

Secular Trends in Cardiovascular Risk Factors: Developments Are Not Encouraging

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The study and evaluation of trends in cardiovascular risk factors in the population can be carried out by repeated transverse studies in sample populations over time. This is perhaps the strategy that has been most used by health care institutions by means of national health surveys and also by research groups using cross-sectional design studies, undertaken either on an autonomous regional level or on a national level. However, longitudinal studies following persons over a particular period of time are the optimal design with which to evaluate the secular trend of risk factors and to observe the phenomenon of tracking or persistence, also known as tracing. This technique enables us to evaluate whether persons with high degrees of risk factors maintain these levels over time, and also to determine the overall evolution of these risk factors in the same persons. This permits us to see to what extent it is worth while detecting high-risk persons at an earlier age and providing them with a closer follow-up and a more intense intervention if these same persons remain in the high quintiles. Observation of the whole population enables us to see whether environmental factors are having a negative influence on the evolution of the risk factors. If this were indeed the case, it would in theory increase the risk of persons in this population for cardiovascular disease or death in the near future, and this increase would be greater than expected from just the worsening risk factors with age.

Longitudinal studies carried out in children and adolescents, such as the classic study by Bogalusa,¹ are useful to evaluate the changes in risk factors with age

and maturity, and also the phenomenon of tracking. The longitudinal studies already undertaken in an adult population, such as the Manresa study,² provide information on the incidence of coronary disease and its association with the risk factors. Balaguer-Vintró³ undertook an excellent review of the various longitudinal studies carried out concerning the prevention of cardiovascular disease, both nationally and internationally, and indicated the areas still open to debate in relation with the methodology and with the measurement of the results.

The AGEMZA study, published in this issue of the *REVISTA ESPAÑOLA DE CARDIOLOGÍA*,⁴ provides interesting information on the questions mentioned above, by studying a population of 20-year-old men and observing them for 15 years until the age of 35 years. The most relevant results of this study highlight a high persistence for weight and the lipid parameters, and also an overall worsening of these parameters in the whole study population. More exactly, the authors found a mean rise of 12 kg weight or a body mass index of 2.6 kg/m² per decade; the population that was overweight or obese rose from 10% to 60%. Total cholesterol and low-density lipoprotein (LDL) cholesterol increased by a mean of 68 and 58 mg/dL, respectively, and high-density lipoprotein (HDL) cholesterol fell by a mean of 5 mg/dL. The prevalence of smoking remained almost the same, at around 25%. Strangely, no negative changes were detected in blood pressure, and the mean systolic blood pressure even fell significantly. This last finding may have been produced by the important loss of information on blood pressure (in 43% of the study subjects), which could have introduced a certain type of bias.

An important factor to consider is the fact that at the initial examination, as the subjects belonged to a military academy, they were exposed to intense physical activity, whereas after 15 years of follow-up their physical activity was much less and even more heterogeneous. This might have been a determining factor in the very marked differences seen in obesity and the lipid profile between the 2 study points. If

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instead of a military population the study had observed a sample from the general population, the degree of baseline physical activity would have been more heterogeneous and, consequently, so would the weight and lipid parameters. The changes detected were probably mostly due to the exposure of this population to current lifestyles that are not particularly healthy for the heart, also referred to as obesogenic as they are associated with the abundant intake of food with a high energy level and low nutritional content, accompanied by an increased sedentary lifestyle. The study by Bogalusa,¹ mentioned above, evaluated a total of 841 children aged between 9 and 11 years (mean age, 10 years) in different cross-sectional studies between 1973 and 1984. The children were then observed until they reached ages from 19 to 35 years (mean age, 28 years) from 1995 to 1996. The percentage of overweight persons rose from 24.7% to 57.7%, and 35.2% of the children whose weight was normal between the ages of 9 and 11 were overweight when they were aged 19 to 35 years. Concerning remaining within the high quintiles, 61.9% of the children in the highest quintiles for body mass index were seen to still be within these highest quintiles as teenagers.

The prevalence of obesity in children and young adults (2-24 years) is worrying, with 13.9% now being obese and 26.3% overweight.⁵ The highest figures are detected in prepuberty, more particularly within the age group of 6 to 12 years, with a prevalence of 16.1%.

Even in populations such as that from the island of Crete, which had one of the lowest rates of coronary heart disease in the world at the beginning of the 1960s, secular trends are now being seen in cardiovascular risk factors that are not particularly encouraging. A study carried out in Cretan children of 12 years of age and followed up from 1982 to 2002⁶ showed increases in the prevalence of overweight and obesity of 63% and 202%, respectively. Increases were also detected of 25% in LDL cholesterol and 19% in triglycerides, and a decrease of 25% in HDL cholesterol.

It has already been noted that in Spain we are probably experiencing a nutritional transition,⁷ such that we now consume more fats, more fruit, fewer vegetables, and more dairy products. This transitional change is being accompanied by an increase in overweight and obesity in adults as well as in children and adolescents, which in turn is associated with worsening of such risk factors as the lipid profile, as noted in the AGEMZA study.

In theory, this pattern of increases in overweight and obesity is associated with different components of the metabolic syndrome in adults, including insulin resistance, dyslipidemia and hypertension, which therefore lead to a worse risk profile in the general

population and could, in the future, be reflected in an increase in cardiovascular disease, above all coronary disease. Recent data from the MONICA-Catalonia study⁸ already show that the rate (incident and recurrent cases), adjusted for age, of coronary episodes in persons aged 35 to 74 years in the period 1985-1997 experienced an annual increase of 2.1% in men and 1.8% in women (though the latter was not statistically significant, very probably because of lack of statistical power). Mortality at 28 days was 46% in the men, with a significant annual reduction of 1.4%, and 53% in the women, with no significant change. We shall have to be very much aware during the coming years of the epidemiological data regarding death and disease from coronary disease that appear as a result of such studies as the MONICA study and others, as well as the data from registries of death themselves, because the trend is uncertain.

The results of the AGEMZA study highlight once again the importance of campaigns promoting health, not only in schools but also aimed at the general population, promoting healthy nutrition and physical exercise. Thus, the Spanish national Integral Plan for Ischemic Heart Disease contains a chapter on prevention and on the promotion of a healthy lifestyle, with special mention of specific aims regarding smoking, obesity, diet and physical activity.⁹ The European guidelines on cardiovascular disease prevention¹⁰ give special attention to aspects related with lifestyle. The Spanish adaptation of these European guidelines includes a special annex with general nutritional recommendations adapted to our environment and setting.¹¹

These recommendations are all necessary but they are not enough, since the role, involvement and commitment of the health authorities, the food industry and other social agencies are also vital to be able to control the problem of obesity and attack it at a population level

REFERENCES

1. Deshmukh-Taskar P, Nicklas TA, Morales M, Yang S-J, Zakeri I, Berenson GS. Tracking of overweight status from childhood to young adulthood: the Bogalusa Heart Study. *EJCN* 2006;60:48-57.
2. Puig T, Varas Lorenzo C, Perez I, Abadal LIT, Balaguer Vintró I. Patronos de mortalidad en una cohorte de trabajadores seguida durante 28 años: Estudio Manresa. *Rev Esp Cardiol*. 2004;57:924-30.
3. Balaguer-Vintró I. Los estudios longitudinales en la prevención de las enfermedades cardiovasculares. *Rev Esp Salud Pública*. 2004;78:149-66.
4. Laclaustra-Gimeno M, González-García M, Casasnovas-Lenguas JA, Luendo-Fernandez E, León-Latre M, Portero-Pérez P, et al. Evolución de los factores de riesgo cardiovascular de jóvenes varones tras 15 años de seguimiento en el estudio Academia

- General Militar de Zaragoza (AGEMZA). *Rev Esp Cardiol*. 2006; 59:671-8
5. Aranceta Bartrina J, Serra Majem L, Ribas Barba L, Pérez Rodrigo C. Factores determinantes de la Obesidad de la población infantil y juvenil española. En: Serra-Mejerm L, Aranceta Bartrina J, editores. *Obesidad en la población infantil y juvenil española. Estudio enKid (1998-2000)*. Barcelona: Masson; 2001. p. 109-28.
 6. Magkos F, Manios Y, Christakis G, Kafatos AG. Secular trends in cardiovascular risk factors among school-aged boys in Crete, Greece, 1982-2002. *EJCN* 2005;59:1-7.
 7. Moreno LA, Sarria A, Popkin BM. The nutrition transition in Spain: a European Mediterranean country. *EJCN* 2002;10:992-1003.
 8. Sans S, Puigdefábregas A, Paluzie G, Monterde D, Balaguer-Vintró I. Increasing trends of acute myocardial infarction in Spain: the MONICA-Catalonia Study. *Eur Heart J* 2005;26:505-15.
 9. Plan Integral de Cardiopatía Isquémica 2004-2007. Madrid: Ministerio de Sanidad y Consumo; 2003.
 10. de Backer G, Ambrosioni E, Borch-Johnsen K, Brotos C, Cifkova R, Dallongeville J, et al. Executive summary. European guidelines on cardiovascular disease prevention in clinical practice. *Eur Heart J*. 2003;24:1601-10.
 11. Brotos C, Royo-Bordonada MA, Álvarez-Sala L, Armario P, Artigao R, et al, como Comité Español Interdisciplinario para la Prevención Cardiovascular (CEIPC). Adaptación Española de la Guía Europea de Prevención Cardiovascular. *Rev Esp Salud Pública*. 2004;78:435-8.