

Blood Pressure, Sodium Intake, and Hypertension Control

Lessons From the North Karelia Project



Tiina Laatikainen^{*,†,‡}, Aulikki Nissinen^{*}, Mika Kastarinen[§], Antti Jula^{*}, Jaakko Tuomilehto^{||,¶}
Helsinki, Kuopio, and Joensuu, Finland; Krems, Austria

ABSTRACT

From the very beginning of the North Karelia Project, prevention, detection, and control of hypertension were included as key aims in the project. An intensive hypertension prevention and control program was established in North Karelia in 1972 that included community-based activities to reduce blood pressure levels in the entire population, detect people with hypertension, improve their treatment, establish standard diagnostic and therapeutic methods, and to monitor blood pressure levels, control of hypertension, and the performance of the health care. After the first 5 years of the project, most of these activities were also implemented on the national level. In late 1970s, work to reduce the salt intake was started, and substantial reductions have taken place in salt intake in the Finnish population. Remarkable improvements have been seen both in blood pressure levels and in treatment and control of hypertension in North Karelia and in the whole of Finland. Between 1972 and 2012 in North Karelia, the mean systolic blood pressure among 30- to 59-year-old men has decreased from 149 mm Hg to 135 mm Hg and among women from 153 mm Hg to 129 mm Hg. The decreases in mean diastolic blood pressure have been from 92 mm Hg to 84 mm Hg among men and from 92 mm Hg to 79 mm Hg among women.

Elevated blood pressure is regarded as the most important risk factor contributing both to mortality and disability adjusted life-years at the global level including the developing world [1,2]. In 2010, based on the Global Burden of Disease Study, the 3 leading risk factors for global disease burden were high blood pressure (7.0% of global disability-adjusted life-years), tobacco smoking (6.3%), and alcohol abuse (5.5%). In 2013, dietary risks and high systolic blood pressure were the 2 risk factors both accounting for >7.5% of disability-adjusted life-years.

The relation of blood pressure to the development of stroke has been well-known and that to coronary heart disease was first reported by Kagan et al in the 1950s from the Framingham Heart Study [3]. The efficacy of antihypertensive drug treatment on cardiovascular morbidity and mortality was revealed much later in the 1960s first in the Veterans Administration Cooperative Study [4]. Even in the early 1970s, treatment of hypertension in Finland had been mainly treatment of very high blood pressure levels and acute events of hypertensive crisis with nitroprusside infusion. As understanding of the effects of hypertension control in the prevention of cardiovascular diseases increased the development and the use of antihypertensive medication increased rapidly. The national Social Insurance Institution established a new policy to reimburse drug costs for several diseases, including hypertension in 1964. This enabled wide scale treatment

of hypertension in Finland in principle. However, the majority of people with hypertension were undetected, and no systematic case detection and long-term management plan existed.

At the same time, in late the 1960s and early 1970s, high blood pressure levels and poor control of hypertension were reported in many populations [5-8]. In many countries, roughly one-half of the individuals with hypertension were aware of their elevated blood pressure levels and one-half were obtaining treatment, but only one-half of those treated were controlled adequately [7,8]. This was called “the rule of halves.” There was globally a clear need for both the reduction of blood pressure levels in the populations as well as improvements in organizing hypertension care.

BLOOD PRESSURE AND HYPERTENSION IN NORTH KARELIA IN THE 1970s

In the beginning of the community-based cardiovascular disease prevention program in North Karelia the population survey was carried out to assess the baseline levels of main risk factors. The study was carried out in spring 1972. From the population aged 25 to 59 years, a 6.6% random sample was drawn from the National Population Register. The participation rate was 94%.

According to the baseline survey, the situation in North Karelia was comparable with many international

The authors report no relationships that could be construed as a conflict of interest.

Drs. Laatikainen and Nissinen have received public funding.

From the *National Institute for Health and Welfare, Chronic Disease Prevention Unit, Helsinki, Finland; †University of Eastern Finland, Institute of Public Health and Clinical Nutrition, Kuopio, Finland; ‡Hospital District of North Karelia, Joensuu, Finland; §Finnish Medicines Agency (Fimea), Kuopio, Finland; ||University of Helsinki, Helsinki, Finland; and the ¶Danube University Krems, Austria. Correspondence: T. Laatikainen (Tiina.Laatikainen@thl.fi).

GLOBAL HEART
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 VOL. 11, NO. 2, 2016
 ISSN 2211-8160/\$36.00
<http://dx.doi.org/10.1016/j.ghheart.2016.04.011>

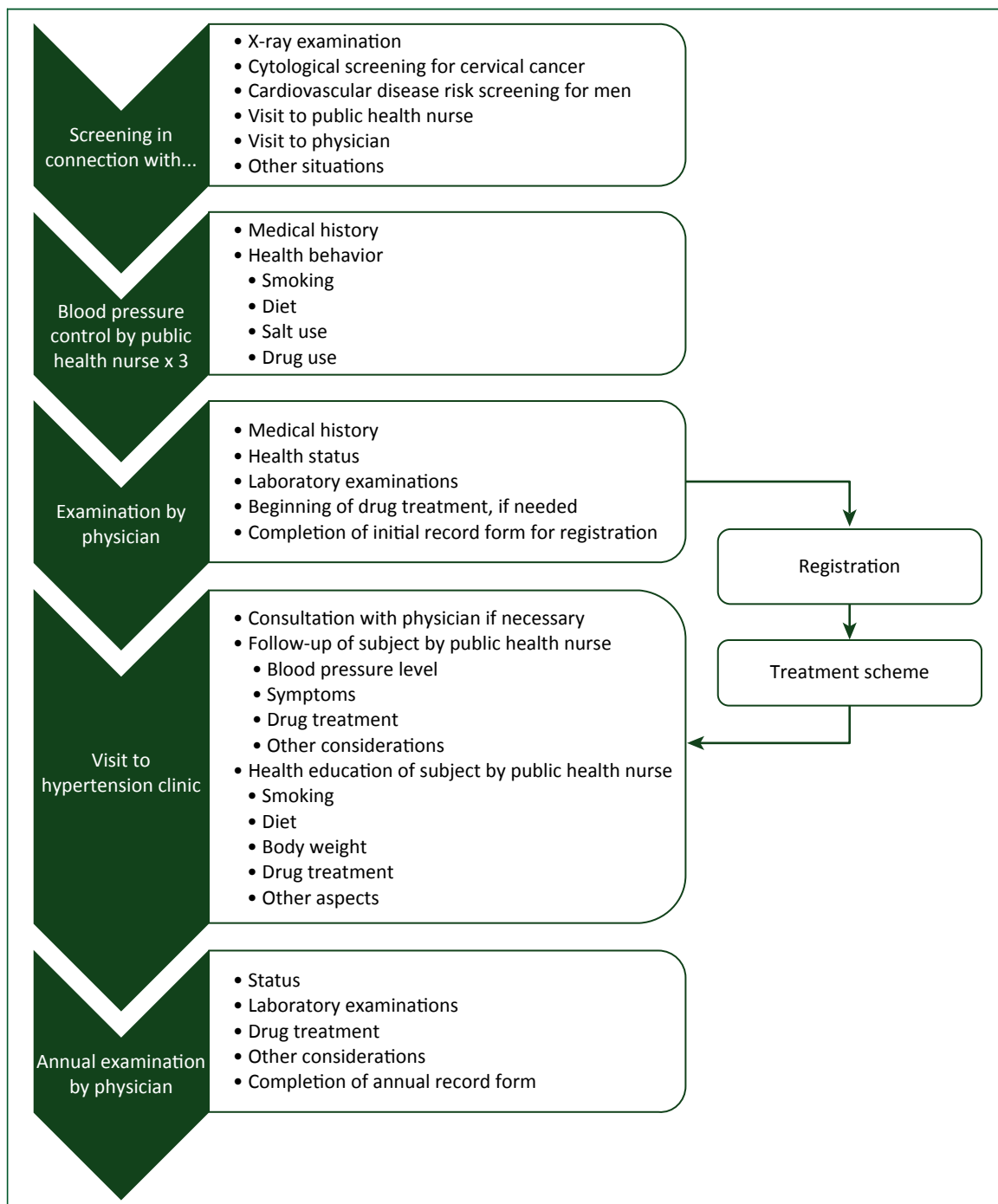


FIGURE 1. The scheme for the follow-up of hypertensives developed in the hypertension program of the North Karelia Project in early 1970s. Figure prepared using data from Nissinen et al. [14].

studies. The mean systolic blood pressure among 25- to 59-year-old men in North Karelia was 147 mm Hg and among women 149 mm Hg. The mean diastolic blood pressure was 91 mm Hg both among men and women [9].

In North Karelia, systolic blood pressure of ≥ 160 mm Hg was found in 23% of men and 31% of women and diastolic blood pressure of ≥ 95 mm Hg in 34% of men and 36% of women [10].

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