Editorial

Cardiovascular Risk Factors in Brazil: The Next 50 Years!

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More than 55 years ago, one North American city, Framingham, in the state of Massachusetts, was selected by the North American government to be the site of a cardiovascular study. Initially, 5,209 healthy residents aged between 30 and 60 years were recruited for an extensive clinical and laboratory assessment. Since then, every 2-4 years, that population and their descendant generations have been carefully reassessed and followed up in regard to the development of cardiac disease. The well-known Framingham study was one of the first cohort studies to demonstrate the importance of some risk factors for the development of cardiac and cerebrovascular diseases [1]. It may seem inconceivable, but before the Framingham study, most physicians believed that atherosclerosis was an unavoidable aging process and that arterial hypertension was a physiological result of such process that aided the heart to pump blood through the arteries with reduced lumen. More than one thousand publications resulting only from that cohort of patients and thousands of others have led us, over the past decades, to a detailed and in-depth understanding of the individual and environmental characteristics related to the greater probability of developing cardiac disease [2]. Such studies have confirmed the importance of the following factors as strongly related to atherosclerosis and its clinical manifestations: smoking, elevated levels of LDL-cholesterol, low levels of HDL-cholesterol, diabetes mellitus, systemic arterial hypertension, familial history, obesity, sedentary life style, central obesity, plurimetabolic syndrome, and alcohol ingestion.

After all these considerations, 2 major questions are yet to be answered. First, do new discoveries and new studies elucidating the role played by the risk factors exist in the area, or does everything continue the same? Second, is there any indication that the epidemiology of cardiovascular disease and its determining factors are different in Brazil as compared with those in other countries? Recently, new evidence has appeared and deserves to be discussed.

The INTERHEART study [3] was an international case-control study designed to systematically assess the importance of the risk factors for coronary artery disease around the world. The study comprised 262 centers in 52 countries of the 5 continents, where patients with acute myocardial infarction (AMI) in the first 24 hours were paired (age and sex) with hospital and community controls. In that assessment, 9 risk factors explained more than 90% of the risk attributed to AMI. Surprisingly, smoking and dyslipidemia (measured through the ApoB/ApoA1 ratio) accounted for more than two thirds of that risk. Psychosocial factors, central obesity, diabetes, and hypertension were also significantly associated, although with some relative differences in the different regions studied. The contemporary data confirmed the traditional risk factors previously established in all regions of the world and all ethnic groups.

The study by Avezum et al [4], published in this volume of the *Arquivos Brasileiros de Cardiologia*, also had objectives and methodology very similar to those of the INTERHEART study. The findings of those authors confirmed the importance of the traditional risk factors (smoking, systemic arterial hypertension, diabetes mellitus, central obesity, LDL- and HDL-cholesterol levels, familial history of coronary disease) in their association with AMI. In another assessment reported by the same authors in the AFIRMAR study [5] carried out in 104 hospitals of 51 Brazilian cities, the findings were practically identical, evidencing that the predisposition to atherosclerotic disease in Brazil is very similar to that observed in European and North American countries.

In a unique opportunity, the results obtained in the population of São Paulo could be directly compared with those obtained throughout the world. The relative impact of each risk factor on the outcome is worth analyzing. According to the authors' report, smoking, central obesity, arterial hypertension, and lipid profile, which are potentially controllable factors, were important indicators of risk in that sample of the Brazilian population. Unfortunately, the study from São Paulo has not reported the prevalences of risk factors in the case and control groups for a better estimate of the profile of the population included. Smoking was one of the major risk predictors, with an almost 6 times greater prevalence in the case group than that in the control group, a much higher impact than that reported in the INTERHEART study, in which the odds ratio (OR) was 2.9 times. In the INTERHEART study, 26.8% of the controls were smokers as compared with 45% of the cases. Data of the AFIRMAR study [5] carried out in 104 Brazilian hospitals have shown a risk nearing 4 in the presence of active smoking (≥ 5 cigarettes/day). Considering that all those studies assessed AMI cases, part of the difference from the study by Avezum et al may have occurred because of the selection of cases or controls, or both, with different prevalences of smoking. In addition, the possibility of chance association exists, because the confidence interval encompasses the estimates of other studies.

A positive familial history also contributed to a greater chance

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of experiencing AMI in the study from São Paulo (OR - 2.33) than that in the INTERHEART study (OR=1.5). As the international study includes other factors related to life style, and environmental and psychological factors, part of the risk related to the familial history may be attributed to those other factors and genetic characteristics instead of to an independent self mechanism. All remaining risk factors identified are similar in their magnitude to other epidemiological estimates. Systemic arterial hypertension, diabetes mellitus, central obesity, and lipid profile contributed to a 2- to 3-fold increase in the chances of myocardial infarction.

However, it is important to discuss that which the study did not show. Some traditional factors assessed were not significant, such as alcohol ingestion, physical activity, and sociodemographic characteristics. As already reported by some authors, part of the lack of association observed may have been due to the low statistical power in a model with certainly correlated variables. Although the authors estimated the size of the sample to detect a risk greater than 2, those calculations were based on univariate analyses, and all the potential confounding and co-linearity of the variables are very difficult to contemplate. Moderate alcohol ingestion has shown to be protective against cardiovascular events, and the INTERHEART study reported a 10%-reduction in risk, similarly to that of the regular physical activity practice. In the AFIRMAR study, the protection provided by moderate alcohol ingestion was greater, 40% as compared with that of noningestion.

Sociodemographic characteristics, familial income, and educational level have been related to the development of cardiovascular disease. The risk factors are known to occur more frequently and in greater numbers in populations with lower economic and cultural levels [6]. Even in developed countries, those associations have been reported. A recent North American study [7] has shown that the presence of 2 or more risk factors is more frequent among those with low educational level (53%) as compared with those with university educational level (26%). The same has been reported in Brazilian population samples [8-10]. In the AFIRMAR study, an elevated income and university educational level provided protection. It is worth emphasizing that, according to the elegant report by Avezum et al [4], studies of the case-control type are extremely subject to bias and should usually be carefully interpreted.

Applicability of the results in the practice

The surprising element within the scenario of cardiovascular diseases is how much we have been able to advance in understanding the entire spectrum of cardiovascular diseases, including their mechanism, pathophysiology, diagnosis, prognosis, and therapy, with solid bases in the fundaments of evidence-based medicine. Our concern is to which extent we have been able to translate such information into improvement in the health of the population. Fortunately, after 5 decades of understanding the factors related to the genesis of heart diseases, a better control of the risk factors has been observed throughout the world, as well as a reduction in the coefficients of mortality. Data from Framingham have shown a 59%-reduction in the mortality rate due to coronary artery disease in the 1950 to 1999 period [11]. In Brazil, the results are still very uneven; some regions show a tendency towards reducing the coefficients of mortality due to ischemic and cerebrovascular diseases, while others show increasing indices [12]. Health policies based on such evidence should be consolidated and implemented. Several initiatives of the Brazilian Health Ministry, such as the screening of diabetes mellitus within the national scope, implementation of campaigns about systemic arterial hypertension, and application of protocols for the aggressive management of dyslipidemia in patients with coronary artery disease, have been adopted to reduce the impact of non-transmissible diseases in the Brazilian population. Those initiatives should be taken in a permanent and continuous way, not spastically. They should be taken not only for a few individuals and a short period of time, but for everybody at all times. We should be critical and recognize that what has been done is not sufficient to eliminate the fraction of potentially preventable disease. If primary and secondary preventive measures were more energetically adopted, the epidemiology of cardiovascular diseases may be drastically modified in the next 50 years, it depends on us, clinicians and managers.

Future research

If on the one hand it is very good to count on the original contribution of Avezum et al, on the other it is important to recognize that we need to move ahead. While traditional risk factors have been confirmed in our population, in-depth research is being carried out around the world. Currently, researchers are looking for the molecular bases of diseases, new risk factors and their role in the development of heart disease, with emphasis on the identification of subclinical atherosclerosis. Clinical and epidemiological studies have been looking for genetic alterations responsible for some conditions, such as arterial hypertension and dyslipidemias. New neurohumoral and inflammatory markers have been described and seem to be strongly related to behavioral variables, such as life style and sociodemographic characteristics. This information has been used to establish clinical predictive scores to individually identify people at higher risk for events. Finally, the international research groups on cardiovascular risk are innumerable. In Brazil, the agencies fostering clinical and epidemiological research should understand that scenario, so that data obtained in our population may be part of the discoveries. We can no longer be 50 years behind!

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