

Successful prevention of non-communicable diseases: 25 year experiences with North Karelia Project in Finland

Pekka Puska

Abstracts

The paper describes the experiences and results of 25 years of noncommunicable disease prevention in Finland in the framework of the North Karelia Project: from demonstration project to national activity. The successful experiences emphasize the need for theory based sustained activity, within a national policy framework. The paper discusses, not only the marked changes in target risk factors and reduction in NCD rates in the population, but also the general experiences: constraints and keys for success. Some general recommendations and conclusions are drawn.

Keywords

noncommunicable diseases, coronary heart disease, lifestyle, community based prevention, national activity.

Introduction

Non-communicable diseases and especially cardiovascular diseases (CVD) represent the major health burden in the industrialized countries and a rapidly growing problem in the developing countries. At the same time they are an area where major health gains can be achieved. In most of the developed world three out of four deaths are due to CVD, cancer, accidents and other violent causes. Globally CVD is responsible for every third death and coronary heart disease (CHD) is already the number one killer in the world¹.

Extensive medical research has, during the last few decades, been carried out to learn about the causes and mechanisms of these noncommunicable diseases. Research has involved large epidemiological studies within and between populations, basic biochemical and animal studies, intervention trials and large-scale community-based preventive studies. This research has clearly shown that CVDs or events leading to them have their roots in unhealthy lifestyles or adverse physical and social environments.

Such factors as unhealthy nutrition, smoking, physical inactivity, excess use of alcohol and psychosocial stress are among major lifestyle issues.

Although much will certainly still be learnt in the future, very much is thus known already to serve prevention. Actually so much is known that the main question for NCD prevention is not "what should be done", but "how should it be done". The key question is, how can the existing knowledge best be applied for effective prevention in real life.

Demonstration programmes

Carefully planned community-based demonstration programmes form an important effort to help solve this problem. The fact that there is a huge gap between the existing medical knowledge and every day situations in society, results from several obstacles for healthy changes: cultural, political, economical, psychological, etc. The aim of a community programme is to try to build a bridge for people and communities to overcome these obstacles.

After the main risk factors had been identified by the beginning of the 70's, preventive studies and efforts were gradually developed, including also major community-based preventive programmes. In the field of cardiovascular diseases, the North Karelia Project was launched in 1972 in response to the record high mortality of CVD in Finland. The project became the first major community-based project for CVD prevention. It was soon followed by several other projects of the same kind. This activity in Europe was co-ordinated by WHO/EURO under the programme "Comprehensive Cardiovascular Community Control Programmes" (CCCCP). The experience was evaluated and published in the 80's². Later on the development led to the WHO INTERHEALTH programme, and in the WHO European Region to the CINDI programme. Recently the American region of WHO (PAHO) has launched a similar programme called CARMEN.

North Karelia Project: from demonstration project to national activity

The North Karelia Project was launched in Finland in 1972 in response to the local petition to get urgent and effective help to reduce the great burden of exceptionally high coronary heart disease mortality rates in the area. In co-operation with local and national authorities and experts, as well as with WHO, the North Karelia Project was formulated and implemented to carry out a comprehensive intervention through the community organizations and the action of the people themselves. Comprehensive activities have been used, involving health and other services, schools, NGO's, innovative media campaigns, local media, supermarkets, food industry, agriculture etc.

The Project has included a comprehensive evaluation, and has acted as a major demonstration programme for national and international applications. Over the years the scope of the Project has been enlarged to include broader objectives of integrated prevention of major noncommunicable diseases and health promotion, as well as prevention of risk related lifestyles in childhood and youth³.

After the original project period (1972-77) the experiences have actively been applied for national action. Numerous activities have been launched involving e.g. health services, schools and NGO's. National expert recommendations and programmes have been prepared. Mass media and industry have been involved. Legislation and other public policy has supported the development that has been monitored carefully.

Main results

The published results of the North Karelia Project show how over the 25 year period major changes have taken place in the levels of the target risk factors in North Karelia⁴. Among the male population in North Karelia, smoking has greatly reduced and dietary habits have markedly changed. In 1972 52% of middle-aged men in North Karelia smoked. In 1997 the percentage had fallen to 31%.

In the early 70's use of vegetables or vegetable oil products was very rare; now it is very common. In 1972 about 90% of the population in North Karelia reported that they use mainly butter on bread. Today it is less than 7%. The dietary changes have led to about 17% reduction in the mean serum cholesterol level of the population. Elevated blood pressures have been brought well under control and leisure time physical activity has been increased.

Among women, similar changes in dietary habits in cholesterol and in blood pressure levels took place. At the same time, however, smoking somewhat increased, but from a low level.

These risk factors that changes were in the 70's significantly greater than in the original reference area. Then the changes have been rather parallel in all Finland. In the 80's some levelling off took place in the trends in North Karelia, but thereafter remarkably great changes took place concerning particularly cholesterol lowering dietary changes. This has been associated with major reductions in serum cholesterol levels.

By 1995 the annual mortality rate of coronary heart disease in the middle-aged (below 65 years) male population in North Karelia has reduced about 73% from the pre-program years (1967-71). This reduction was especially rapid in North Karelia in the 70's and again after mid 80's. During the last ten years the decline in CHD mortality in North Karelia has been approximately 8% per year. Among women, the reduction in CVD mortality has been of the same magnitude as among men.

Since the 80's the favourable changes began to develop also in all Finland. By 1995 the annual CHD mortality among men in all Finland has reduced 65%. At the same time the lung cancer mortality has also reduced, more than 70% in North Karelia: and nearly 60% in all Finland.

With greatly reduced cardiovascular and cancer mortality the all cause mortality has reduced about 45%, leading also to greater life expectancy: approximately 7 years for men and 6 years for women. Associated with favourable risk factor and lifestyle changes the general health status of the people has greatly improved. A separate analysis has shown that most of the decline in CHD mortality can be explained in the change in the population levels of the target risk factors, and that the reduction in serum cholesterol level has been the strongest contributor⁵.

Experiences

As the results indicate, the general experiences have been positive. Most of the planned activities have been feasible and it has been possible to have this sustained activity over a long period of 25 years.

This does not mean that there have not been problems and constraints. In the early years the concept of community based prevention was alien, especially to the cardiological community that wasn't happy about the funding of the project. North Karelia was also a low socio-economic area with scarcity of medical resources and with many socio-economic problems in the 70's. The local culture was in many ways traditional, resisting change. Dairy farming was a major source of livelihood; butter was the local product much liked. The national dairy industry took major efforts and resources to protect their economic interests.

So what were the keys to success? Obviously, several factors were important. The cardiovascular problem was bad in the early 70's, there was common concern and the project activities were built upon this. The theoretical frameworks were carefully outlined; in collaboration with WHO and other leading experts. This concerned both the strategy on risk factors (choice of risk factors, population approach) and the social and behavioural frameworks (community approach - different theories).

A key was community organization: working within the community with its numerous organizations and with strong people's involvement. Within the overall science-based framework the intervention was flexible, based on continuous monitoring and feedback and taking advantage of the naturally occurring possibilities.

The intervention used multiple strategies: from innovative media and communication activities and systematic involvement of primary health care (especially general practitioners and public health nurses) to environmental changes, collaboration with food industry and policy changes. The project worked in close collaboration with national health authorities; its activities benefited from and contributed to national health policy.

Long term sustainable activity was also based on strong leadership and appropriate institutional basis. The overall national co-ordination has been based at the National Public Health Institute (KTL) which is linked with the Ministry of Social Affairs and Health. Finally, the importance of international collaboration should be emphasized: the project has taken advantage of international experiences and programmes (especially those of WHO) and also much contributed to those programmes.

A related publication of the North Karelia Project summarizes recommendations for similar projects as follows:⁶

- Preventive community programmes should pay attention to the well-established principles and rules of general programme planning, implementation, and evaluation.
- Preventive community programmes should be concerned with both appropriate medical/epidemiological frameworks to select the intermediate objectives, and with relevant behavioural/social theories in designing the actual intervention programme.
- Good understanding of the community ("community diagnosis"), close collaboration with various community organizations, and full participation of the people are essential elements of successful community intervention programmes.
- Community intervention programmes should combine well-planned media and communication messages with broad-ranged community activities involving primary health care, voluntary organizations, food industry and supermarkets, worksites, schools, local media, and so on.
- Community intervention programmes should seek the collaboration and support from both formal community decision-makers and informal opinion leaders.
- Successful community intervention programmes need to combine sound theoretical frameworks with dedication, persistence and hard work.
- A major emphasis and strength of a community intervention programme should be attempts to change social and physical environments in the community more conducive to health and healthy lifestyles.
- Major community intervention programmes can be useful for a target community, but can also have broader impact as a national demonstration programme. For this, proper evaluation should be carried out and results disseminated.
- For national implications the project should work in close contact with national health policy makers throughout the programme.

Conclusions

The experiences and results of the North Karelia Project in Finland support the idea that a well-planned and determined community-based programme can have a major impact on lifestyles and risk factors, and that such a development really leads quite rapidly to reduced cardiovascular rates in the community. Furthermore, they demonstrate the strength of community-based approach in changing the people's risk factors as well as give practical experience in organizing such activities.

The experiences also show that a major national demonstration project can be a strong tool for favourable national development. Experiences have actively contributed to a comprehensive national action with very good results. The decline in heart disease mortality during the last few years has been in Finland one of the most rapid in the world and the overall health of the adult population has greatly improved.

Active international collaboration with WHO and other agencies initially helped the North Karelia Project. Later on WHO has helped to apply elsewhere the approach and experiences of the North Karelia Project. As indicated earlier, numerous community-based projects and national demonstration programmes are under way in many countries of the world, particularly related to the WHO programmes. This development will ultimately help different parts of the world to

start controlling the modern epidemics of non-communicable disease and tell us more about the usefulness of different intervention approaches in different cultural settings.

Correspondence:

Dr. Pekka Puska
World Health Organization
Director, Noncommunicable Disease Prevention and Health Promotion
CH-1211 Geneva
Switzerland
E-mail: puskap@who.int

Accepted for publication
20th September 2002
PHM 2002;4(1):5-7
Rila Publications Ltd.

¹ World Health Organization. World Health Report 1999. Making a Difference. WHO, Geneva 1999.

² Puska P. (ed) Comprehensive cardiovascular community control programmes in Europe. EURO reports and studies 106 -WHO/EURO, 6 Copenhagen 1988.

³ Puska P, Tuomilehto J, Nissinen A, et al; The North Karelia Project. 20 Year Results and Experiences. Helsinki 1995.

⁴ Puska P, Vartiainen E, Tuomilehto J, et al; Changes in premature deaths in Finland: successful long-term prevention of cardiovascular diseases: Bulletin of the World Health Organization 1998; 76(4): 419-425.

⁵ Vartiainen E, Puska P, Pekkanen J. et al; Changes in risk factor explain changes in mortality from ischaemic heart disease in Finland. BMJ 1994; 309: 23-27.

⁶ Puska P. Community interventions in cardiovascular disease prevention. In: Orth-Gomer K, Schneidermann N eds. Behavioural medicine approaches to cardiovascular disease prevention. Hillsdale, New Jersey:Lawrence Erlbaum, 1996: 237-262.

TABLE 1 Mortality changes in North Karelia in 1970-1995 (per 100 000, 35-64 years, men, age adjusted).

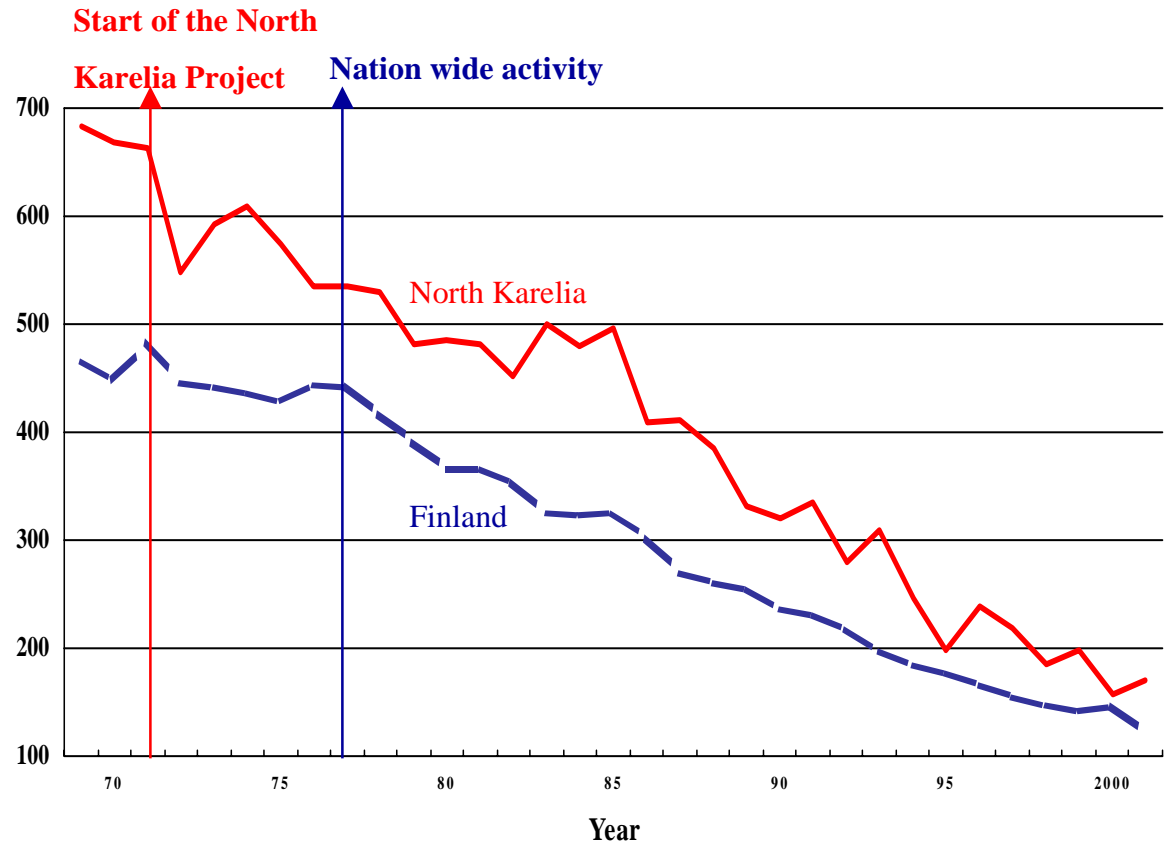
	Rate in 1970	Change in 1970-1995
All Causes	1509	-49%
All cardiovascular	855	-68%
Coronary heart disease	672	-73%
All cancers	271	-44%
Lung cancer	147	-71%

TABLE 2: Risk factor changes in North Karelia 1972-1997 (30-59 years).

Year	Men			Women		
	Smoking	S-Cholesterol mmo1/1	Blood Pressure mmHg	Smoking	S-Cholesterol mmo1/1	Blood Pressure mmHg
1972	52	6.9	149/92	10	6.8	153/92
1977	44	6.5	143/89	10	6.4	141/86
1982	36	6.3	145/87	15	6.1	141/85
1987	36	6.3	144/88	16	6.0	139/83
1992	32	5.9	142/85	17	5.6	135/80
1997	31	5.7	140/88	16	5.6	133/80

Prevention Works

Age-adjusted mortality rates of coronary heart disease in North Karelia and the whole of Finland among males aged 35-64 years from 1969 to 2001



Mortality per
100 000
population