

Coronary heart disease: outlook for Africa

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SUMMARY

In Africa, coronary heart disease (CHD) is near absent in rural areas, and very uncommon in urban centres, where many Africans are in an advanced stage of transition. Among town dwellers intakes of food, especially fat, have risen and intakes of fibre-containing foods have fallen. Mean serum cholesterol level is almost double that of rural populations living traditionally. Obesity in females has risen enormously. Prevalence of hypertension exceeds that in the white population. The same applies to the practice of smoking in males, but not in females. The level of physical activity has fallen generally. With these increases in risk factors we can expect urban Africans to attain the high mortality rate for CHD now experienced by Afro-Americans. Prevention by urging reversion to previous life-style behaviour is a non-starter. However, as long as Africa remains impoverished, a major rise in CHD is unlikely.

EPIDEMIOLOGY

Numerous reviews have emphasized the rarity of coronary heart disease (CHD) in Africa. In 1960, Shaper and Williams¹ considered CHD to be 'extremely rare' in Uganda. In 1977, Vaughan described Africans as 'virtually free of hypertension and CHD'². In the same year, at Enugu, Nigeria, not one patient out of 348 with cardiac disorders, over a 4-year period, had CHD³. In 1983, in the UK, a leading article on 'British and African Hearts' underlined the tremendous contrast between the experience of CHD in the two types of population⁴. Later, in Zimbabwe, at the Parirenyatwa Hospital, which is the main referral centre for the country, from 1988 to 1993 there was an annual average of six African patients with acute myocardial infarction⁵. Even at present, as concluded in a comprehensive review by Bertrand, compiled in Nigeria, 'CHD is still rare . . . despite its increased incidence in recent years'. This rarity applies particularly to rural dwellers, as recently noted also in Tanzania⁷.

In Johannesburg in 1946 Becker found only one death due to the disease from post-mortems made on a series of 352 Africans aged 50 years and over⁸. Subsequent studies undertaken in the same city by Higginson and Pepler⁹ in 1954, and by Reef and Isaacson¹⁰ in 1962, testified to the rarity of occlusion of the coronary arteries. In Durban in

1976, Seedat *et al.* emphasized that myocardial infarction was rare in Africans; about 10 cases were seen annually at King Edward VIII Hospital out of a catchment population stated to be about 2 million¹¹. Chesler *et al.*, also in Durban, concluded that 'prevalence of the disease has not increased over the last two decades and the immunity of the African population is unexplained'¹². Later, in 1980, from their angiographic and other studies carried out in the same city, Thandroyen *et al.* reaffirmed that 'coronary heart disease is rare in the black population'¹³. In 1992, Seedat *et al.* noted rises in risk factors, yet CHD remained very uncommon¹⁴.

In Soweto (which has an approximate population of 3 million or more, and is adjacent to Johannesburg), at Baragwanath Hospital (3200 beds), according to records of the department of cardiology, in 1992, 35 Africans were diagnosed with CHD; in 1993, 51; but in 1994, 62 patients. However, of the latter number, 36 were Sowetans; the rest lived elsewhere. Thus, CHD remains very uncommon in urban Africans in South Africa.

To afford perspective—how uncommon is CHD in Africans, when compared with its occurrence in western populations? The main part of the population in Soweto attend Baragwanath Hospital. If it is assumed that all of the 36 CHD patients mentioned ultimately die from the disease, then CHD would be responsible for only about 0.2% of the roughly 20 000 deaths occurring annually in Soweto¹⁵, an extremely low proportion even allowing for uncertainties. In the recently reported Seven Countries Study¹⁶, for those in the Mediterranean countries and inland the age standardized 25 year CHD mortality rate percentages were 4.7% and 7.7% respectively. The proportions reported for countries in Northern Europe and for the US were far higher, namely

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16.0% and 20.3%, respectively. These comparisons underline the rarity of CHD in urban Africans.

Evidence indicates that African patients tend to be younger, that males outnumber females, and that the clinical and laboratory features and complications of the disease are similar to those in the white population^{5,6,12-14}.

PREVIOUS RARITY OF CORONARY HEART DISEASE IN WESTERN POPULATIONS

Some might question the validity of the present very low occurrence of CHD in present-day African patients, and of its virtual absence in patients admitted to rural hospitals.¹⁷ It could be reasoned that the conclusion reached rests entirely on hospital data, since death certificate information on Africans is almost wholly unreliable. However, the situation described is fully matched by the previous rarity of the disease in western populations, as noted elsewhere¹⁸. For example, the 1912 edition of *Osler's Principles and Practice of Medicine* states, of angina pectoris, 'It is a rare disease . . . a case a year is about average, even in the large metropolitan hospitals'¹⁹. Prior to World War I, the pathology department of the London Hospital had on average one or two necropsies a year with a recent coronary thrombosis and/or acute myocardial infarction²⁰. In the US, in the 1920s the cardiologist, Paul Dudley White (President Eisenhower's physician), recounted

The disease in my youth was hardly a problem . . . at the Massachusetts General Hospital. That hospital was then reserved for the poor, who were almost always physical laborers, whether male or female, and they did not have coronary heart disease of moment even when they were in their 50's and 60's . . . But I know that my professors did have occasional cases among their well-to-do patients whom they cared for at home²¹.

In brief, epidemiologically, the current low CHD mortality rate of urban Africans closely resembles the situation which prevailed in the UK and the US in the 1920s and previous years. In this connection, it must be added that in the US, among Afro-Americans, CHD only became common in the 1980s. Thus, in St Louis in 1973, an analysis was made of 6414 emergency visits, embracing three hospitals. Although Afro-Americans were involved in half of all visits, myocardial infarction was found to be 15 times more common in the white patients²². It is only very recently that their mortality rate has reached that of the white population²³.

VARIABLE SIGNIFICANCE OF RISK FACTORS IN DIFFERENT CONTEXTS

The low occurrence of CHD in Africans is puzzling because of the extensive presence of risk factors among city dwellers. In brief, dietary intakes of energy and fat have increased, and

that of fibre-containing foods has fallen^{24,25}. In one study, mean energy intakes of men and women were 8.5 MJ (2022 kcal), and 6.4 MJ (1386 kcal); fat intakes were 57 g and 42 g, contributing 23.8% and 26.1% of energy. Corresponding fibre intakes were 19 g and 13 g daily. Unpublished studies on children and adults in Johannesburg suggest that energy intake has risen and that fat now accounts for 30-35% of energy. Obesity in women has greatly increased; in one study²⁶ 45-50% had a body mass index ≥ 30 . Prevalence of hypertension has risen, exceeding that in the white population; in Durban, there was a mean of 25% (WHO criteria) compared with 23%^{14,27}. As to smoking practice, in one investigation 60% of men but only 17% of women were current smokers²⁸. Prevalence of diabetes has reached and now surpasses that reported in the white population, namely 5.3% versus 4.1%²⁹⁻³¹. As to lipid levels, serum cholesterol concentration has increased considerably. In Bloemfontein, in a series of Africans aged 45-64 years, the mean cholesterol concentration was 5.0 mmol/L in men and 5.5 mmol/L in women³². As a comparison, these values are similar to the average for men and women combined in Mediterranean populations, namely 5.15 mmol/L¹⁶. In enormous contrast are current values reported for rural dwellers in Nigeria aged 41-50 years, namely 2.8 mmol/L and 3.4 mmol/L, for men and women respectively³³. Clearly, the various risk factors mentioned in urban Africans are exerting their influence in a far less noxious manner than is the case in most western populations. In this respect it is noteworthy that in Africans, compared with whites, obesity appears of less moment respecting hypertension, hyperglycaemia, and hyperlipidaemia^{26,34}, just as it does in Afro-Americans³⁵.

It must be emphasized, in passing, that this variability in the noxiousness of risk factors is not uncommon. Recently, it was reported that there is a fourfold higher CHD mortality rate in Belfast than in Toulouse, and that neither the classical risk factor scores nor the major nutrient intakes were able to explain adequately the large differences in mortality rates from CHD and from other causes of death between centres³⁶. Also puzzling, to provide a further example, is the situation among Indian immigrants, those in the UK³⁷ as well as in South Africa^{38,39}. Among such people, CHD is far too common to be explained from known risk factors. Undoubtedly, in each of the scenarios described, there must be additional factors in operation, some restraining, others promoting, the development of CHD.

CORONARY HEART DISEASE OUTLOOK FOR URBAN AFRICANS

The worst future scenario envisaged is that city Africans will ultimately attain the CHD morbidity and mortality rates of Afro-Americans, whose mortality rate, as already indicated,

has now reached that of white Americans²³. What would this mean locally? Were Soweto populated by Afro-Americans, even when allowance was made for the difference in age structure there would be 2000–3000 patients admitted to hospital with CHD annually. What a frightening prospect, with the limited health resources available⁴⁰!

However, as noted elsewhere, although a considerable rise is likely, it is not wholly inevitable. At the extreme of puzzlement, it has been reported that among Japanese men, whose CHD mortality rate is very low (about a tenth of the rate in the UK), the rate is *falling* despite a *rise* in fat intake and in serum cholesterol level⁴¹. Furthermore this behaviour is not unique since there is a similar paradox in Spain, where intakes of total fat and of saturated fat are increasing but mortality from CHD is falling⁴². Additionally, in South Africa, the CHD mortality rates for Indians and Coloureds (Eur-African-Malay) are falling, yet in neither population is any significant avoiding action being taken³⁹. However, despite there being so much that cannot be explained in the epidemiology of CHD, this by no means lessens the need for Africans, and even more so for the other South African populations, to seek to conform to recommendations for a 'prudent' lifestyle^{43,44}.

What, pragmatically, are the changes urged, regarding avoidance of CHD?

1. Principally among urban dwellers, to eat less fat, and to eat more of fibre-containing foods, especially vegetables and fruit.
2. To reduce at least the intensity of smoking in men.
3. To reduce the frequency of hypertension, again principally in urban dwellers.
4. To increase or, at least to maintain, present levels of physical activity.

It will be understood that any level of compliance to these measures will also contribute to the avoidance of diet-related cancers, all of which are still of relatively low occurrence in Africans⁴⁵. They also will lessen liability to stroke, which is common in these people^{17,46}. Clearly, for maximum benefit people will need to change their lifestyle when young.

In western populations, it has to be faced that only limited responses have been made to the recommendations proposed. In the US, while fat intake has fallen by 15%⁴⁷ there has been little or no rise in the consumption of cereals, vegetables and fruit⁴⁸. In the UK, fat intake is not falling; moreover, the rise in vegetable and fruit consumption since 1940 has only been 15%⁴⁹. Not least as a reason for conservativeness is the fact that a 'prudent' diet is more expensive than an everyday diet⁵⁰. In view of the reluctance displayed by western populations to conform to dietary

guidelines, there are no grounds for considering that Africans might be more responsive.

What is the present situation for Africans? As already indicated, intakes of energy, fat and protein among children and adults, while still lower than those in developed populations, are rising, and intakes of fibre-containing foods are falling²⁵. Cereal products are refined; many people now favour white rather than brown bread⁵¹. In an inter-ethnic series of urban adolescents investigated in the Western Cape, of the six food items most frequently consumed neither vegetables nor fruit were listed by Africans⁵². In both vitamin C and β -carotene rich fruit and vegetables, the percentage of children who consumed one or more items daily was far higher in the white than in the African pupils. As to adults, in a study made in 1988, 64% of whites but no Africans consumed the recommended four portions of vegetables and fruit daily⁵³. Among African adults studied in the Cape Peninsula (the BRISK Study)^{25,54} 29% of respondents reported no intakes of these foodstuffs. Those of high socio-economic status ate more vegetables and fruit, especially fruit.

One reflection of changes occurring in Africans was noted in a recent study of selected risk factors for CHD in a series of adolescent boys⁵. The prevalences and severity of coronary risk factors as reflected by serum cholesterol level and other laboratory parameters were found to be generally high in young Indians, Whites and Coloureds, and becoming increasingly prevalent in urban Africans.

As to non-dietary risk factors, while smoking practice in western men and women has almost halved, that among Africans is already high in men, and is still rising⁵⁶. While physical activity has been progressively falling in most western populations⁵⁷, in Africans it remains broadly higher than in whites. Level of activity in Africans is likely to diminish in urban populations.

CONCLUSION

In the urban African population there is no doubt that CHD is rare. Equally, there is no doubt about the commonness and rising prevalence of virtually all risk factors for the disease. There is increasing conformity to an atherogenic diet. Clinically, there is a rise in obesity, particularly among women, a very high prevalence of hypertension, a rising frequency of smoking, especially among men, and diminishing physical activity.

The alterations that have been made in behaviour are the antithesis of the desired conformation to a 'prudent' lifestyle. Nevertheless, every endeavour must continue to be made, at schools and through various avenues of the media, to urge the recommended changes. Even limited conformation, by a small percentage of Africans, could add to the sum of disease-free years.

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