biochemical and physiological values was still worthwhile to provide a basis on which further and more extensive studies could be done. The polyglot nature of the group studied also enabled some tentative conclusions to be made on ethnic differences in the aged in Singapore.

MATERIALS AND METHODS

The heights and weights of the subjects were measured with the Detecto weighing scale fitted with a height measure. The skinfold thickness was measured by the Ponderax skinfold calipers at the triceps. The resting blood pressure was taken by a mercury-column sphygmomanometer with the subjects in bed in a reclined position. Three readings were taken and the mean recorded. One-minute pulse rate readings were taken. Haemoglobin level was measured on the Hitachi 124 spectrophotometer using the Cyanmethaemoglobin method. Random blood sugar estimations were done by the o-toludine method on morning samples. Serum cholesterol was measured by the sulphuric acid colour development method. Serum protein levels were measured by direct reading on the American Optical refractometer. Blood urea was estimated by the diacetyl-monoxine method. A haematological examination (haemoglobin, leucocytes and platelets) was done.

RESULTS

Height and Weight

From Tables 1 and 2 it can be seen that significantly more ethnic Chinese males and females were shorter than their non-Chinese counterparts. It must be stressed, however, that the non-Chinese were a mixed group, comprised mainly of Eurasians, Indians and Pakistanis. There was no significant difference between the residents of either individual homes or age cohorts. Relatively more non-Chinese females were found to be 45 kg or more in weight, as compared with Chinese females. The difference was significant (X^2 = 6.92, $p<0.01$). For the males, no significant difference was found between the Chinese and non-Chinese.

TABLE 1
COMPARISON OF HEIGHTS OF CHINESE AND NON CHINESE MALES

Height (m)	Chinese		Non-Chinese	
	Number	%	Number	%
<1.6	62	45.3	4	18.2
1.6 +	75	54.7	18	81.8
Total	137	100.0	22	100.0

(X^2 = 4.66, $p<0.05$)

TABLE 2
COMPARISON OF HEIGHT OF CHINESE AND NON CHINESE FEMALES

Height (m)	Chinese		Non-Chinese	
	Number	%	Number	%
<1.5	114	73.1	14	43.8
1.5 +	42	26.9	18	56.2
Total	156	100.0	32	100.0

(X^2 = 9.20, $p<0.01$)

Skinfold Thickness

There was no significant variation in skinfold thickness between age groups. Proportionately more non-Chinese than Chinese females had a skinfold thickness of 1.6 cm or more (Table 3). The difference was significant (X^2 = 13.10, $p<0.001$). However, no such racial difference was seen in males.

TABLE 3
COMPARISON OF SKINFOLD THICKNESS BETWEEN CHINESE AND NON CHINESE FEMALES

Skinfold thickness (cm)	Chinese		Non-Chinese	
	Number	%	Number	%
<1.6	129	81.1	17	50.0
1.6 +	30	18.9	17	50.0
Total	159	100.0	34	100.0

(X^2 = 13.10, $p<0.001$)

Blood Pressure

There was no significant difference according to age or ethnic group in terms of the mean values of diastolic or systolic blood pressure. However, Chinese females had a systolic mean of 9mm higher than the Chinese males. This was found to be statistically significant (t = 3.18, $p<0.01$). A similar phenomenon was observed among Indians, but the sex difference was not found to be statistically significant (t = 0.8 not significant).

Pulse Rate

The mean was 72.9 per minute and there was no significant difference between age or ethnic groups or the sexes.

Haemoglobin Levels

For all ages and ethnic groups, the females had a lower mean value (11.3 gm %) than the males (12.3 gm %). In addition, significantly more males than females had haemoglobin of less than 12 gm % (X^2 = 27.48, $p<0.001$).

Haematological Picture

The total white count ranged from 3,000 to 13,000 per cu mm (mean 5,880, S.D. 1,752). All the platelet counts were within the normal limits for adults.

Serum Cholesterol

The distribution of serum cholesterol values for males and females is shown in Table 4. For females, the mean value was 259.1 mg % (S.D. = 77.2), while for the males the mean was 214.8 mg % (S.D. = 79.7). Taking 260 mg % as the upper limit of normal, significantly more females than males had cholesterol values greater than 260 mg (X^2 = 28.42, $p<0.001$).

TABLE 4
DISTRIBUTION OF SERUM CHOLESTEROL VALUES BY SEX

Serum Cholesterol Level (mg %)	Sex		
	Male	Female	Total Number
< 180	60	18	78
180 –	23	23	46
200 –	24	21	45
220 –	19	20	39
240 –	21	29	50
260 –	7	25	32
280 –	7	17	24
300 +	24	55	79
Total	185	208	393

Blood Sugar

The mean value for all the subjects was 97.5 gm % and there was no significant difference between sexes or age groups. The Indian females were found to have significantly higher blood sugar (167.5 gm %) than Indian males (90.7 mg %).

Serum Urea

The mean values for males (38.2 mgm %) and females (36.2 mgm %) were within the ranges of normally accepted levels. There was no increase with age. However, as could be seen from Table 5 there were quite a few subjects, without either history or symptoms of renal disease, who were found to have blood urea values in excess of the range taken as normal in young adults.

TABLE 5
DISTRIBUTION OF BLOOD UREA

Urea mg %	Number
10 –	4
20 –	51
30 –	140
40 –	106
50 –	62
60 –	18
70 –	10
80 +	3
Total	394

DISCUSSION

In many studies carried out among Caucasian subjects, it was found that height and weight tended to diminish with advancing age. Among many non-Caucasian communities studied, however, it was found that height and weight tended to be the same irrespective of age. The present study seems to bear out that observation, although following the same cohort of subjects through several years would perhaps be more conclusive on this point than cross-sectional studies on different age cohorts, as were done by us. It is difficult to draw conclusions on the height weight or skinfold differentials between Chinese and non-Chinese subjects. In general, Eurasians are bigger than Chinese in Singapore and the heavy representation of Eurasians in our study population might explain the differences.

The significantly higher systolic blood pressure among aged females than males is in keeping with several other studies done on the subject. Our finding that females had a significantly lower haemoglobin level than males coincides with that of most previous studies. Kaufman, Grant and Moorhouse (1969) found that the sex difference persisted through old age (1). It is noteworthy that the consistently lower haemoglobin levels among females tended to remain unchanged even in advanced age and after blood loss from menses or childbirth had long passed. It cannot be explained on nutritional grounds, as both sexes partook of the same institutional diet and lived in identical conditons. It has also been found that post-menopausal women did not take less iron in their diet than at earlier ages (2).

The significantly higher serum cholesterol among females is also difficult to explain on dietary or other reasons. It is well known that females of young adult age have lower cholesterol levels than males of the same age. Other studies among the aged, however, have shown the same reverse finding amog the sexes (3).

The higher blood sugar levels among Indian females than males could be explained probably by the fact that there were 16 known diabetics among Indian females but only 6 among Indian males.

The range of total white counts was 3,000 to 13,000 per cu mm. The lowest value of the range would perhaps be regarded as slight leucopaenia if found among young adults. However, it is consistent with the observations from other studies (4).

The blood urea levels were quite high among symptomless subjects, compared with the usual standard for young adults. Therefore, caution has to be exercised in construing such levels as abnormal if found in older persons (5). It has also to be pointed out that our study did not control for the taking of durugs, although it has been found that medications could affect blood values of urea and other substances in the aged (6).

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