The Effect of a Community Hypertension Control Program

IGNACIO MACÍAS, FERNANDO DEL COLLADO, AND GUILLERMO FORTE

SUMMARY A hypertension detection and control program sponsored by the Pan-American Health Organization and the World Health Organization (PAHO/WHO) was carried out in an urban health district of Havana City, Cuba. A baseline (initial) survey was conducted on a random sample of the population (≥ 15 years of age) to assess the problem of hypertension in that community. Subsequently, we extended the program in the same area by taking the blood pressure of as many people as we could, and a health education program on hypertension was developed and implemented. All hypertensive persons were treated. We surveyed about 90% of the adult population (29,640) over a 5-year period. We then conducted a final survey on a second random sample of the population to assess the effect of the program. The response rate to the letter of invitation to visit the hypertension clinic was 50%; 30% of the recall appointments were missed, and the dropout rate was 18.6%. Seventy percent of the hypertensive persons had Stage I disease (PAHO/WHO) with normal electrocardiograms. Before the program, 15.7% of the total number of hypertensive persons surveyed in the area had the disease under good control, and this increased to 31% after the program. Mortality due to cerebrovascular disease was reduced from 11/10,000/yr to 7/10,000/yr, whereas mortality caused by myocardial infarction did not change. (Hypertension 11 [Suppl I]: I-194-I-197, 1988)

KEY WORDS • blood pressure • prevalence • dropout rate • mortality • screening • health education

In Cuba the prevalence of hypertension in the adult population (15 years of age or older) is about 15% in urban areas and about 7.5% in rural areas. Our country was invited to participate in a Pan-American Health Organization/World Health Organization (PAHO/WHO) pilot program for community control of hypertension. The program included simultaneous action along three lines: general health education, physician education, and better care for hypertensive patients, including timely diagnosis and appropriate treatment. Our objective was to determine if a program based on this approach was feasible, effective, and efficient.

The objectives of the program were to 1) decrease the mortality caused by complications of hypertension (stroke and coronary heart disease); 2) increase the number of people aware of being hypertensive; 3) increase the number of hypertensive persons under treatment; 4) increase the number of hypertensive persons whose disease was under control; 5) classify the different types of hypertension in the community and their distribution by age, sex, and race; and 6) demonstrate the feasibility, effectiveness, and efficiency of the program.

Subjects and Methods

An urban community in Havana City with 32,694 persons aged 15 years or older was chosen for the study.

Hypertension Clinic

A hypertension clinic was established within the framework of the district's health center. Office hours of the program were Monday through Friday from 0800 to 1600. On Tuesdays and Fridays, additional time was offered from 1900 to 2100.

Baseline Survey

A random sample of 4295 persons was selected from residents of both sexes and their blood pressure was measured. The objective of this baseline survey was to assess the dimension of hypertension as a community health problem.

Eligibility for the Program

Subjects of both sexes found on three occasions to be at or above the following values were classified as hypertensive and registered.

<table>
<thead>
<tr>
<th>Age group (years)</th>
<th>15–19</th>
<th>20–29</th>
<th>30–64</th>
<th>≥ 65</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood pressure (mm Hg)</td>
<td>140/90</td>
<td>150/90</td>
<td>160/95</td>
<td>170/95</td>
</tr>
</tbody>
</table>

From the National Committee for the Study of Hypertension, Ministry of Public Health, Havana, Cuba.

We are grateful to Dr. Lewis J. Greene for his assistance in preparing this article for publication.
Subjects previously diagnosed as hypertensive whose blood pressure values were below the hypertensive range because of treatment were also considered to be hypertensive. Casual blood pressure was determined in the right arm with the subject in the sitting position. The point of first appearance of an audible pulse beat (first sound) was recorded as the systolic pressure. Diastolic pressure was determined as phase 5 (disappearance of Korotkoff sounds).

Screening
Almost 90% of the population (29,640) was screened during the 5-year duration of the program. Several techniques were used for screening. Health education of the public included lectures and printed materials mailed or otherwise distributed. Letters were sent to the population inviting them to visit the hypertension clinic to have their blood pressure measured. We made house-to-house visits, and occupational group screening was carried out at places of work.

Diagnostic Workup
The basic workup was kept at a simple level. It included only the following: history, physical examination, weight, blood pressure, heart rate, serum potassium level, electrocardiograms, and urinalysis.

Guidelines for Therapy
The aim of treatment was to reduce blood pressure to the lowest level tolerable to the patient. Ideally, this was close to the normal range of pressure for a given age. Treatment consisted of reduction of salt consumption, maintenance of normal weight, discontinuance of smoking, physical exercise three to five times a week, mental relaxation, and medication. All patients were given some type of medication.

Follow-up
Patients were seen as often as was judged necessary. The interval between two visits did not exceed 3 months. The minimum information recorded at each visit included blood pressure, the therapy given since the last examination, weight, and heart rate. Once a year patients underwent a more detailed examination, which included electrocardiography, urinalysis, and determination of serum potassium.

If a patient missed an appointment, we sent him or her a letter. If he or she did not then appear, we sent a field nurse to the patient’s home. Members of the community organizations and the unions helped us to locate patients and to follow up on missed appointments and dropouts.

Education of Health Workers and the Population
The health workers of the area and the population were informed about the program, its objectives, methods, and expected benefits for the community. All vehicles of professional information were used: journals, meetings, seminars, and bulletins. Printed materials were also distributed. We also used local radio stations, television, videocassettes, and the press. Special emphasis was given to the benefits of controlling high blood pressure.

Evaluation
At the end of the fifth year the final evaluation of the program took place. A second random sample of 4325 persons was selected from the population and was studied in the same way as the baseline survey sample. The results of the second survey were compared with the findings of the initial survey.

Data for mortality caused by complications of hypertension (stroke and coronary heart disease) before and after the program were compared. Death certificates were the source of mortality data.

The number of missed appointments and dropouts, the total population screened, and the response rate to the letters and home visits were also studied in the final evaluation.

PAHO/WHO Classification of Essential Hypertension
Stage I: high blood pressure without evidence of organic changes in the cardiovascular system.
Stage II: high blood pressure with cardiovascular hypertrophy but without other evidence of organ damage.
Stage III: high blood pressure with evidence of organ damage attributable to the hypertensive disease (heart, kidney, cerebrovascular system).

Classification of Blood Pressure Control
Good: more than half of the blood pressures taken during the period were normal.
Medium: more than half of the diastolic blood pressures taken during the period were 95 to 105 mm Hg.
Poor: no response to treatment.

Results
Mortality due to cerebrovascular disease decreased from 11/10,000 inhabitants per year before the program to 7/10,000 inhabitants per year at the end of the program. There was no significant change in mortality caused by myocardial infarction.

Thirty percent of the recall appointments scheduled during the regular (0800–1600) office hours were missed, as well as 15% of the evening (1900–2100) appointments; 18.6% of the subjects dropped out of the program. Women attended the program more regularly than men. The response rate to the letter of invitation was 50% and to the home visits 68%.
The electrocardiograms were classified by the Minnesota Code. Seventy percent of the hypertensive participants had Stage I disease and normal electrocardiograms. The hypertensive group consisted of 95% with essential hypertension and 5% with secondary hypertension. Tables 1 to 4 provide relevant statistical data.

Discussion
The feasibility of the program was demonstrated at the end of the 5-year period. The support of the population and local decision makers was encouraging, and health personnel were cooperative.

Assessment of the project cost for this kind of integrated community approach is the most complicated
TABLE 1. Distribution of Hypertension by Age and Sex

<table>
<thead>
<tr>
<th>Age (yr)</th>
<th>No. screened</th>
<th>Prevalence of hypertensive patients (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Men</td>
<td>Women</td>
</tr>
<tr>
<td>Baseline survey</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 to 19</td>
<td>200</td>
<td>285</td>
</tr>
<tr>
<td>20-29</td>
<td>425</td>
<td>700</td>
</tr>
<tr>
<td>30-64</td>
<td>780</td>
<td>843</td>
</tr>
<tr>
<td>≥65</td>
<td>369</td>
<td>510</td>
</tr>
<tr>
<td>Final survey*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15-19</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>20-29</td>
<td>65</td>
<td>87</td>
</tr>
<tr>
<td>30-64</td>
<td>950</td>
<td>1050</td>
</tr>
<tr>
<td>≥65</td>
<td>763</td>
<td>1237</td>
</tr>
</tbody>
</table>

*Conducted on a second random sample of the same population.

issue. We could not separate the cost of the project from the budget of the health district because the program was carried out within the framework of the district's health center.

The participation of 90% of the area population was a necessary requirement for evaluation of this type of program. In the initial and final surveys, more than 95% of both population samples were screened as recommended by PAHO/WHO.

In our study the prevalence of hypertension was almost the same in the initial and final surveys when the hypertension was analyzed by age group. There was a great difference in the age distribution of the two samples, because at the time of the final survey the majority of the population below 30 years of age were out of the area. However, since our main objective was to assess the program's capability to improve the control of high blood pressure in the community, we think that this difference in the age distribution between the initial and final surveys does not invalidate our results.

The increase in the awareness of being hypertensive, in the number of people under treatment, and in the total number of cases under control was a modest one. This could be due to various reasons, for example: 1) the effort was not great enough; 2) the intensity of the intervention was often limited compared with the magnitude of the task; and 3) 5 years was not enough time to produce a more important impact on the community.

The reduction in mortality due to cerebrovascular disease was significant, but mortality caused by myocardial infarction was not reduced. It seems that cerebrovascular disease is more vulnerable to blood pressure control. Moreover, almost all the patients were receiving thiazide therapy, and it may be that blood lipids increased with use of the diuretic. The distribution of hypertension by age, sex, and race had the same pattern as previously reported. It was more prevalent in women over 30 years of age, increased with age, and was more common in blacks than in whites. We found the more severe forms of hypertension in black people.

TABLE 2. Difference Between the Baseline Survey and Final Survey Results

<table>
<thead>
<tr>
<th>Variable</th>
<th>Baseline survey (%)</th>
<th>Final survey (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aware of being hypertensive</td>
<td>56.5</td>
<td>76.9</td>
</tr>
<tr>
<td>Not aware of being hypertensive</td>
<td>43.4</td>
<td>23.1</td>
</tr>
<tr>
<td>With treatment</td>
<td>55.5</td>
<td>78.2</td>
</tr>
<tr>
<td>Without treatment</td>
<td>44.5</td>
<td>21.8</td>
</tr>
<tr>
<td>No control</td>
<td>59.8</td>
<td>48.4</td>
</tr>
<tr>
<td>Good control</td>
<td>40.2</td>
<td>51.6</td>
</tr>
</tbody>
</table>

TABLE 3. Distribution of Hypertension by Age and Race

<table>
<thead>
<tr>
<th>Age (yr)</th>
<th>White (%)</th>
<th>Black (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-19</td>
<td>4.8</td>
<td>6.7</td>
</tr>
<tr>
<td>20-29</td>
<td>3.4</td>
<td>5.4</td>
</tr>
<tr>
<td>30-64</td>
<td>16.4</td>
<td>27.9</td>
</tr>
<tr>
<td>≥65</td>
<td>34.8</td>
<td>43.5</td>
</tr>
</tbody>
</table>

The distribution of hypertension by age, sex, and race had the same pattern as previously reported. It was more prevalent in women over 30 years of age, increased with age, and was more common in blacks than in whites. We found the more severe forms of hypertension in black people.

The frequency of essential and secondary hypertension was the same as in other reports.

Conclusions

Because of the high prevalence of hypertension, this health problem must be attacked within the community at the primary care level. A program for the detection and control of hypertension with follow-up, such as the one described here, is feasible, efficient, and effective. Our study included the following findings:

- The number of persons whose hypertension was under control in the area studied had doubled at the end of the 5-year program.
- Seventy percent of the hypertensive persons in the urban health area studied were in Stage I (mild hypertension) and had normal electrocardiograms.
- Ninety-five percent of the hypertensive participants had essential hypertension; only 5% had secondary hypertension.
- Mortality caused by stroke was reduced during the study, but that due to myocardial infarction did not change.
- A high proportion of missed appointments and dropouts was encountered.

We believe that with more intense activity within the community and a longer period of time (10, 15, or 20 years), the health problem must be attacked within the community at the primary care level.
years), the results would be better and the impact on the mortality would be more impressive.

References
1. Macias I. Modelo experimental de un programa de salud nacional para la atención integral del paciente con hipertensión arterial. (An experimental model of a comprehensive national program for the care of patients with hypertension.) Rev Cubana Med 1975;14:7-63
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