

Prevention and treatment have led to a reduction in coronary heart disease mortality. However, this has levelled off and there may be an increase for women in the future. So there is no reason to rest on our laurels.

Coronary heart disease mortality

■ During the last 70 years Norway has seen dramatic changes in mortality from cardiovascular diseases. In the first half of last century, mortality increased steadily but then fell markedly during the Second World War. In a classic 1950 study, Strøm & Jensen described the decline in mortality from cardiovascular diseases during the war. The study indicated the major significance of environmental factors for the development of cardiovascular diseases (1). Changes in diet during the war years entailed less intake of energy and less fat. In addition, people smoked less and were more physically active. Thus Strøm & Jensen showed that mortality from cardiovascular diseases can change quickly in step with changes in lifestyle.

In the post-war years, mortality from ischemic heart diseases increased sharply, particularly among young and middle-aged males. This led to an increase in total mortality with the result that the predicted life expectancy for males fell in the period from 1955–75, for the first time in recent decades (2). In this issue of the Journal of the Norwegian Medical Association, Reikvam & Hagen describe trends in myocardial infarction mortality for the period from 1969–2007 (3). The authors find that mortality fell sharply from the end of the 1980s up to 2007. The decline began among the youngest age groups first, and was stronger among males than among females. Consequently the proportion of the population who die of cardiovascular disease in Norway fell from 50 % in 1975 to 33 % in 2009, and myocardial infarction mortality now stands at the same level as in the immediate post-war period (2).

International data reveal that most of the decline (50–75 %) in coronary heart disease mortality can be attributed to reduced levels of the classic risk factors in the population – high cholesterol level, smoking and high blood pressure (4). In Sweden cholesterol levels sank by 10.4 % from 1986 to 2002. This decrease alone explained 39 % of the decline in coronary heart disease mortality (5). Even though physical inactivity, overweight, and diabetes mellitus affected mortality unfavourably, the effect is far from strong enough to counteract the significance of a reduction in cholesterol level and smoking.

In most studies the remainder of the reduction (25–50 %) in coronary heart disease mortality is explained by medical treatment. Drug treatment is the most important, in particular acetylsalicylic acid, beta blockers, ACE-inhibitors and statins (4, 5). Revascularization treatment with percutaneous coronary transluminal angioplasty and surgery has also contributed, but most of the studies were carried out before such treatment became common.

Overall, there is strong evidence that the decline in coronary heart disease mortality is due to changes in risk factors and treatment that in turn have an impact on the incidence of the disease and the prognosis for those affected. The WHO MONICA study found that two-thirds of the reduction in mortality was related to the decline in the incidence of myocardial infarction, while one-third could be explained by a decrease in case fatality (6). In the US the incidence of acute myocardial infarction fell by 25 % in the period from 2000–09, mainly because of the reduced incidence of myocardial infarction with ST segment elevation in the ECG, while lethality for the first 30 days sank from 10.5 % to 7.8 % (7). The Tromsø health survey shows a considerable reduction for first-time myocardial infarction in young and middle-aged males for the period from

1974–2004, whereas there was a surprising increase for females (8). The prognosis following a myocardial infarction improved for both males and females.

Norwegian researchers have helped to document the significance of the classic risk factors for myocardial infarction. An article by Holme & Tonstad in this issue of the Journal shows that the total cholesterol level, blood pressure and smoking also predict total mortality among men in the Oslo survey (9). In all likelihood the changes in cholesterol level and smoking habits have contributed significantly to the decline of the Norwegian myocardial infarction epidemic. From the 1970s onwards, the cholesterol level has been reduced by approximately 10 % and the proportion of smokers has been halved (10).

However, neither in Norway nor internationally is the battle against the myocardial infarction epidemic won. On the contrary, we are faced with a massive global increase in cardiovascular diseases because of unfavourable risk factors in low-income and middle-income countries (11). In some rich countries, the decline has come to a halt and in the US myocardial infarction mortality has increased in recent years (12). The decline has also levelled off in Norway (3); seven out of ten Norwegians still have too high cholesterol levels, and we have significant socio-economic gradients when it comes to risk factor level and mortality (10). And what about women? In 2008 more females than males in the age group 16–74 in Norway smoked (10). Smoking has led to an increased incidence of lung cancer and chronic obstructive pulmonary disease among women and may be a contributing factor to less favourable incidence trends for myocardial infarction among women than among men (8, 12). Higher life expectancy will result in an increase in the number of myocardial infarctions in older people and a growing number of patients with chronic heart disease. We must therefore continue to focus on both the prevention and treatment of myocardial infarction.

Kaare Harald Bønaa
kaare.harald.bonaa@ntnu.no

.....
Kaare Harald Bønaa is Professor of Cardiovascular Epidemiology at the Norwegian University of Science and Technology, and Senior Consultant in Interventional Cardiology at the Clinic of Heart disease, St. Olavs hospital.
.....

Reported conflicts of interest: None

References

1. Strøm A, Jensen RA. Mortality from circulatory diseases in Norway 1940–1945. *Lancet* 1950; 1: 126–9.
2. Statistisk sentralbyrå. www.ssb.no/emner [15.2.2011].
3. Reikvam Å, Hagen TP. Endringer i dødelighet av hjerteinfarkt. *Tidsskr Nor Legeforen* 2011; 131: 468–70.
4. Ford ES, Ajani UA, Croft JB et al. Explaining the decrease in US deaths from coronary disease, 1980–2000. *N Engl J Med* 2007; 356: 2388–98.
5. Björck L, Rosengren A, Bennett K et al. Modelling the decreasing coronary heart disease mortality in Sweden between 1986 and 2002. *Eur Heart J* 2009; 30: 1046–56.
6. Tunstall-Pedoe H, Kuulasmaa K, Mähönen M et al. Contribution of trends in survival and coronary-event rates to changes in coronary heart disease mortality: 10-year results from 37 WHO MONICA project populations. Monitoring trends and determinants in cardiovascular disease. *Lancet* 1999; 353: 1547–57.
7. Yeh RW, Sidney S, Chandra M et al. Population trends in the incidence and outcomes of acute myocardial infarction. *N Engl J Med* 2010; 362: 2155–65.

8. Mannsverk J. Insidens og case fatality av førstegangs hjerteinfarkt i Tromsø kommune 1974–2004. Abstrakt. Hjerteforum 2009; 22: 88–9.
9. Holme I, Tonstad S. Risikofaktorer og dødelighet – oppfølging av Oslo-under-søkelsen fra 1972–73. Tidsskr Nor Legeforen 2011; 131: 456–60.
10. Folkehelseinstituttet. www.norgeshelsa.no [15.2.2011].
11. Anand SS, Yusuf S. Stemming the global tsunami of cardiovascular disease. Lancet 2011; 377: 529–32.
12. Ford ES, Capewell S. Coronary heart disease mortality among young adults in th U.S. from 1980 through 2002. Concealed leveling of mortality rates. J Am Coll Cardiol 2007; 50: 2128–32.