The hypertension register of the North Karelia Project

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Summary

1. One major subprogramme of the North Karelia Project was the hypertension programme which aimed at lowering of the high blood pressure among the whole population, and especially among middle-aged men. The hypertension programme consisted of intervention integrated with the existing health care structure of the county of North Karelia.

2. The hypertension register, which was the major tool of the programme, aimed to maintain patients in treatment and to get information about the development of the programme. Registration of hypertensive subjects was continuous between 1972 and 1977 and registered patients had annual follow-up examinations.

3. After 5 years of the programme, there were approximately 17,000 registered patients which is 9.7% of the total population.

4. Proportion of drop-outs at the annual follow-up examinations was less than 10%. 83% of the registered hypertensive subjects were under drug treatment after 3 years intervention. The percentage of normotensive subjects increased significantly year by year.

5. Preliminary results from the stroke register of the North Karelia Project indicate that the incidence of stroke decreased as hypertension control was improved.

Key words: hypertension, North Karelia Project.

Introduction

Cardiovascular diseases are the main cause of mortality and severe morbidity in Finland (Puska, 1972). Faced with this problem a pilot preventive community programme was carried out between 1972 and 1977 with the support of the World Health Organization. The North Karelia (NK) Project was a comprehensive preventive programme against cardiovascular diseases for the population of the county of North Karelia (180,000 inhabitants). The Project consisted of a five year intensive community intervention and its evaluation (Puska, Koskela, Pakarinen, Puimalainen, Soininen & Tuomilehto, 1976).

A major component of the Project was the community control programme for hypertension (Tuomilehto, Puska & Nissinen, 1976). This was part of an international co-operative study ‘Community Control of Hypertension’ which followed the protocol prepared by the meeting of a World Health Organization expert group in Gothenburg, 1971 (World Health Organization, 1971; Strasser, 1972).

The main objective of the hypertension programme was reduction of high blood pressure among the whole population, and especially among the middle-aged population in North Karelia (Tuomilehto et al., 1976).

Special objectives were (Tuomilehto, 1975): 1. to bring to treatment as many hypertensive subjects in the population as possible; 2. to control the blood pressure of as many as possible of these subjects; 3. to unify and improve the methods of physicians and public health nurses concerned with diagnosis and treatment of hypertension and cardiovascular disease. In addition the aim was to gather new information about the incidence of hypertension and the function of health services.

The hypertension programme consisted of a community intervention integrated with the existing service structure. The methods used included health education of the public, education of health service personnel, organization of a service for the spreading of information and also for screening, treatment and follow-up (Tuomilehto, 1975).
In 1972 before the programme, 22% of the population aged 25–59 had high blood pressure and the treatment of hypertension was unsatisfactory (Tuomilehto, 1975).

In this paper we describe the patients of the hypertension register and some results of the treatment and follow-up of the registered patients.

Methods

The aim was to register all hypertensive subjects among the population of North Karelia. The principles of the register are described elsewhere (World Health Organization, 1971; Tuomilehto, 1975).

A person was eligible if blood pressure on three consecutive occasions was at least: 150 and/or 95 mmHg (<29 years), 160 and/or 95 mmHg (30–64 years), 170 and/or 95 mmHg (65+ years), or already receiving drug treatment for hypertension.

A doctor or a qualified assistant measured blood pressure for the register data according to the recommendations of the NK Project. Patients rested for 5–10 min in a sitting position. The diastolic blood pressure was recorded in the fifth phase of Korotkoff sounds. The use of any antihypertensive drug for 5 days during the preceding week was noted as ’drug treatment’.

Registration of the patient was decided by a local physician, who filled the initial record form. All physicians cooperated. New cases were continuously registered from spring 1972 to spring 1977. Record forms were sent regularly to the coordinating centre of the Project, where they were checked and completed for data processing.

The co-ordinating centre of the NK Project sent an advice to patients to visit their doctor 2 months before the annual follow-up date. The aim of this procedure was to eliminate drop-outs and to make it possible for the patient to combine other medical problems with the annual follow-up visit of the register.

Local health centres were responsible for treatment and other health activities. Each health centre established a hypertension dispensary which was run by public health nurses. The treatment and follow-up of patients continued according to principles created during the NK Project until 1977 when the final survey of the project was carried out.

Results

After 5 years there were 17 100 hypertensive subjects in the register: 9.7% of the total population of North Karelia. 6 307 were males and 10 661 females. About 60% of men and 40% of women were under 55 years, and 16% of males and 30% of females were over 65 years. 77% were followed over 1 year, 63% over 2 years, 42% for more than 3 years and 15% over 4 years.

About half were already receiving antihypertensive drug treatment at their initial examination. This proportion was smaller among men than among women. This difference between sexes levelled off during the first 3 annual follow-up years. At the third annual follow-up examination the proportion of treated subjects was 87% among men and 84% among women.

The blood pressure of registered patients reduced through all follow-up years. There was observed a drop of 19/10 mmHg during the first 3 years among all registered patients. Among those patients who started a treatment during the first follow-up year the mean value of blood pressure reduced 22/13 mmHg.

Blood pressure below the criteria for registration was observed initially in 12% of all registrants. This proportion was three times greater at the third

<table>
<thead>
<tr>
<th>Time of examination</th>
<th>DBP &lt; 100 mmHg (%)</th>
<th>DBP &lt; 105 mmHg (%)</th>
<th>SBP &lt; 160 mmHg (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial examination</td>
<td>12</td>
<td>54</td>
<td>62</td>
</tr>
<tr>
<td>1 Follow-up</td>
<td>28</td>
<td>72</td>
<td>80</td>
</tr>
<tr>
<td>2 Follow-up</td>
<td>33</td>
<td>77</td>
<td>85</td>
</tr>
<tr>
<td>3 Follow-up</td>
<td>36</td>
<td>80</td>
<td>88</td>
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<tr>
<td>4 Follow-up</td>
<td>38</td>
<td>83</td>
<td>89</td>
</tr>
</tbody>
</table>

* ≤ 29 years < 150/90; 30–64 years < 160/95; ≥ 65 years < 170/95.
annual follow-up. The proportion of patients with blood pressure below 100 mmHg increased from 54% of the initial examination to 83% at the fourth annual follow-up (Table 1). At the first annual follow-up examination adequate data was obtained from 90% of the men and 93% of the women who were expected to make their annual follow-up visit in the register. The compliance improved further at subsequent follow-up examinations.

Discussion

The aim of the hypertension programme of the NK Project was to reduce high blood pressure among the North Karelian population (Tuomilehto et al., 1976). One of the main tools to achieve this was to establish a register of hypertensive subjects in the county of North Karelia. This operated from 1972 to 1977 and the number of patients was, after 5 years, 17 100, which is 9.7% of the total population. This observed number of registered hypertensive subjects is similar to the expected number in this community (Tuomilehto, 1975).

Many epidemiological studies have shown that men have more hypertension than women under the age of 45. However, treatment of hypertension has been found to be more common among women of all age groups (Kagan, Gordon, Kannel & Dawber, 1959; Gordon, 1964; Socialstyrelsen, 1968; Pickering, 1968). In the hypertension register of NK Project the number of the registered men is greater than that of women under the age 45 and the age structure is in accordance with expected age structure of the hypertensive population in North Karelia. Control of hypertension in the community has been difficult especially for men, but methods developed in the hypertension programme of the NK Project have been successful in providing adequate treatment.

Data in the hypertension register is based on measurements by physicians and their assistants in everyday practice. Thus methodological shortcomings may have influenced the results. On the other hand results reflect the true situation of control of hypertension in the community as seen by health personnel at their work. Methods used to collect data have not changed during the entire period of follow-up. Recommendations for measurement of blood pressure and other variables included in the hypertension register record forms were distributed to everybody concerned. This methodology was controlled continuously by checking all record forms and educational meetings with physicians and nurses. Of great importance is that the implementation of a hypertension register in the health service system of North Karelia was proved feasible.

The proportion of drop-outs was very small. In a separate study of these only 1% of 225 drop-outs had missed control blood pressure measurements (Tuomilehto, Rajala & Puska, 1975). The compliance of patients depends mainly on the efficiency of the health-care system in providing adequate hypertension control services (WHO, 1971; Finnerty, Mattie & Finnerty, 1973; Andersson & Berglund, 1975; Podell & Gary, 1976). The main emphasis of the hypertension programme of the NK Project was on developing methods for effective follow-up of hypertensive subjects, partly through using the hypertension register for the whole country, and at the local level by the establishment of the network of hypertension dispensaries run by trained public-health nurses (Nissinen, Tuomilehto & Puska, 1978). In addition these dispensaries made possible a systematic follow-up of patients and the health education of mild hypertensive subjects.

The proportion of treated hypertensive subjects among those registered increased significantly during the follow-up. That only 17% had a diastolic blood pressure over 100 mmHg after 3 years is a good indicator of the effect of the programme. From several clinical studies we know that antihypertensive treatment can reduce blood pressure effectively (Stamler, Stamler, Civinelli, Pritchard, Gosch, Ticho, Restivo & Fine, 1975). Until now, however, efforts to reduce blood pressure in the community have not been effective in spite of a great increase of antihypertensive drug treatment (Stamler, Stamler, Riedlinger, Algera & Roberts, 1976).

The overall effect of the hypertension programme of the NK Project will be measured later using data from the final evaluation of the project.

The normalization of blood pressure reduces complications of hypertension (Veterans Administration, 1967; 1970; Berglund, Wilhelmsen, Sannerstedt, Hansson, Andersson, Sivertsson, Wedel & Wikstrand, 1978) and even a partial reduction of blood pressure seems to be favourable (Takuchi & Freis, 1974). Thus the lowering of blood pressure among patients in the hypertension register of the NK Project (19/10 mmHg during three years) may provide a better and healthier outlook for these patients. First preliminary observations from the stroke register of the NK Project indicate that yearly stroke incidence was reduced among men by 40% and among women 30%

References


