Effects of interventions on community awareness and treatment of hypertension: results of a WHO study*

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A WHO-coordinated study of the community control of hypertension in six countries (Cuba, Finland, France, Italy, Mongolia and Portugal) has shown that a comprehensive approach clearly improves the care of hypertensives in various populations. Hypertension control programmes were individually designed in each country and were implemented in defined communities. The intervention strategies varied between countries, the major components being: establishment of hypertension clinics and hypertension registers, involvement of health care personnel, and health education of the entire community. As a result of this programme, the blood pressure in the age group 30–59 years decreased on average by 3/2 mmHg among men and by 6/3.5 mmHg among women; the mean blood pressure level decreased twice as much in hypertensive subjects as in the entire population in the intervention areas of the study.

By the early 1970s, the benefits of antihypertensive treatment were proved beyond doubt (1, 2). However, from the available evidence, it was clear that only a fraction of the large number of hypertensives in any population were receiving appropriate antihypertensive treatment. In fact, half of the hypertensives were not aware that they had high blood pressure, and of the others, about half were not taking any antihypertensive drug; only a small number were on effective treatment that could satisfactorily lower their blood pressure (3–7). Detection and correct treatment of hypertension at the community level thus emerged as a major challenge in cardiovascular disease prevention. The World Health Organization therefore convened in 1971 a meeting of researchers interested in hypertension and this led to a protocol for an international cooperative study on the community control of hypertension. 4 The protocol was adopted in 1972 and the study was started in several centres in different parts of the world, including developed and developing countries.

The present paper describes the effects of community intervention on the control of hypertension, as assessed by a controlled study involving the following six centres: Havana (Cuba), North Karelia (Finland), Lyon (France), Padua (Italy), Ulan Bator (Mongolia), and Lisbon (Portugal).

METHODS

The main objective of the project was to assess whether organized intervention to control hypertension in a community would result in reduction of the level of blood pressure in the population, improved control of hypertension cases, and reduced morbidity and mortality associated with high blood pressure.
pressure. Changes in the intervention communities were to be compared with changes in matched reference communities. In the initial stage, a baseline survey of a random sample of each population was carried out in two comparable communities ("intervention" and "reference community", respectively) in order to assess the distribution and mean levels of blood pressure, and the status of the control of hypertension. The survey was repeated five years later; in the period between the two surveys systematic actions were introduced in the intervention community to improve the control of hypertension.

Table 1. Age and sex composition of sampled populations

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* B = baseline survey; T = terminal survey
* Figures in these columns are percentages of the total number of subjects examined.
* Total number of subjects aged 30-59 years.
To this end, the main actions were the establishment of a hypertension clinic (dispensary) and of a hypertension register and the continuous education of the public. The involvement and motivation of general practitioners and other health care personnel were assured by informing them about recent developments in the treatment of hypertension and stimulating them to upgrade the care of hypertensive patients. In their turn, the patients were systematically reminded to attend follow-up visits and to comply with the prescribed treatment. In the reference community, no such special steps were taken; the hypertensives detected during the surveys were referred in the usual way to the existing health care facilities. The intervention and reference communities were of similar size and had similar ethnic and socioeconomic characteristics.

Separate (independent) random samples were drawn for the initial and terminal surveys, except in Lyon, where an exhaustive sample of factory workers was examined. No reference population was examined in Lisbon. The present analysis includes only subjects aged 30 to 59 years. The sizes and age distributions of the examined samples are given in Table 1.

The age and sex structure of the examined samples was similar in both intervention and reference communities, at both the baseline and terminal surveys, with the exception of Ulan Bator where the population sample was somewhat younger and Lyon where there was a small upward age shift in both communities after five years (Table 1). The participation rates ranged between 70% and 96%.

Blood pressure was measured by the auscultatory method, after five minutes of rest, with a mercury sphygmomanometer applied to the right arm, while in the sitting position. Values were recorded to the nearest 2 mmHg. Diastolic pressure was taken at the fifth phase. The recommendations of the WHO Expert Committee were followed in all centres (8). Hypertension was defined as casual blood pressure at or above 180 mmHg (24 kPa) systolic and/or 100 mmHg (13.3 kPa) diastolic. Subjects on antihypertensive drug treatment were considered to be hypertensive, regardless of the blood pressure values found at the survey.

Hypertensive people described as “aware” knew that they had high blood pressure before being examined in the survey; “treated” hypertensive patients were those who reported that they had regularly taken antihypertensive drugs in the week preceding the examination.

RESULTS

Blood pressure

In the intervention communities, after five years the proportion of lower blood pressure classes (particularly those below 130 mmHg (17.3 kPa) systolic and 80 mmHg (10.7 kPa) diastolic) had increased,

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**Fig. 1.** Percentage distribution of baseline and terminal systolic blood pressure levels in the intervention and reference communities among males and females.
Fig. 2. Percentage distribution of baseline and terminal diastolic blood pressure levels in the intervention and reference communities among males and females.

i.e., those in the higher class decreased. This change was more marked in women than men. In the reference communities slight changes occurred, mainly in the opposite direction, with the exception of the diastolic blood pressure class below 80 mmHg in women which increased considerably, although to a smaller extent than in the intervention community (Fig. 1 and 2).

Fig. 3. Changes in mean systolic blood pressure between baseline and terminal surveys among hypertensives and in the whole population.

Fig. 4. Changes in mean diastolic blood pressure between baseline and terminal surveys among hypertensives and in the whole population.
Changes in the mean blood pressure to a certain extent reflect those in the distribution. In the intervention communities there was a mean decrease in systolic blood pressure of about 3 mmHg in males and of 6 mmHg in females; diastolic blood pressure decreased 2 mmHg and 3.5 mmHg in males and females, respectively. In the hypertensive subjects, the changes were approximately twice as large. It is noteworthy that in the reference areas there were substantial decreases in diastolic blood pressure in all subgroups, while the systolic blood pressure fell less and only in women (Fig. 3 and 4).

**Indicators of hypertension control**

**Awareness rate.** In North Karelia, awareness of hypertension increased to a greater extent in the study than in the reference community in both sexes. In Padua the increment was much greater in the intervention than in the reference community. There was a small increase of awareness in the intervention groups in Ulan Bator and Havana, but a considerable increase in the reference communities (Fig. 5).

**Treatment rate.** The proportion of hypertensive subjects taking drugs in North Karelia before the
intervention was slightly higher in the reference than
in the study community, particularly in women. Five
years later, the treatment rate was considerably
higher in the intervention than in the reference
population. Also a greater increase in the propor-
tion of treated hypertensives occurred in the study area
than in the reference area in Padua, particularly in
women. Baseline percentages of treated hyperten-
sives were considerably higher in Havana than in the
other centres, particularly in the intervention com-
community. However, the relative terminal increase in
treatment rates observed in the reference community
was two and a half times (in females) to three times (in
males) larger than in the study community. In Ulan
Bator the increase was small and similar in the two
communities in males; an appreciable increase in the
intervention community was apparent only in women
(Fig. 6).

DISCUSSION

The rates of awareness and of treatment among
hypertensives are usually taken as indicators of the
level of hypertension control in a population. These
indicators have clearly improved in North Karelia and
Padua. The apparent paradox of a better outcome in
the reference population of Havana may be explained
by the fact that a comprehensive cardiovascular pre-
vvention project was installed in the reference com-
community shortly after the baseline survey had been
completed. This in turn may be taken as a confirma-
tion of the beneficial effects of intervention,
especially when aimed at the control of all major
cardiovascular diseases. The greater change in the
awareness rate in the reference area in Ulan Bator is
rather puzzling, particularly since there was no paral-
lel change in the treatment rate: the two rates in the
other centres always moved in the same direction. We
have no reasonable explanation for this anomaly.

Women were considerably more aware of being
hypertensive and their treatment rates were higher
than those of men. In general, women also gained
more from the intervention. A better control of hyper-
tension in women may be due in part to the fact that
they are willing and can more easily spare the time to
go to a hypertension clinic than men. It is likely that
among hypertensives the same anxiety-related factors
are influencing demand as in primary medical care as
a whole, as described by Banks et al. (9).

The improvement in hypertension control is reflec-
ted in the changes of mean blood pressure levels. The
mean blood pressures were lower in the terminal
survey in the random population samples, especially
in the group of hypertensive subjects where the
effects of the intervention were more concentrated, as
expected. Here again, better results were achieved in
women than in men. An additional reason may be that
women had higher initial average pressures and may
have been treated more vigorously.

The main actions in intervention were detection
of hypertension cases, health education of the popu-
lation, education and direct involvement of the
general practitioners and other health workers in the
detection and follow-up of hypertensive patients,
establishment of a hypertension clinic, and establish-
ment of a hypertension register. Each of these had
been used as single approaches to hypertension
control in other studies, and all of them proved to be
effective. Concerning health education, one of the
initial findings of the Hypertension Detection and
Follow-up Program (HDFP) in the USA was a two-
fold-threefold increase in the percentage of hyper-
tensives detected, treated and controlled since the
early 1970s (10). This remarkable improvement
of hypertension control was associated with the
implementation of the national High Blood Pressure
Education Program, specifically designed to stimu-
late hypertension control all over the USA (11).

The experience of the Patient Education Hyper-
tension Project at the Johns Hopkins Hospital in
Baltimore confirms the efficacy of educational inter-
ventions directed towards the hypertensive patients
(12). On the other hand, physician tutorials also
improved the care of hypertensive patients (13).

Screening and referral procedures also proved to
effectively improve the control of hypertension only
when treatment and follow-up systems had been prop-
erly organized (14, 15). Finally, a register proved to
be a useful tool in cardiovascular disease control.

The present WHO study made use of all these
procedures and is probably the most comprehensive
approach so far undertaken to control hypertension in
whole communities. In the light of the results
obtained in the intervention areas, it is reasonable to
conclude that the interventions were successful in
improving the control of hypertension. The measure
of success, however, must take into account both the
financial cost of the project and its impact on
cardiovascular morbidity and mortality. Although
these aspects are still under scrutiny in the other
centres, the analysis carried out in North Karelia (16)
shows that this hypertension community control
project, which was based mainly on potentiation and
better organization of existing health services but
without considerable additional resources, imposed
only a limited financial burden (17). On the other
hand, and this is what is important, cardiovascular
morbidity and mortality were substantially reduced
(18).

* Community control of stroke and hypertension: report on a
WHO meeting. Copenhagen. WHO Regional Office for Europe,
RÉSUMÉ

EFFETS DES INTERVENTIONS SUR LA SENSIBILISATION DU PUBLIC AU PROBLÈME DE L'HYPERTENSION ET SUR LE TRAITEMENT DE CETTE AFFECTION. RÉSULTATS D'UNE ÉTUDE OMS

En 1972, une étude OMS de lutte contre l'hypertension au niveau communautaire a été engagée dans plusieurs centres de pays développés et en développement, dans différentes parties du monde. Ses objectifs principaux étaient d'esterminer dans quelle mesure une intervention organisée visant à lutter contre l'hypertension dans une communauté donnée se traduirait par une baisse de la tension artérielle dans cette population, par une amélioration de la lutte contre l'hypertension et par une réduction de la morbidité et de la mortalité associées à cette affection.

Des programmes de lutte contre l'hypertension ont été mis au point séparément dans chaque pays et appliqués à des communautés définies. Les stratégies d'intervention variaient suivant les pays, leurs principaux éléments étant les suivants: ouverture de centres de traitement de l'hypertension et création de registres de l'hypertension, mise à contribution du personnel de soins de santé et éducation sanitaire de toute la communauté.

Les résultats des six centres — la Havane (Cuba), Carolle du Nord (Finlande), Lyon (France), Padoue (Italie), Oulan Bator (Mongolie) et Lisbonne (Portugal) — ont pu être analysés. Ils indiquent qu'une telle approche améliore nettement les soins administrés aux hypertendus dans différentes populations.

Dans cette étude, la tension artérielle des sujets du groupe d'âges 30-59 ans a en moyenne diminué de 3/2 mmHg chez les hommes et de 6/3,5 mmHg chez les femmes; la tension artérielle moyenne diminuait deux fois plus chez les hypertendus que dans l'ensemble de la population des régions d'étude.

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