A Comparative Study of the Prevalence of Adult Obesity in the Three Racial Groups of Kuala Lumpur

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Summary

THE HEIGHTS and body weights have been measured in 550 healthy adults in Kuala Lumpur, and also in another 50 adults with minor disorders. The degree of obesity was determined from the Quetelet index i.e. weight . height^{-2}. Obesity was found to be most uncommon before the age of 30 years, and also throughout life in the Chinese man. After 30 years of age, 21 to 40% of Malay and Indian men and women and of Chinese women were found to be more than 20% overweight. Amongst the women, obesity was particularly prevalent in Indians aged 31 to 40, and in Chinese over 50 years of age.

This pattern of obesity does not appear to be related to differences in diet, but it may well be expected to influence the prevalence of coronary heart disease and diabetes in the adult population of urban Malaysia.

Introduction

Recent population studies in Europe and America show that obesity predisposes to the development of many degenerative diseases associated with the "Western" way of life, including diabetes, coronary heart disease and hypertension, (1,2). These three conditions are now becoming increasingly more common in urban Malaysia and have already acquired a popular name: "tiga serangkai" meaning a collection of three (diseases) forming one bunch.

Consequently it is important to determine the prevalence of obesity in the urban population of Malaysia, and to establish whether obesity carries the same risk for the Asian as already established for the European.

Methods

Heights (without shoes) and body weights (without shoes and in light clothing) were measured on 300 adult women and 300 adult men aged 20 to 70 years. The numbers from the three main racial groups (Malay, Chinese and Indian) were almost equal. Five hundred of these adults were the healthy relatives of patients attending the General Hospital Kuala Lumpur, 50 were technicians and cleaners and 50 were patients with minor complaints, (mostly of the skin). In this group of technicians, cleaners and patients, the skin fold thickness was measured with Harpenden calipers and details of the previous 24 hours' diet were recorded.

The Quetelet index has been strongly recommended as being the most reliable index of obesity (3). It was calculated as weight . height^{-2}, with the body weight measured in kg and the height in m. The significance of the differences between groups was calculated using Wilcoxon's test, the hypergeometric distribution or chi squared as appropriate (4).

Results

Figures 1 to 4 show the body weights ane Quetelet indices for men and women from ths three racial groups. Compared with the "average" American (5) of the same age and height, all groupd are underweight; but in general, all groups after 30 years of age are overweight when compared with the "desirable" (5) weight (and corresponding index) of an American of the same height with a "light

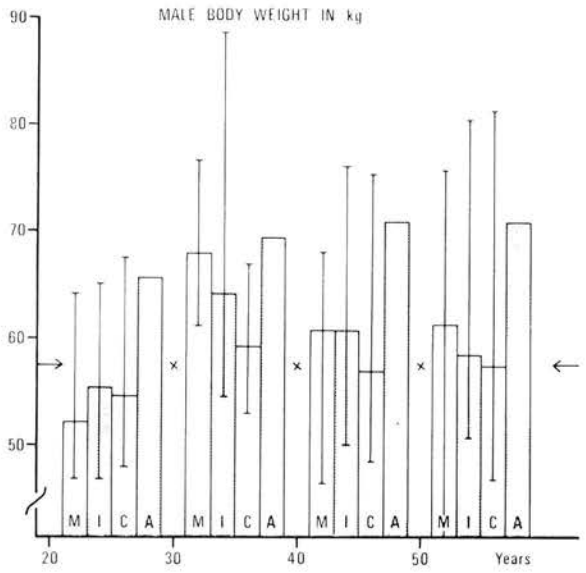

Figure 1

The effect of age on the median body weight (measured in kg) of 300 men from the Malay (M), Indian (I) and Chinese (C) populations compared with the "average" American man (A) of the same height (5). The two arrows and the crosses show the "desirable" weight of the American man of the same height and with a "light frame" (5). The bars show the 10th and 90th percentiles.

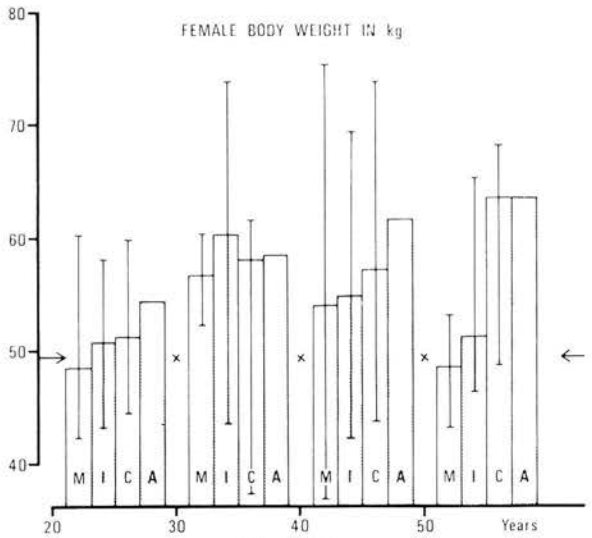

Figure 2

The effect of age on the median body weight (measured in kg) of 300 women from the Malay (M), Indian (I) and Chinese (C) populations compared with the "average" American woman (A) of the same height (5). The two arrows and the crosses show the "desirable" weight of the American woman of the same height and with a "light frame" (5). The bars show the 10th and 90th percentiles.

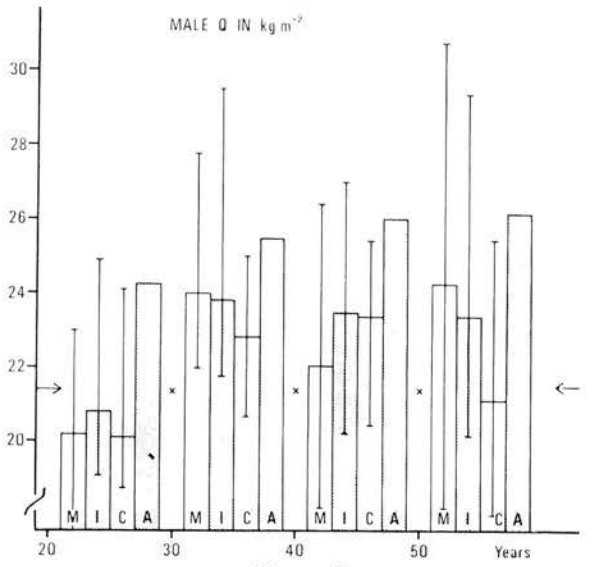

Figure 3

The effect of age on the median Quetelet index (measured in kg.m^{-2}) of 300 men from the Malay (M), Indian (I) and Chinese (C) populations compared with the "average" American man (A) of the same height (5). The two arrows and the crosses show the "desirable" index of the American man of the same height and with a "light frame" (5). The bars show the 10th and 90th percentiles.

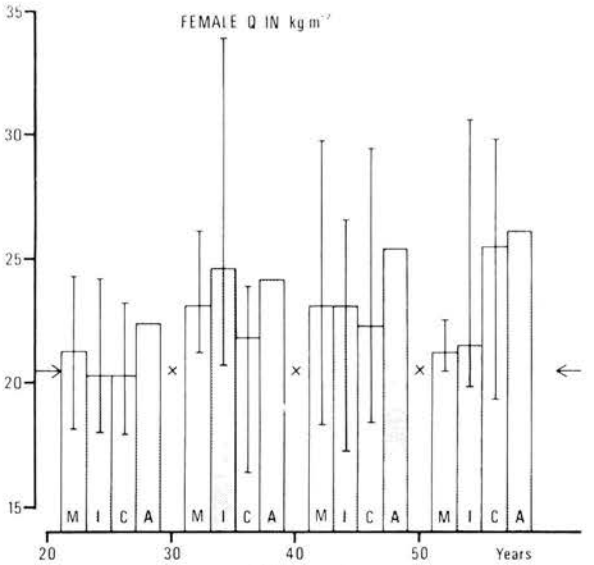

Figure 4

The effect of age on the median Quetelet index (measured in kg.m^{-2}) of 300 women from the Malay (M), Indian (I) and Chinese (C) populations compared with the "average" American woman (A) of the same height (5). The two arrows and the crosses show the "desirable" index of the American woman of the same height and with a "light frame" (5). The bars show the 10th and 90th percentiles.

frame". In the American population, the desirable weight (and index) predict the minimum mortality, particularly from cardiovascular disease.

Table I shows that although there is no difference between the median heights of young men in the three racial groups, young Malay women are significantly shorter than both Chinese and Indian women. In all groups, a loss of height of about 2 cm occurred with increasing age.

women aged 20 to 30, it is probably a valid criterion. below the Americans' "desirable" weight, so that the increase in obesity in the older men is almost certainly underestimated.
On the other hand, the median weight of men aged 20 to 30 from all three racial groups is considerably

Table II shows that in all sections of the urban population, obesity is most uncommon at 20 to 30 years of age. However, after this age obesity

Table I

Height of Men and Women Aged 20 to 30 Years

	MEN (M)			WOMEN (F)*		
	Median	10th %	90th %	Median	10th %	90th %ile
Malay (M)	164	152	170	154	145	157
Chinese (C)	164	160	173	157	152	163
Indian (I)	165	152	170	159	147	165

Height without shoes measured in cm
* FM<FC and FI; P<0.02

If obesity is defined as 20% or more overweight, it will occur when the Quetelet index exceeds 120% of the "desirable" value. Since the "desirable" weight is identical to the median weight for Asian

occurs in 21 to 40% of all racial groups with the notable exception of the Chinese men. Obesity is particularly prevalent in Indian women aged 30 to 40 and in Chinese women over 50 years of age.

Table II

Percentage of Each Group More Than 20% Overweight

	Age in years				
MEN	20 to 30	31 to 40	41 to 50	over 50	over 30
Malay (MM)	2	44	20	33	28 a
Chinese (MC)	3	4	20	8	9 a b
Indian (MI)	6	24 c	27	27	23 a
American	12	25	32	32	30
WOMEN					
Malay (FM)	9	20 d	33	8 c	21
Chinese (FC)	3	7 d	20	56 c	28 b
Indian (FI)	7	50 d e	27	38 c	40
American	12	25	40	45	37

a: MC<MM and MI; P<0.02
b: MC<FC ; P<0.04
c: FC>FM and FI ; P<0.07
d: FI>FM and FC ; P<0.01
e: FI>MI ; P<0.07

Table III shows the skin fold thickness in men and women aged 20 to 30 years. No racial difference could be detected, but as expected, skin folds were thicker in women than in men. No sex or racial difference was found in the ratio of abdominal girth to height: median 0.42 (0.37 to 0.45).

Table IV shows the diet during the previous 24 hours. It can be seen that the only significant differences detected were the smaller quantity of sucrose and larger quantity of meat eaten by the Chinese when compared with the Malays and Indians. All three groups appear to eat the same quantity of fruit (1 per day), vegetables (twice per day), eggs (1 per 5 days), saturated fat (80 g per day) and cholesterol (300 mg per day), but the Indians drink significantly more alcohol ($P < 0.02$).

No differences in blood pressure or plasma cholesterol were found between the three racial groups, but the expected increase with age was detected:
cholesterol 190 mg per dL (160 to 310) at 25 years increasing to 230 (120 to 280) at 55 years
systolic pressure 120 mm Hg (100 to 130) at 25, increasing to 130 (110 to 150) at 55 years
diastolic pressure 80 mm Hg (60 to 85) at 25, increasing to 85 (70 to 100) at 55 years.

No difference with race or age was found in plasma uric acid, but the expected sex difference was detected: men 6 mg per dL (4 to 9) and women 5 mg per dL (2 to 7).

Discussion

With the striking exception of the Chinese men, obesity appears to be equally prevalent in all sections of the adult population in Kuala Lumpur. After the age of 30 years, it is equally common as in America (6), 21 to 40% of the population being 20% or more overweight. In America and Europe, this degree of obesity carries a three fold increase in the risk of developing coronary heart disease (1,2).

Apart from small differences in sucrose and alcohol consumption, diet does not appear to explain the Chinese man's relative freedom from obesity, nor were racial differences in plasma biochemistry

Table III

Skin Fold Thickness Measured in mm

	MEN			WOMEN		
	Median	10th %	90th %	Median	10th %	90th %ile
Triceps	9	6	16	15	11	23
Subscapular	12	8	22	18	11	23
Supra-iliac	11	7	19	14	10	19
Thigh	12	6	19	22	6	40

Table IV

Diet During the Previous 24 Hours

	MALAY (M)			CHINESE (C)			INDIAN (I)		
	Median	10th	90th %ile	Median	10th	90th %ile	Median	10th	90th %
Sucrose (a)	90	30	200	50	0	180	110	60	230
Meat (b)	15	0	50	50	15	150	25	0	80
Fish	160	80	240	120	80	240	160	80	240
Rice	400	300	600	330	150	450	300	0	450
Bread	50	0	120	60	0	120	90	0	250

Food measured in g
a) C<M and I; P<0.02
b) C>M and I; P<0.001

or blood pressure detected. It is therefore suggested that the lower body weight of the Chinese man is most probably associated with a greater degree of physical activity.

If obesity carries the same risk for diabetes and coronary heart disease in the Asian as has already been recognised for the European, the Chinese man would be expected to be relatively free from these disorders when compared with the Malay and the Indian. This possibility is now being investigated.

Acknowledgement

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