The coexistence of major coronary heart disease risk factors in the coloured population of the Cape Peninsula (CRISIC study)

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Summary

A cross-sectional study of risk factors for coronary heart disease in a random sample of 976 people from a South African coloured population revealed this group to be at great risk.

The prevalences of individual and of coexisting reversible risk factors — hypercholesterolaemia, hypertension and smoking — were highest in the older subjects, who use medical services more often. One or more of the three risk factors was present in 80% of men aged 45 years or over. Smoking was the most common single risk factor for both sexes, and almost 30% of women aged 45 years or over were hypertensive. Hypertension and smoking was the most common combination for males and hypertension and hypercholesterolaemia the most common for females.

Medical personnel could identify and treat these very-high-risk patients if they were to screen for all the risk factors after identifying any one risk factor. Younger people at risk and particularly younger men, who rarely utilise health services, should be reached at their workplace for early identification of risk factors.

The study of the interrelationship of risk factors for coronary heart disease (CHD) has shown that, besides being associated individually with CHD, risk factors often coexist. In addition they can be considered synergistic in that their simultaneous contributions to the development of CHD are more than additive.[1-4] People with more than one risk factor could therefore have a very high overall risk.

Criqui et al.[1] showed that clustering of cardiovascular risk factors was stronger in subjects at the highest level of risk than in subjects with moderate levels of risk. This implies that persons belonging to a subgroup within the population that is at extremely high risk of CHD can be more accurately identified if health personnel, when identifying persons with a high level for one risk factor, also screen for the other important risk factors.

In 1985 the CRISIC study identified the CHD risk factors in the coloured population of the Cape Peninsula. The methods and results are reported elsewhere.[5-8] This paper reports on the coexistence of hypertension, hypercholesterolaemia and the smoking of cigarettes in the study population.

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Subjects and methods

Subjects for the study were an age- and sex-stratified sample of 976 participants, randomly selected by a multistage probability sampling technique, drawn from 485 120 coloureds aged 15 - 64 years in the Cape Peninsula (as reflected in the 5% subsample of the 1980 census). A response rate of 90,5% was achieved. Only one member per household was selected. Exclusion criteria were pregnancy, being bedridden, mental retardation, carcinoma, leg amputation, drug therapy for tuberculosis, hospitalisation for more than 1 week during the previous 3 months, and inability or unwillingness to participate.

Trained fieldworkers visited participants in their homes. A CHD risk factor questionnaire was completed. The questionnaire covered socio-economic items, family history of ischaemic heart disease, smoking habits and physical activity patterns, as well as items on risk factor knowledge and health-related behaviour. A short medical history was also taken.

Non-fasting blood samples were collected from each participant. The serum was separated within 6 hours of clotting and then frozen at $-20°C$. The total cholesterol levels were measured on a Gilford auto-analyser using the Boehringer CHOD-PAP enzymatic method. The Gilford auto-analyser was calibrated against Precilip or Precilip EL control sera, which were corrected by Boehringer Mannheim for the specific test kit in question. Two control samples were included in each batch analysed. At least 7 days after the first sample, a further 100 random blood samples were collected to determine biological and technique variation. For total cholesterol values the correlation coefficient for both samples was 0,88.

Blood pressures were measured by trained fieldworkers using a standardised technique, after participants had been seated for at least 5 minutes. A mercury manometer connected to a standard 12,5 x 23 cm cuff was used. The American Heart Association guidelines for measuring blood pressure[9] were applied. During the fieldwork the fieldworkers' standard for blood pressure readings was checked against the reference person weekly. End-digit preference was not found on subsequent analysis. At least 7 days after the first reading, 100 random blood pressure readings were repeated to determine variation. This gave acceptable reproducibility, as reflected in correlation coefficients of 0,77 for systolic and 0,75 for diastolic readings, these being similar to findings in other studies.[10]

Hypercholesterolaemia was defined as a serum total cholesterol value of 250 mg/dl (6,5 mmol/l) or more, hypertension as a blood pressure of 160/95 mmHg or more or a subject receiving treatment,[11] and smoking as 10 or more cigarettes per day.

Block charts were drawn to show those participants in the study population who had none, one, two, or all three of the major risk factors for CHD.

Results

Fig. 1 shows the coexistence of the three major risk factors for CHD among coloured men. Only 37,2% of men aged 15 - 64
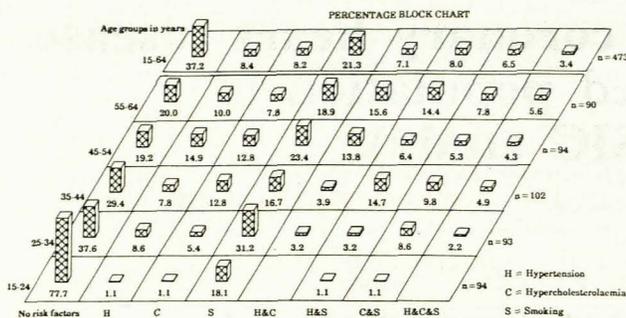
Fig. 1. Coexistence of major risk factors for CHD among coloured men (%).

years did not have any risk factors, and these were mostly the younger members of the group. Of men aged 55 - 64 years, only 20% were without a risk factor. Smoking was by far the most common risk factor and often present at a young age. The combination of hypertension and smoking was found in over 14% of men aged 35 - 44 and 55 - 64 years, and overall this was the most common combination of risk factors for males. The next most common combination, particularly among men over 45 years of age, was hypercholesterolaemia and hypertension. Approximately 5% of men aged over 45 years had all three risk factors.

Fig. 2 shows the coexistence of the three major risk factors for CHD among coloured women at the same high level of risk. Only 40,4% of women aged 15 - 64 years had no risk factors, and these were mostly aged less than 45 years. In the oldest age group of women (between 55 and 64 years) only 3,2% did not have any risk factors. In the younger groups of women smoking was the most common risk factor, while hypertension was the most common among the older women. Of women aged 55 - 64 years 27,4% had both hypertension and hypercholesterolaemia, making this the most common combination overall. Smaller percentages of women than of men had combinations of smoking and hypertension, or smoking and hypercholesterolaemia.
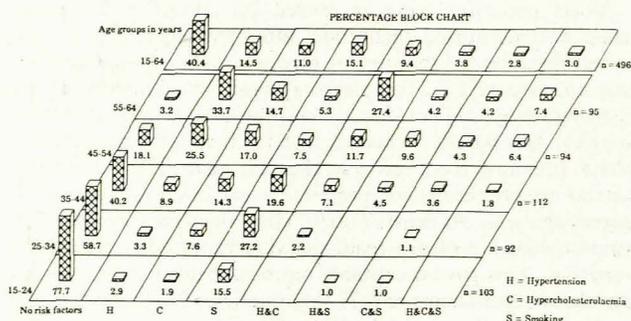

Fig. 2. Coexistence of major risk factors for CHD among coloured women (%).

Discussion

This urban coloured population has previously been found to have high prevalences of CHD risk factors,[5] and this study shows that in addition risk factors in the population frequently coexist. A minority (37,2% of men and 40,4% of women) did not exhibit at least one of the three major risk factors. It could therefore be anticipated that urban coloureds would have a high CHD mortality rate, and that a large proportion of these

deaths would take place in the very-high-risk group with combinations of risk factors.

When the national CHD mortality rates for the total coloured population are compared with those for the total white and Asian populations, and the limited figures for the black population of South Africa for 1983, it is seen that whites of all ages had the highest CHD mortality rate (189,7/100 000). They were followed by the Asians (110,6/100 000), the coloureds (60,7/100 000) and the blacks (4,4/100 000).[12,13] However, there are indications that the mortality rate for the urban coloured population of Cape Town is much higher than that for rural coloureds, and approximates that for whites. Mortality rates calculated for the period 1981 - 1985, using data provided by Central Statistical Services, showed that the rate for white men aged 15 - 64 years in the Cape Peninsula was 176,3/100 000, while that for coloured men in the same area was 145,5/100 000. The rates for coloured and white women in the Cape Peninsula over the same period were 62,6 and 52,6/100 000 respectively (age-standardised against an international reference population).[14]

Furthermore, CHD mortality for whites is decreasing nationally as well as in the Cape Peninsula, while that for coloureds is static.[15] The adverse risk profile of the urban coloured population must play a significant role in determining its relatively high CHD mortality.

The findings of this study have important implications for the prevention of CHD. It is clear that a population strategy to reduce risk factor levels is of paramount importance. The population strategy is more cost-effective than the case-finding strategy.[16] On the other hand, identification of the subset of individuals who have a combination of two major risk factors at a high level (6,5 - 8,0% of men and 2,8 - 9,4% of women aged 15 - 64 years) or of all three risk factors (3,4% of men and 3,0% of women) cannot be neglected, since they are at extremely high risk. This is perhaps best accomplished by case-finding, i.e. the identification of risk factors during contacts with health personnel. Such risk identification seems more urgent in urban areas, where the mortality rate is higher.

Levels of risk and risk factor coexistence were found to be the highest in older groups of participants, who frequent medical services most often. They could therefore be identified and treated if medical personnel were to seek other risk factors in patients found to have one risk factor. Circumstances under which patients are seen should be such that time is available to review their risk status. Screening for smoking and hypertension could be done by nurses. Laboratory facilities for cholesterol assay could be made available at clinics or day hospitals.

It is interesting to note that the prevalence of smoking among young women is nearly as high as that among young men. The younger coloured person at risk will have to be reached at the workplace if risk factors are to be identified early. This is particularly true for men, since they rarely utilise health services. Measures for preventing risk factors and promoting sensible lifestyles in this group could be brought into play at an early age through education at school as well as public campaigns.

Such a combined population and high-risk approach has been advocated for other high-CHD populations, and would be most likely to succeed in reversing the high rate of CHD for this population.

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