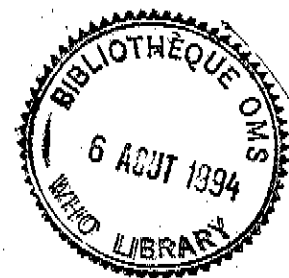




WHO

REGIONAL OFFICE FOR EUROPE

*STUDY ON
HYPERTENSION
CONTROL
MONITORING AT
COMMUNITY
LEVEL*



SCHERFIGSVEJ 8
DK-2100 COPENHAGEN Ø
DENMARK

TEL.: (45) 39 17 17 17
TELEFAX: (45) 39 17 18 18
TELEX: 15348

1994

EUR/HFA target 4

51286
EUR/ICP/NCD 226
ENGLISH ONLY
UNEDITED

TARGET 4

REDUCING CHRONIC DISEASE

By the year 2000 there should be a sustained and continuing reduction in morbidity and disability due to chronic disease in the Region.

ABSTRACT

As part of the WHO Regional Office for Europe initiative on improving the prevention and control of high blood pressure, a questionnaire was distributed to CINDI participating countries to document the current practice of hypertension control and to identify gaps in data and intervention programmes, thereby focusing the actions of CINDI programme members on better control of high blood pressure and reduction of other comorbid conditions and attendant risk factors.

The document presents information from 15 areas in 13 CINDI participating countries on stroke mortality and morbidity, the prevalence of high blood pressure in various age groups, public awareness of high blood pressure, the extent of treatment and control of high blood pressure, the prevalence of attendant risk factors and the availability of community interventions and professional education programmes.

Keywords

HYPERTENSION – prevention and control
COMMUNITY HEALTH SERVICES
EUROPE
CCEE
NIS
CANADA

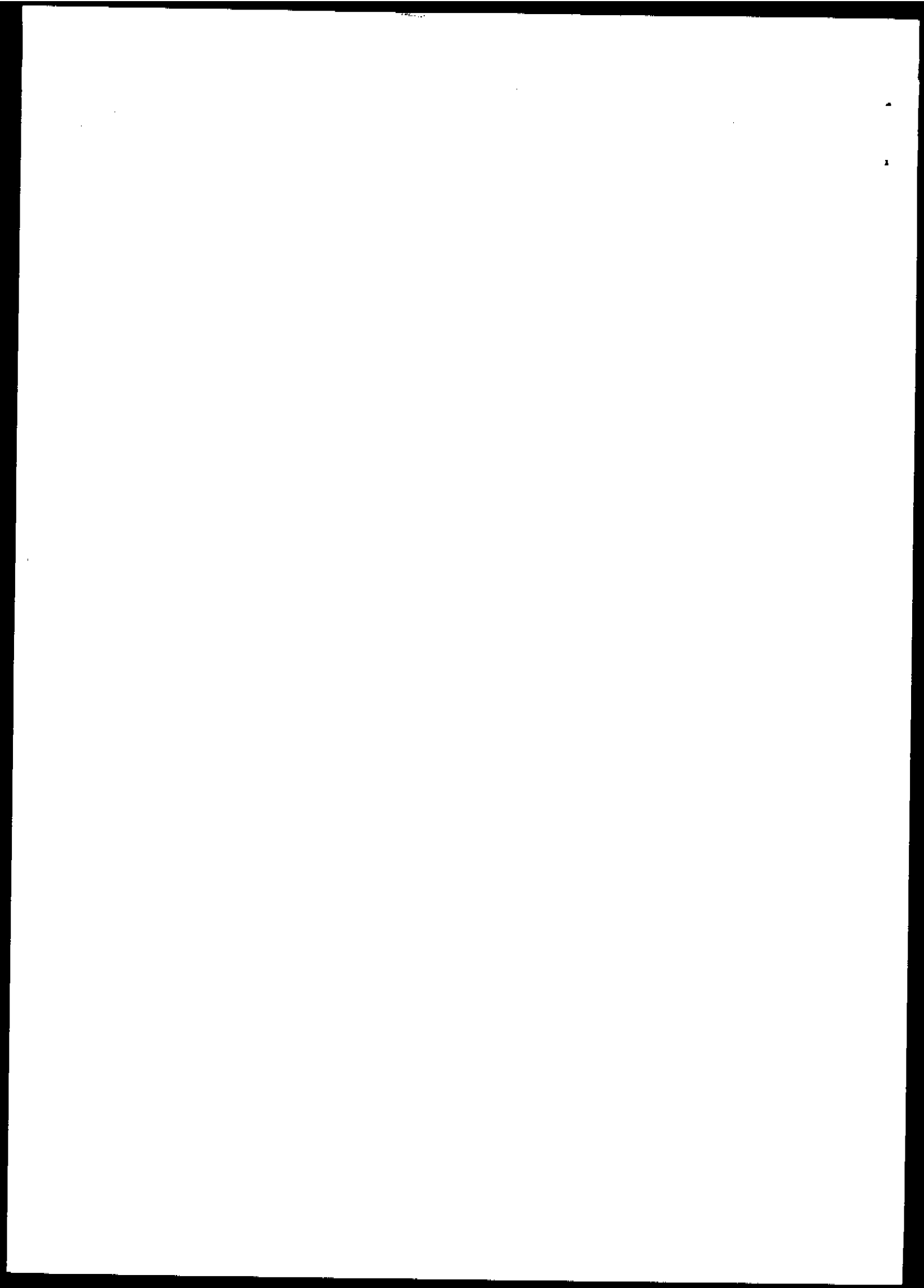
STUDY

ON

HYPERTENSION CONTROL MONITORING AT

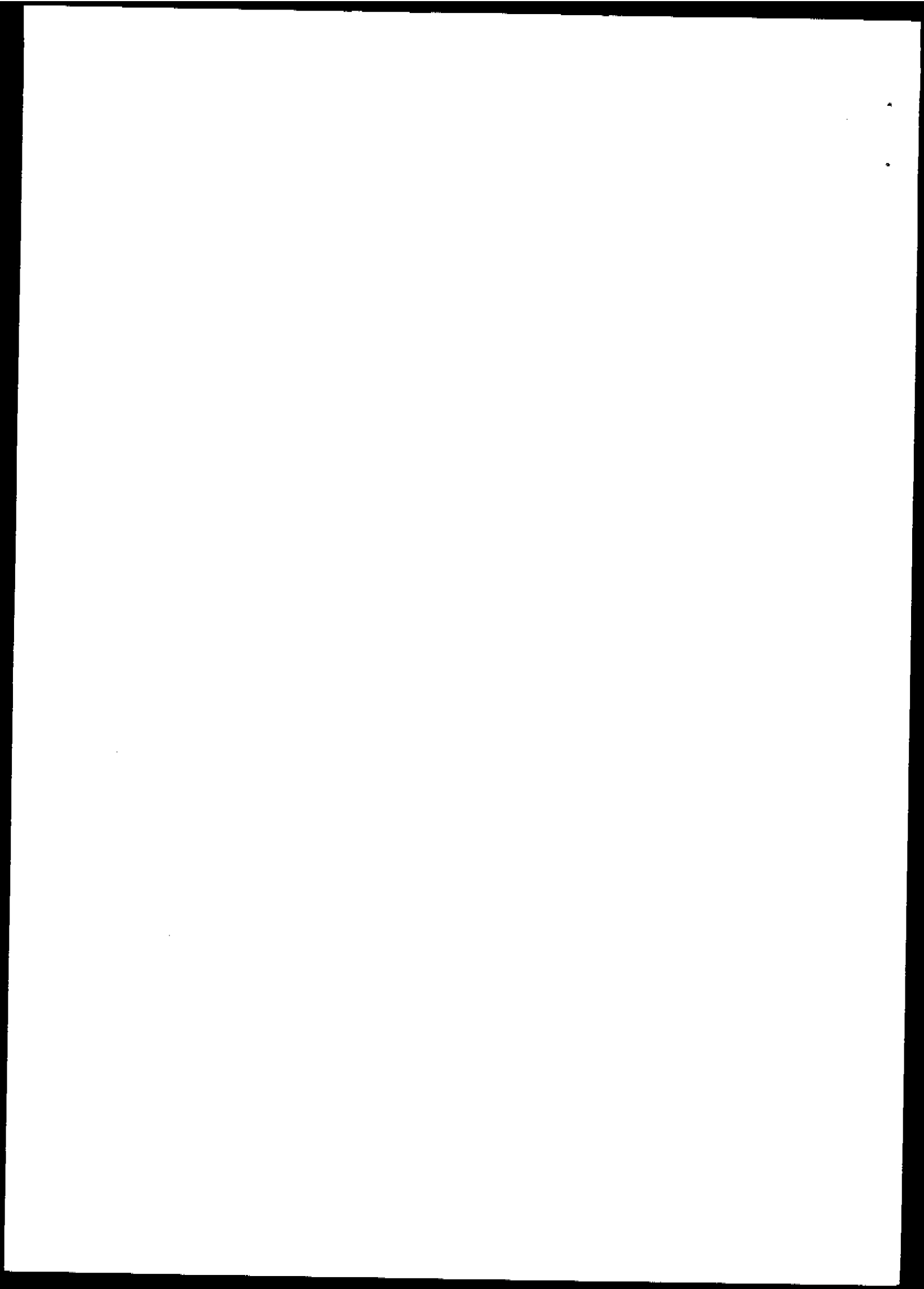
COMMUNITY LEVEL

ICP/NCD 226
6 July 1994
CHR\BHA-RPTS\BHAP-HBP\DOC



CONTENTS

1. INTRODUCTION	1
2. METHODS	2
3. RESULTS AND DISCUSSION	2
3.1 Stroke Mortality.....	3
3.2 Stroke Incidence and Occurrence.....	3
3.3 Prevalence of High Blood Pressure.....	3
3.4 Average Blood Pressure Levels.....	4
3.5 Blood Pressure in Adolescents.....	4
3.6 Awareness of High Blood Pressure	4
3.7 Hypertension Control.....	4
3.8 Actions to Control High Blood Pressure.....	5
3.9 Professional Education and Professional Societies.....	6
3.10 Community Programmes and their Impact.....	6
3.11 Areas of Concern in Hypertension Prevention and Control.....	7
3.12 Impact of High Blood Pressure: Economic Aspects and Quality of Life.....	8
4. CONCLUSIONS	8
5. REFERENCES	10
6. TABLES 1-12	
7. APPENDIX I: List of Participants in the Study on Hypertension Control Monitoring at Community Level	
8. APPENDIX II: Questionnaire	



1. INTRODUCTION

The burden of stroke is significant in all "Countrywide Integrated Noncommunicable Disease Intervention Programme" (CINDI) participating countries, in terms of premature death, quality of life of affected individuals and their families, lost productivity and economic costs to the health care system. It is commonly accepted that stroke accounts for about 5 percent of health care resources in western countries. The costs appear to be increasing, e.g., in Canada, stroke accounts for 3 million days of hospitalization per year representing 8 percent of the total (Petrasovits, 1993).

Prospective studies show that there is a powerful association between the risk of stroke and the level of diastolic and systolic blood pressure (Kannel, 1970; Wolf, 1990). There is also evidence that stroke risk can be reduced within a few years by lowering the blood pressure (Collins, 1990).

Smoking, obesity, diabetes, and hypercholesterolemia are risk factors that occur often in hypertensives and which confer an increased risk of cardiovascular disease (Stamler, 1986; Wolf PA, 1987; Kannel, 1990, 1992; Bjorntorp, 1992; Dunbabin, 1990). This supports the need for an integrated, multifactorial approach to high blood pressure management at clinical and public health levels (Rose, 1981; Stamler, 1991).

Epidemiological inter-country comparisons (Intersalt Cooperative Research Group, 1988) suggest that considerable reduction in vascular disease would accrue from primary prevention of hypertension through nutritional interventions targeted to communities (Forte, 1989) and to individuals at high risk (Stamler, 1989). Modest dietary modification in a whole population may result in a small, but generalized reduction of blood pressure level. Such reduction has the potential to yield benefits comparable to a high risk strategy of detection and treatment of high risk individuals (Strachan, 1991).

For policy purposes it is relevant to link trends in high blood pressure control at community level with trends in stroke mortality rates. A study in the Catalonia CINDI demonstration area revealed a significant relationship between the prevalence rates of uncontrolled hypertension and corresponding stroke mortality rates in two different periods (Tresserras, 1990). However, a study in USA by Casper and co-workers (1992) found only a weak association between the rates of stroke mortality change and the rates of change in uncontrolled hypertension. This is an area worthy of further investigation by the CINDI programme.

As part of the WHO EURO initiative on improving high blood pressure prevention and control, a questionnaire was distributed to CINDI participating countries in 1992 to document the current practice of hypertension control and to identify data and intervention programme gaps, thereby focusing the actions of the CINDI programme countries towards better high blood pressure control and reduction of comorbid conditions and attendant risk factors.

Thirteen CINDI participating countries provided information for fifteen demonstration areas on the occurrence of stroke mortality and morbidity, the prevalence of high blood pressure in various age groups, public awareness of high blood pressure, the extent of treatment and control of high blood pressure, the prevalence of attendant risk factors and the availability of community interventions and professional education programmes.

The present report provides an overview of received information. It complements the data periodically submitted by the CINDI participating countries to the CINDI Data Management Centre in Heidelberg.

This report should stimulate the CINDI participating countries to share among themselves the existing epidemiological information, to elaborate appropriate indicators to monitor and evaluate the control of hypertension and to strengthen preventive and control strategies.

2. METHODS

A six-part questionnaire (Appendix II) was distributed to the 18 CINDI participating countries to obtain information on: stroke mortality, morbidity, blood pressure levels; control of hypertension including antihypertensive medication and the occurrence of other cardiovascular risk factors in hypertensives; indicators of quality of life; economic aspects; intervention activities including professional education, community programmes, availability of supporting coalitions; achievements of programme implementation; major areas of concern to carry out hypertension control actions in CINDI demonstration areas/countries.

The data on stroke mortality used in this report are the national data obtained from the WHO Health for All Statistical Database that was prepared by the Statistical Unit of the WHO Regional Office for Europe (Version June 1993). The latest year available was used for the tabulation. Trends on stroke mortality were also obtained from the same database for the last twenty years. Data for the Czech and Slovakia Republics were those reported for the former Czechoslovakia as separate series are not available. The Canadian data were obtained from the Health Division in Statistics Canada, Ottawa. Data on stroke incidence (first occurrence) were available from the Finnish MONICA Centre (Tuomilehto, 1992) and from the MONICA Center in Kaunas (Lithuania). Two other countries provided data on stroke morbidity (occurrence): Bulgaria and the Russian Federation (Novosibirsk).

3. RESULTS AND DISCUSSION

It is known that most CINDI participating countries have information of the type indicated in the questionnaire (Morgenstern, 1991). However, there is some variation in the extent of information provided.

Responses were received from the CINDI teams in thirteen countries, covering fifteen demonstration areas: Bulgaria, Canada (Nova Scotia), Czech Republic, Estonia, Finland (North Karelia), Israel (Ashkelon), Lithuania, Poland (Lodz), Portugal (Setubal), Russian Federation (Chelyabinsk, Electrostal, Novosibirsk), Slovakia, Spain (Catalonia), Yugoslavia (Novi Sad).

Although data on stroke mortality data were available for all the countries, the report covers only those countries which have replied to the questionnaires.

Ten CINDI demonstration areas returned questionnaires with data on high blood pressure prevalence and average blood pressure levels for the group 25-64 years of age. The methodology followed in these surveys corresponds the CINDI Protocol and Guidelines for Monitoring and Evaluation Procedures (Leparski, 1987). The Canadian data from the Nova Scotia demonstration

area are based on the mean of four measurements taken in two separate visits (MacLean, 1992).

Seven countries reported blood pressure data for children and adolescents: Bulgaria, Estonia, Finland, Lithuania, Poland, the Russian Federation and Yugoslavia. Data on population awareness of high blood pressure were provided by seven countries: Canada, the Czech Republic, Estonia, Finland, Lithuania, Poland and Yugoslavia. Six countries were able to provide data on blood pressure in persons over 65 years. Two CINDI participating countries - Bulgaria and Lithuania - presented data on the prevalence of high blood pressure for children and adolescents, adults, and old age groups. Five countries were able to provide data also on high blood pressure trends in the age group 25-64.

Eight countries provided data on the levels of hypertension control: Canada, the Czech Republic, Estonia, Finland, Lithuania, Portugal, the Russian Federation and Yugoslavia. Eleven countries reported on intervention activities at community level and discussed areas of concern in hypertension prevention and control. With the exception of two countries, the participating countries did not report information on quality of life indicators of hypertensives. Information about the economic aspects of hypertension control was also scarce.

3.1 Stroke Mortality

Stroke mortality rates in the CINDI participating countries vary widely before and after the age of 65 (Table 1). The rates in the countries of Central and Eastern Europe are several times higher than those in Israel, Spain or in Canada. The data on trends points to a degree of improvement in most countries. Canada, Finland, Israel and Spain have achieved higher reduction in stroke mortality than other countries.

3.2 Stroke Incidence and Occurrence

Only a few countries were able to provide information on stroke incidence or occurrence. The rate of first-ever stroke for the region of North Karelia, Finland (Table 2) (Tuomilehto, 1992) is comparable to that reported by other registries in USA and Europe (Malmgren, 1987). The rate of stroke occurrence obtained from the Novosibirsk CINDI demonstration area (Russian Federation) is considerable lower than those reported for Bulgaria.

3.3 Prevalence of High Blood Pressure

Among the CINDI participating countries that returned the questionnaires, the prevalence of hypertension (blood pressure \geq or $>$ 160/95 mm Hg and/or on treatment) in the age group 25-64 varies from 9 percent to 34 percent in men and from 12 percent to 30 percent in women. The prevalence of high blood pressure in this age group appears to be higher in Estonia, Finland, Lithuania, the Russian Federation and Yugoslavia (Table 3).

Only 50 % of the countries which provided data on the prevalence of high blood pressure were able to send information on the prevalence of high blood pressure in persons over 65 for men and women. The prevalence among women is about 20-30 percent higher than among men in four of five countries.

3.4 Average Blood Pressure Levels

Those countries which provided data on the prevalence rates supplied data also on the average levels of blood pressure. Mean diastolic and systolic blood pressures in Nova Scotia (Canada) and in Catalonia (Spain) appear to be lower than in other countries (Table 4). Lack of estimates of error for the average values does not permit a formal statistical assessment of the difference among the reporting demonstration areas.

3.5 Blood Pressure in Adolescents

These data are limited (only five countries were able to provide this information) and are not collected in a standardized manner. The prevalence of elevated systolic blood pressure in Finnish adolescents is appreciably higher than those reported by the demonstration areas in Bulgaria, Lodz (Poland), Novosibirsk (The Russian Federation) and Kaunas (Lithuania) (Table 5). This variation among populations has also been observed in other epidemiological studies (Kotchen, 1978).

Table 6 shows the average diastolic and systolic blood pressure levels in adolescents obtained from demonstration areas in six countries. The average systolic blood pressure from North Karelia appears to be higher than those in other CINDI demonstration areas and are also higher than the levels reported in the prospective Bogalusa Heart Study (Berenson, 1991).

The tracking phenomenon of blood pressure levels since childhood provides evidence that essential hypertension originates early in life (Berenson, 1986). However, the interpretation of blood pressure data from children is a challenge. In particular, the cut off points chosen in the questionnaire (140/90 mm Hg) can only be taken as indicators of abnormality.

3.6 Awareness of High Blood Pressure

Table 7 presents the percentage of the population ever told having high blood pressure. This indicator is a good mean to detect efforts to control hypertension in the population. However, it should be noted that this data was available only in half of the CINDI demonstration areas that completed the questionnaire.

In the age group of 25-64 this percentage ranged from 19 percent (Estonia) to 78 percent (Poland) in men and from 19 percent (Estonia) to 77 percent (Czechoslovakia) in women.

In three of the five demonstration areas with data for the age group of 25-64, sixty to eighty percent of the population reported that they had had their blood pressure measured during the last year (Table 8). This percentage was in most cases higher in women.

3.7 Hypertension Control

The questionnaire inquired about the percentage of hypertensives on adequate treatment, this being defined as maintaining the blood pressure below 140/90 mm Hg. Although a cautious approach should be used when comparing the data, Table 9 shows that there are considerable differences among the eleven reporting demonstration areas. Sixty percent of all hypertensive

women in Canada are controlled for hypertension as compared to only 14 percent in Estonia (below 160/95 mm Hg) and 4 percent in Kaunas (below 140/90 mm Hg). The percentage controlled in the demonstration area of North Karelia is quite low for both men and women. There are also differences between the rates of controlled hypertension in men and women. In most countries the percentage is higher for women. Especially low percentage of hypertensive men controlled for hypertension is reported in Estonia, Finland, Lithuania, and Novosibirsk (The Russian Federation).

Only eight CINDI countries were able to provide information on the percentage of hypertensives (blood pressure = or >160/95 mm Hg) taking medication. The data are presented in Table 10. The percentage varies considerably among the demonstration areas. In particular the percentage obtained from the Czech Republic (4 and 9 percent for men and women respectively) is low compared with the percentage in North Karelia (82 and 82 percent respectively). Not having access to data on the severity of hypertension at the start of medication, the data in Table 10 is difficult to interpret.

In hypertensives, the presence of other risk factors increases the chances of cardiovascular disease by several-fold (Stamler, 1986). Thus, the existence of hypertension with other risk factors has critical implications at clinical and public health levels. Table 11 shows the prevalence of high blood cholesterol, smoking, obesity and diabetes in hypertensive individuals. In the group aged 25-64 years, the prevalence of hypercholesterolemia ranges from 24 to 50 percent in the reporting CINDI demonstration areas.

Smoking is highly prevalent among male hypertensives, especially in the demonstration area of Electrostal (The Russian Federation). Obesity in hypertensives is prevalent in all the reporting areas, but the prevalence is lower in the Catalonia CINDI programme area than in other CINDI participating countries. Five areas provided data on the prevalence of diabetes among hypertensives. In the Czech Republic this rate is considerably higher than that for the other areas.

The CINDI Baseline Evaluation (Morgenstern, 1991) and the provincial heart health surveys in Canada (MacDonald, 1992) have established that in the CINDI participating countries, two in three adults have one or more of the major risk factors for cardiovascular disease. These facts support the need for a comprehensive public health approach to primary prevention of cardiovascular disease and of high blood pressure. They also point to the importance of adopting policies that promote a multifactorial approach to prevention, both at individual and population levels.

3.8 Actions to Control High Blood Pressure

Only several countries collected data on patient knowledge on hypertension management. Four demonstration areas provided information (Table 12) on the percentage of hypertensives who take action to control their blood pressure. The data show that in Nova Scotia, in the age group 25-64, a majority of hypertensives takes medication. In North Karelia, more hypertensives try to make positive lifestyle changes to control their blood pressure compared to other demonstration areas, e.g. areas in Canada, the Czech Republic and in Yugoslavia. These data are useful as process indicators to judge the performance of patient education programmes that promote non-pharmacological measures.

3.9 Professional Education and Professional Societies

Practically all countries that responded to the questionnaire reported that they provide undergraduate and postgraduate education in preventive cardiology, including hypertension control. In Novosibirsk, the Institute for Internal Medicine trains yearly 600 physicians at postgraduate level in preventive cardiology; computerized training modules are used extensively. In Canada, the Czech Republic, Finland, Portugal and Spain, courses on CVD prevention are offered at undergraduate and graduate levels by Faculties of Medicine. Medical schools, voluntary heart associations, cardiology institutes and colleges of family physicians offer continuing education courses. In-service courses for nurses are offered at district levels in Electrostal (Russian Federation), Poland and in the Czech Republic. In Electrostal, ad hoc guidelines have recently been developed to control hypertension at work place. The CINDI Programme in Estonia offers a course to physicians and nurses in the CINDI demonstration areas. In Israel, the Sick Fund sponsors continuing education courses.

Canada, Israel, Portugal and Spain report having one or more hypertension leagues (Catalonia has four, plus a council). In Yugoslavia, the district of Vojvodina is in the process of organizing a hypertension league. All countries have cardiology institutes or cardiac research societies. The CINDI programmes themselves have coalitions of their own, and in all cases they concern themselves with high blood pressure control.

3.10 Community Programmes and their Impact

All countries report having organized community interventions in the context of the CINDI programme.

Portugal has a community control programme in Setubal that is run through a network of public health centres. CINDI Israel has in place a series of primary care teams based in public health clinics. The teams specialize in the application of well-defined protocols for hypertension control. The CINDI programme has distributed a booklet on non-pharmacological management to all physicians and documented the cost-effectiveness of the approach (Viskoper, 1990). This programme has developed and evaluated training modules for non-pharmacological management that could serve well to other CINDI participating countries.

Finland, Poland, Spain and Yugoslavia have developed comprehensive frameworks to deal with hypertension control. The CINDI programmes in these countries have defined goals and long-term strategies, including professional and public health education, mass media and organized hypertension detection and follow-up measures. Three demonstration areas indicate that the community programmes have been instrumental in the success of their hypertension control activities. North Karelia has made great strides in the control of high blood pressure. Its programme protocol is detailed and extensive and may serve as a model for control programmes in other CINDI participating countries.

The MONICA project provides CVD epidemiological research data in Kaunas, North Karelia, Novosibirsk and Catalonia. In the Czech Republic and Lithuania the projects on Healthy Cities and Healthy Schools are collaborating with CINDI. In Canada, community programmes dealing with hypertension control exist in most of the provinces that participate in the Canadian Heart Health Initiative.

Nine demonstration areas reported positive trends in hypertension control at community level. These trends were expressed in better patients awareness of high blood pressure, higher treatment rates and an increased number of persons on adequate antihypertensive treatment.

3.11 Areas of Concern in Hypertension Prevention and Control

Better data collection is seen as an area of concern by five countries: Portugal, Poland (standardized data system for the CINDI programme), Canada (measurement standardization), Lithuania and Spain (integration of regional, national and international data systems).

Access to modern drugs and the high cost of medication, specially for the elderly, is seen as a barrier to better hypertension control in Estonia, Lithuania and in the Czech Republic. Primary care physicians are not always abreast of the use of the newer agents and their reaction with concomitant therapy (Canada).

There is general recognition of the need to increase the use and the effectiveness of non-pharmacological approaches to the management of high blood pressure. However, dietary modifications are not always considered to be practical due to higher cost of healthy food or lack of education required for choosing a healthy diet (especially in central and eastern Europe). Lack of training of health care workers in how to use non-pharmacological management is recognized as a barrier in Estonia and Lithuania.

Compliance, particularly concerning achieving positive and lasting lifestyle changed, is a continuing concern in all countries.

Community-based programmes carry out population screenings in some countries (e.g., Yugoslavia), although the norm is to rely on the primary care as a setting for case-findings. Gaining social support for CINDI activities and the establishment of effective intersectoral coalitions (with the inclusion of financial institutions) are seen as challenges for CINDI programmes. In Canada, provincial programmes collaborating with the Federal Department of Health in the Heart Health Initiative strive to develop multidisciplinary models for training and delivery of community programmes.

The mass media is a recognized need and given high priority in the CINDI demonstration areas of Nova Scotia (Canada), Ashkelon (Israel), Lithuania and Novosibirsk (The Russian Federation). The demonstration area of Lodz (Poland) points to the high cost of the media as a barrier for its extensive utilization in the CINDI programme.

Most CINDI programmes recognize the importance of recruiting a multidisciplinary team of health professionals to support hypertension control programmes. There is a strong need to establish a new patient-physician relationship which is based more on partnership than on traditional authority of the physician or other health professionals over patients.

Health education is seen as a key priority for hypertension control programmes. A number of CINDI demonstration areas regard the media as a key vehicle for health education of the population. For example, community television channels are increasingly popular in rural and remote areas in Canada and present possibilities for delivering education programmes at low cost. The programme in North Karelia has pointed out the difficulty of reaching out to lower socio-economic groups with traditional health education approaches.

3.12 Impact of High Blood Pressure: Economic Aspects and Quality of Life

Poor response to the questions on economic aspects and quality of life indicates that information on economic aspects of high blood pressure control and on indicators of quality of life of hypertensives is not collected in a systematic manner. CINDI, Israel has carried out pioneering research on economic aspects of non-pharmacological control of hypertension (Viskoper, 1990). In Finland, the cost of anti-hypertensive medication has escalated between 1987 and 1989 from 90 to 152 million FIM (Nordic Statistics of Medicines, 1990).

The current priority for quality of health care issues suggests that the time is right to develop and promote the use of indicators of quality of life for persons with hypertension.

4. CONCLUSIONS

Considerable difference in stroke mortality rates and in the prevalence of high blood pressure among the CINDI participating countries (Morgenstern, 1991) point to the potential for prevention. High blood pressure control and stroke prevention have been identified as priorities for collaborative action in the CINDI participating countries from the very beginning of the programme. They were endorsed by the Victoria Declaration on Heart Health (Advisory Board of the International Heart Health Conference, 1992) and by the CINDI Policy Development Working Group (1993).

This study of hypertension control programmes and issues in CINDI participating countries suggests the need for cooperative action in the following areas:

- further database development;
- improvement of hypertension management practice;
- increasing use of non-pharmacological management of high blood pressure; and
- strengthening of implementation of population-wide hypertension prevention and control programmes.

Database development is required, particularly to obtain data on blood pressure of children, adolescents and elderly, regular information on hypertension prevention and control activities at population and individual level.

The results of high blood pressure control would be enhanced through continuous monitoring of the extent of hypertension control at community level; through feeding back this information periodically to the relevant health care professionals and authorities; and through continuing education courses to familiarize practitioners with an integrated approach towards hypertension management and the use of new anti-hypertensive medication and behavioural methods for improved compliance.

To this end national, regional and local health information systems should be integrated. A set of indicators for process and outcome monitoring and evaluation should be elaborated and adopted. Local health information systems for GP's (including software) need to be further developed.

There is a strong need to intensify the use of non-pharmacological approaches to control high blood pressure. Environmental changes affecting the whole population through widespread changes in health behaviour (e.g., improved diet, reduction of obesity, reduction of smoking) are bound to have a greater impact than interventions targeted to the individual. This approach will require mobilization of communities and regional resources, support by governments, establishment of intersectoral coalitions and commitments to sustain implementation of strategic plans with medium to long term horizons. Enhanced quality of life of patients and potential for economic savings are obvious benefits.

The current study of hypertension control in CINDI participating countries supports the ongoing efforts of the WHO CINDI programme to promote collaboration in the quest to meet the objectives of the Health for All Strategy.

5. REFERENCES

- Advisory Board of the International Heart Health Conference. The Victoria Declaration on Heart Health. Department of National Health and Welfare, Ottawa, 1992.
- Berenson, G.S. (ed.). Causation of Cardiovascular Risk factors in Children: Perspectives on Cardiovascular Risk in Early Life. New York: Raven Press, 1986.
- Berenson, G.S.; Sathanr, R.S.; Webber, S., et al. Cardiovascular Risk in Early Life: The Bogalusa Heart Study. Kalamazoo, Michigan: the Upjohn Company, 1991.
- Björntorp, P. Regional fat distribution - implications for type II diabetes. *Int J Obes* 1992 Dec;16 Suppl 4:S19-27.
- Casper, M.; Wing; Strogaz, D.; Davis, C.E.; Tyroler, H.A. Antihypertensive treatment and US trends in stroke mortality 1962 to 1980. *Am J Public Health* 1992;82:1600-5.
- CINDI Policy Development Working Group. Positioning CINDI to Meet the Challenges. WHO EURO Copenhagen, 1993.
- Collins, R.; Peto, R.; MacMahon, S., et al. Blood pressure, stroke and coronary heart disease: part II, Short term reductions in high blood pressure: overview of randomized drug trials in their epidemiological context. *Lancet*;335:827-38.
- Dunbabin, D.W.; Sandercock, P.A. Preventing stroke by the modification of risk factors. *Stroke* 1990 Dec;21(12 Suppl):IV36-9.
- Forte, J.G.; Pereira Miguel, J.M.; Pereira Miguel, M.J.; De Padua, F.; Rose, J. Salt and blood pressure: a community trial. *Journal of Human Hypertension* 1989;3:179-184.
- Kannel, W.B. Epidemiology of cardiovascular disease in the elderly: an assessment of risk factors. *Cardiovasc Clin* 1992;22(2):9-22.
- Kannel, W.B.; Higgins, M. Smoking and hypertension as predictors of cardiovascular risk in population studies. *J Hypertens Suppl* 1990 Sep;8(5):S3-8.
- Kannel, W.B.; Wolf, P.A.; Verter, J.; McNamara, P.M. Epidemiologic assessment of the role of blood pressure in stroke: the Framingham Study. *JAMA* 1970;214:301-10.
- Kotchen, J.M.; Kotch, T.A. Geographic effect on racial blood pressure differences in adolescents. *J. Chronic Dis.* 1978;31:581-6.
- Leparski, E.; Nussel, E. (eds.). CINDI Protocol and Guidelines for Monitoring and Evaluation Procedures. Springer, Berlin Heidelberg New York, 1987.
- MacDonald, S.; Joffres, M.R.; Stachenko, S.; Horlick, L.; Fodor, G. Multiple cardiovascular risk factors in Canadian adults. *CMAJ* June 1992, Suppl.
- MacLean, D.R. Canadian heart health surveys: Survey methods and data analysis. *CMAJ* June 1992

Suppl.

Malmgren, R.; Warlow, C.; Bamford, H.; Sanderock, P. Geographical and secular trends in stroke incidence. *Lancet* 1987;2:1196-2000.

Morgenstern, W.; Tsechkovski, M.S.; Nüssel, E.; Schettler (eds.). Countrywide Integrated Noncommunicable Diseases Intervention Programme: Baseline Evaluation. Springer, Berlin Heidelberg, New York 1991.

Nordic Statistics of Medicines 1987-1989. Nordic Council of Medicines, Uppsala, 1990.

Petrasovits, A; Nair, C. Epidemiology of stroke in Canada. Proceedings of the International Conference on Stroke Prevention and Epidemiology - Selected Papers, Health Reports 1994, Vol. 6. No.1 p. 39-44. Statistics Canada, Cat. 82-003.

Plans, P.; Pardell, H.; Salleras, L. Epidemiology of cardiovascular disease risk factors in Catalonia (Spain). *Eur J Epidemiol* 1993;9:381-9.

Rose, G. Strategy of Prevention. Lessons from Cardiovascular Disease. *British Med J* 1981;1:1847-51.

Stamler, R.; Stamler, J.; Gosch, F.C., et al, Primary prevention of hypertension by nutritional-hygienic means: final report of a randomized controlled trial. *JAMA* 1989;262:1801-07.

Stamler, J.; Weatworth, D.; Neaton, J. Is the relationship between serum cholesterol and risk of premature death from coronary heart disease continuous and graded. Findings in 356222 primary screenees of the Multiple Risk Factor Intervention Trial. *Am Med J* 1986;256:2823-28.

Stamler, J. Blood pressure and high blood pressure. Aspects of risk. *Hypertension* 1991 Sep;18(3 Suppl):195-197.

Strachan, D.; Rose, G. Strategies of prevention revisited: effects of imprecise measurement of risk factors on the evaluation of "high-risk" and "population-based" approaches to prevention of cardiovascular disease. *J Clin Epidemiol* 1991;44:1187-96.

Tresserras, R.; Serra Majem, L.; Canela, J.; Armario, P.; Pardell, H. Ecological association between hypertension and stroke in Catalonia (Spain): development and use of an ecological regression model. *Journal of Human Hypertension* 1990;4:300-2.

Tuomilehto, H.; Sarti, C.; Narva, E.V., et al. The FINMONICA Stroke Register. Community-based stroke registration and analysis of stroke incidence in Finland, 1983-85. *Am J Epid* 1992;135:1259-70.

Viskoper, R.J. Resource savings from non-pharmacological control of hypertension. *Journal of Human Hypertension* 1990;4:375-8.

Wolf, P.A. An overview of the epidemiology of stroke. *Stroke* 1990;21 Suppl II:II-4-II-6.

Table 1.
Stroke mortality rates per 100,000 for selected CINDI participating
countries by age and sex

Country (Year)	0-64 Years			All Ages			Overall Trend All Ages 1971-1991
	Men	Women	Both Sexes	Men	Women	Both Sexes	
Bulgaria (1991)	68	38	52	263	209	234	D
Canada (1990)	7	6	7	45	44	53	D
Czechoslovakia (1990)	44	22	33	162	213	183	D
Estonia (1990)	63	26	43	251	191	214	=
Finland (1991)	22	11	16	112	86	97	D
Israel (1989)	11	9	10	73	69	71	D
Lithuania (1990)	41	23	31	138	115	125	I
Poland (1991)	32	17	24	89	66	76	I
Portugal (1991)	40	21	30	256	194	220	D
Russian Federation (1990)	66	38	50	287	224	246	=
Spain (1989)	16	8	12	102	86	93	D
Yugoslavia (1990)	39	26	32	160	134	145	I

Sources: Health For All Statistical Database, Version June 1993;
 Statistics Canada, Ottawa, 1992

Note: D: Decreasing
 I: Increasing
 =: Little or no appreciable change

Table 2.
Stroke incidence or occurrence rates per 100,000 in selected CINDI
participating countries, by sex

Country/Area	Men	Women	Both Sexes	Age Group
Bulgaria: (1991) (Occurrence)	-	-	531	All age groups
Finland: (1983-85) - North Karelia (Incidence)	352	204	-	35-74
Lithuania: (1991) - Kaunas (Incidence)	220	100		All age groups
Russian Federation: - Novosibirsk (1981-89) (Occurrence)	206	277	245	All age groups
Yugoslavia - Novi Sad (1990)	161	112		All age groups

Table 3.
Prevalence of high blood pressure (a) in demonstration areas of selected CINDI participating countries by age and sex

Country/Area	25-64 Years		65 Years and over	
	Men	Women	Men	Women
Bulgaria (1986) (g)	9	12	24	34
Canada (1986) - Nova Scotia	11	12	43	50
Czechoslovakia (1990) (h)	9	14	37	31
Estonia (1991) (i)	28	22	-	-
Finland (1992) - North Karelia	31	21	-	-
Lithuania (1987) - rural areas	34	30		
- Kaunas (e)	29	26	38	
Portugal (1987) - Setubal	16	18	-	-
Russian Federation - Electrostal (1990)	25	22	-	-
- Novosibirsk (1989) (c)	31	31	-	-
- Chelyabinsk (1992) (f)	7	2	-	-
Spain (1990) - Catalonia (d)	13	12	25	45
Yugoslavia (1982) - Novi Sad	37 (b)	32 (b)	38	54

- (a) Blood pressure equal to or greater than 160/95 mm Hg and/or on anti-hypertensive treatment.
 (b) Data refer to age group 45-54.
 (c) Average of two districts.
 (d) Data refer to age group 40-59.
 (e) Data refer to age group 35-64.
 (f) Epidemiological studies in factories. Data refer to age group 25-34.
 (g) Data refer to age group 7-69.
 (h) Blood pressure equal to or higher than 160/95 mm Hg
 (i) Epidemiological studies in factories.

Table 4.
Average level (mm Hg) of diastolic (DBP) and systolic (SBP) blood pressure in the age group 25-64 years in demonstration areas of selected CINDI participating countries, by sex

Country/Area	DBP		SBP	
	Men	Women	Men	Women
Bulgaria (1986) (a)	83	83	133	133
Canada (1986) - Nova Scotia	79	74	127	119
Czechoslovakia (1990)	83	82	131	131
Estonia (1991) (d)	87	83	134	130
Finland (1992) - North Karelia	83	78	141	135
Lithuania (1987) - rural areas	90	88	143	141
Poland (1990) - Łódz (a)	84	85	132	137
Portugal (1987)	81	79	134	133
Russian Federation - Electrostal (1990)	84	80	135	129
- Novosibirsk (b) (1989)	89	88	133	132
- Chelyabinsk (1992) (c)	75	77	120	116
Spain - Catalonia	81	76	124	121
Yugoslavia - Novi Sad (1988)	91	88	140	141

- (a) Data refer to age group 45-54.
 (b) Average of two districts.
 (c) Epidemiological studies in factories; Data refer to age group 25-34.
 (d) Epidemiological studies in factories.

Table 5.
Prevalence of elevated level (mm Hg) of diastolic (DBP) and systolic (SBP)
blood pressure in adolescents in demonstration areas of selected CINDI
participating countries

Country/Area	DBP \geq 90		SBP \geq 140		DBP/SPB \geq 140/90		Age Group (Years)
	Boys	Girls	Boys	Girls	Boys	Girls	
Bulgaria (1986)	-	-	-	-	1	1	10-14
Finland (1988) - North Karelia	3 (both sexes)		18 (both sexes)				12-16
Lithuania (1991) - Kaunas	-	-	-	-	4	5	12-15
Poland (1992)	9	5	4	1	-	-	13-14
Russian Federation (1989) - Novosibirsk	-	-	-	-	6	6	10-14

Table 6.
Average level (mm Hg) of diastolic (DBP) and systolic (SBP) blood pressure in adolescents in demonstration areas of selected CINDI participating countries, by sex

Country	DBP			SBP			Age Group (Years)
	Boys	Girls	Both Sexes	Boys	Girls	Both Sexes	
Estonia (1988)	64	64	61	107	108	107	11-12
	68	69	68	117	117	117	14-15
Finland (1988) - North Karelia	-	-	71	-	-	128	12-16
Lithuania (1987) - Kaunas	63	65	-	115	117	-	12-15
Poland (1992) - Łódź	74	74	74	118	114	-	13-14
Russian Federation (1989) - Novosibirsk	60	60	60	98	98	98	10-14
	66	67	66	105	107	106	12-14
Yugoslavia (1986) - Novi Sad	68	67	-	110	107	-	10-18

Table 7.
Percentage of the population ever told having high blood pressure in demonstration areas of selected CINDI participating countries, by sex

Country/Area	Men	Women	Both Sexes	Age Groups (Years)
Canada (1986)				
- Nova Scotia	23	29	-	25-64
	38	60	-	55-74
Czechoslovakia (1990)	62	77	-	15 and over
Estonia (1991)	19	19	19	25-64
Finland (1992)				
- North Karelia	34	33	-	25-64
Lithuania (1987)				
- rural areas	52	65	-	25-64
Poland (1990)				
- Łódź	78	82	-	25-64
Yugoslavia (1988)				
- Novi Sad	17	8	-	35-44
	22	25	-	45-54
	37	41	-	55-64

Table 8.
Percentage of the population having had their blood pressure
measured in the last year in demonstration areas of selected
CINDI participating countries, by sex

Country/Area	Men	Women	Both Sexes	Age Groups (Years)
Canada (1986) - Nova Scotia	71	81	-	25-64
Czechoslovakia (1990)	75	75	-	25-64
Estonia (1992)	-	-	64	25-64
Finland (1992) - North Karelia	66	67	-	25-64
Lithuania (1992) - Kaunas	56	62	-	35-64
Yugoslavia (1992) - Novi Sad	65	59	-	25-34
	61	65	-	35-44
	70	77	-	45-54
	78	84	-	55-64

Table 9.

Percentage of hypertensives receiving adequate treatment for hypertension in demonstration areas of selected CINDI participating countries, by sex

Country/Area	Men	Women	Both Sexes	Adequate Treatment: Maintain Blood Pressure below mm Hg	Age Group
Canada - Nova Scotia (1986)	28	60	-	140/90	25-64
Czechoslovakia (1990)	14	8	-	140/90	25-64
Estonia (1991)	3	14	8	160/95	25-64
Finland (1992) - North Karelia	2 7	3 5	- -	140/90 160/95	25-64
Lithuania (1987) - rural areas - Kaunas	2 1	10 4	- -	140/90	25-64 35-64
Poland (1990) - Łódź	19	24	-	160/95	25-64
Portugal (1987) - Setubal	-	-	15	140/90	25-64
Russian Federation - Electrostal (1990) - Novosibirsk (1985-86)	- 6	- 23	21 -	140/90	25-64 30-59
Spain - Catalonia	14	26	21	160/95	15+
Yugoslavia (1984) - Novi Sad	29 55 46	44 57 44	- - -	160/95	35-44 45-54 55-64

Table 10.
Percentage of hypertensives (a) taking medication to control it in demonstration areas of selected CINDI participating countries, by sex

Country/Area	Men	Women	Both Sexes	Age Groups
Canada - Nova Scotia (1988)	22	49	-	25-64
Czechoslovakia (1990)	4	9	-	25-64
Estonia (1991)	21	40	31	25-64
Finland (1992) - North Karelia	82	80	-	25-64
Lithuania (1987) - rural areas	16	35	-	25-64
- Kaunas	20	34	-	35-64
Portugal - Setubal (1987)	-	-	71	25-64
Russian Federation - Electrostal (1991)	-	-	33	25-64
- Novosibirsk (1985-86)	16	43	-	25-64
Yugoslavia (1988) - Novi Sad	45 54	43 56	- -	45-54 55-64

(a) Blood Pressure \geq 165/90 mm Hg.

Table 11.
Prevalence of risk factors in persons aged 25-64 years with
high blood pressure in demonstration areas of selected
CINDI participating countries, by sex

Country/Area	Sex	High Blood Cholesterol	Smoking	Obesity (BMI)	Diabetes	Notes
Canada (1986) - Nova Scotia	M	24	31	67	-	B. chol. \geq 6.2 mmol/L BMI \geq 27
	F	27	23	53	-	
Czechoslovakia (1990)	M	30	36	34	19	B. chol. \geq 6.45 mmol/L BMI $>$ 30
	F	38	14	41	14	
Estonia (1991)	M	-	44	48	-	
	F	-	8	68	-	
Finland (1992) - North Karelia	M	35	26	37	7	B. chol. \geq 6.5 mmol/L BMI \geq 30
	F	29	12	39	7 (self-reported)	
Lithuania (1987) - rural areas - Kaunas	M	-	32	41	2	BMI \geq 29
	F	-	2	73	5	
	M	28	30	51	3	BMI \geq 29
	F	40	3	78	6	
Poland (1990) (a) - Łódź	M	64	-	64	-	B. chol. \geq 5.2 mmol/L BMI \geq 27
	F	73	-	69	-	
Russian Federation - Electrostal (1990)	M	-	69	22	2	-
	F	-	4	53	3	
Spain (1989) - Catalonia	M	42	23	21	8	B. chol \geq 6.2 mmol/L BMI \geq 30
	F	17	42	7	2	
Yugoslavia (1988) - Novi Sad	M	50	26	31	-	B. chol \geq 6.5 mmol/L Age group 45-54 years
	F	45	16	51	-	

M: Men

W: Women

(a) prevalence of risk factors in those with blood pressure \geq 160 mm Hg.

Table 12.

Percentage of persons with high blood pressure who take action or who try to take action to help control their blood pressure in demonstration areas of selected CINCI participating countries, by sex

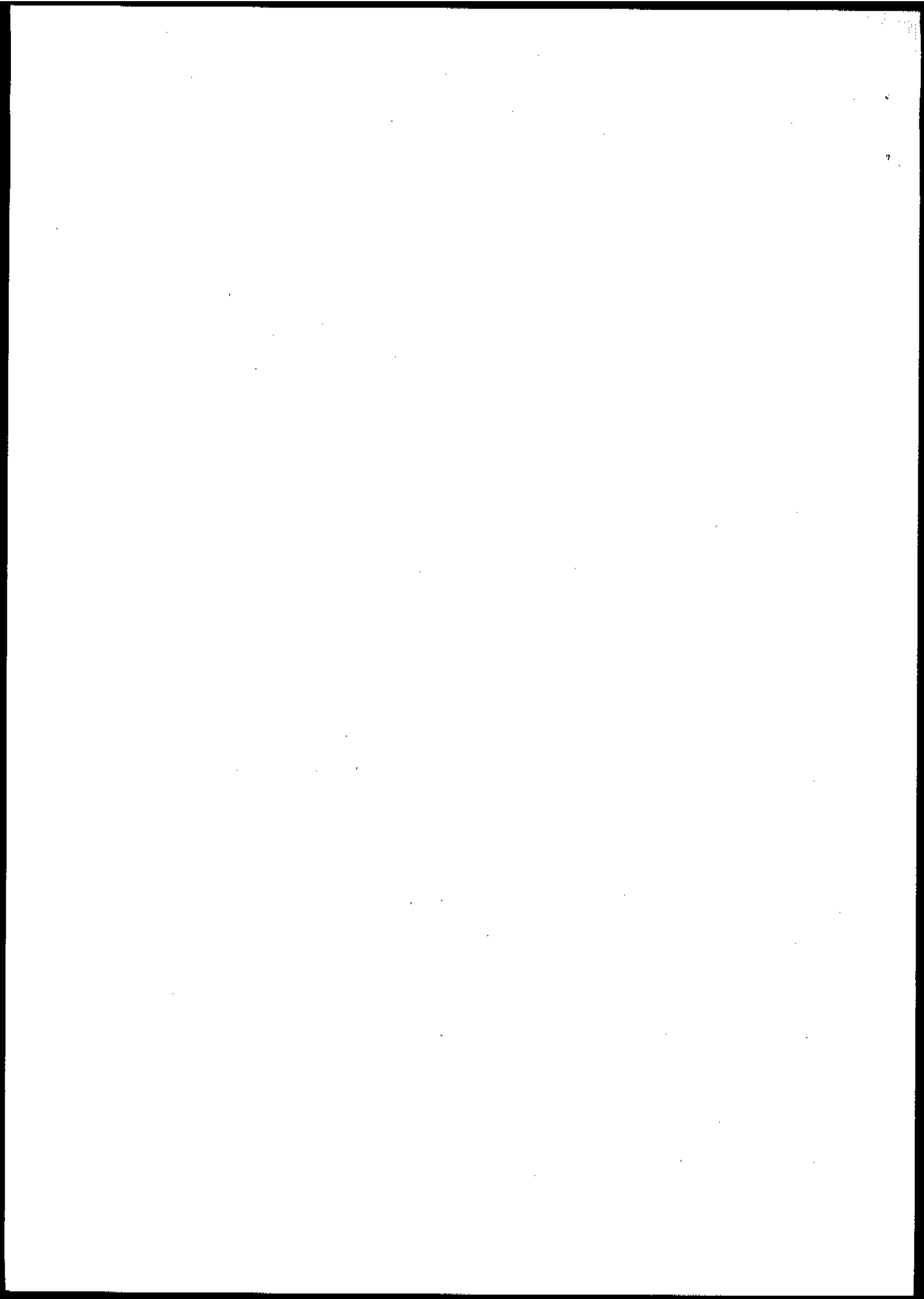
Country/Area	Take Medication		Lose Weight		Cut Down on Salt		Eat less fat		Drink Less Alcohol		Stop Smoking		Exercise More	
	M	W	M	W	M	W	M	W	M	W	M	W	M	W
Canada (1986) - Nova Scotia (a)	63	90	25	29	22	26	-	-	7	0	-	-	15	8
Czechoslovakia (1990) (b)	41	50	59	68	-	-	-	-	-	-	-	-	37	39
Finland (b c) - North Karelia	-	-	62	79	63	80	-	-	39	26	13	11	70	87
Yugoslavia (b) - Novi Sad (1992)	38	54	34	42	45	54	47	60	18	1	18	1	40	33

M: Men

W: Women

- (a) Age group: 25-64 years.
 (b) Tried to change lifestyle habits.
 (c) Age group 35 years and over.

APPENDIX I

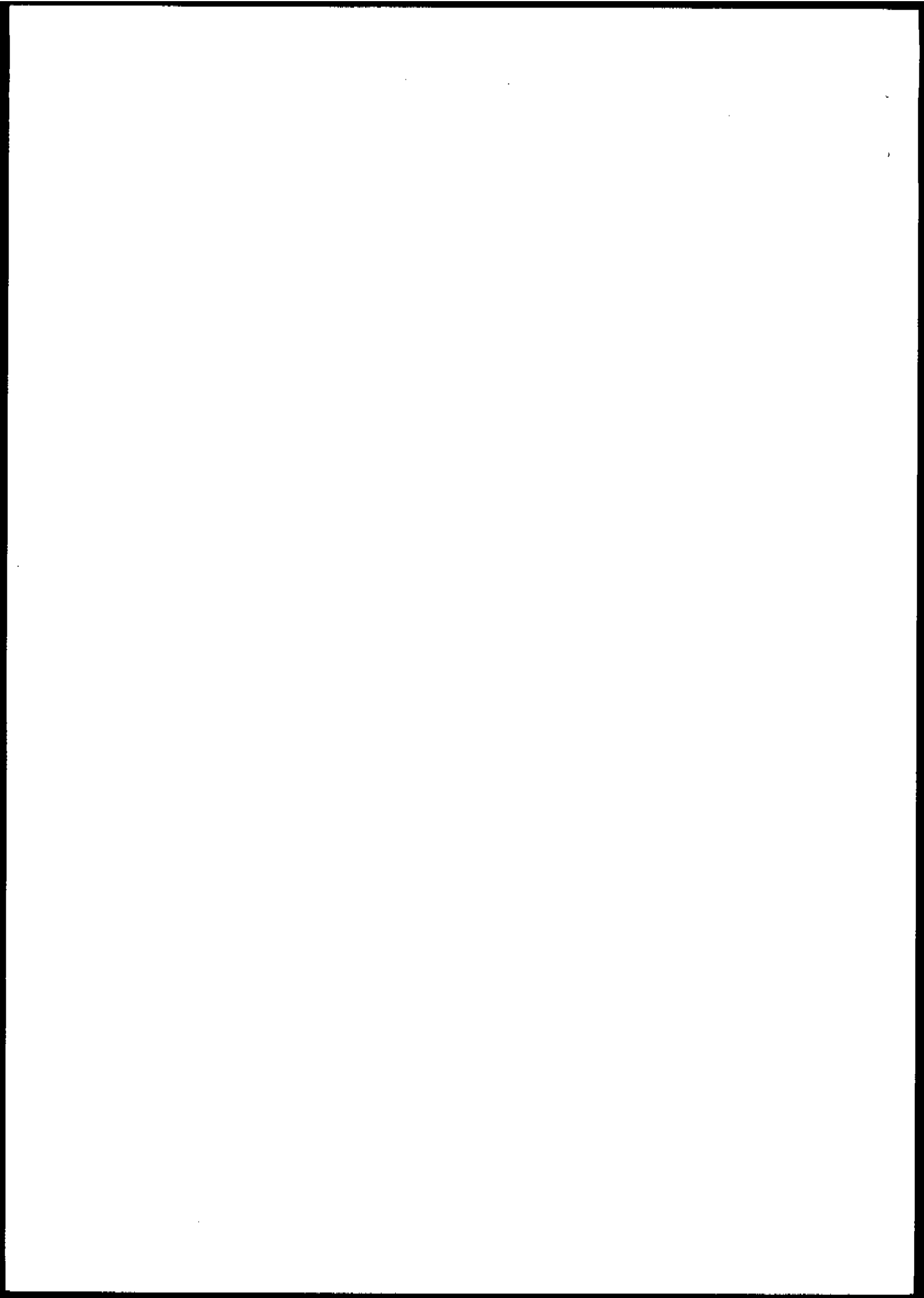


APPENDIX I: List of Participants in the Study on Hypertension Control Monitoring at Community Level

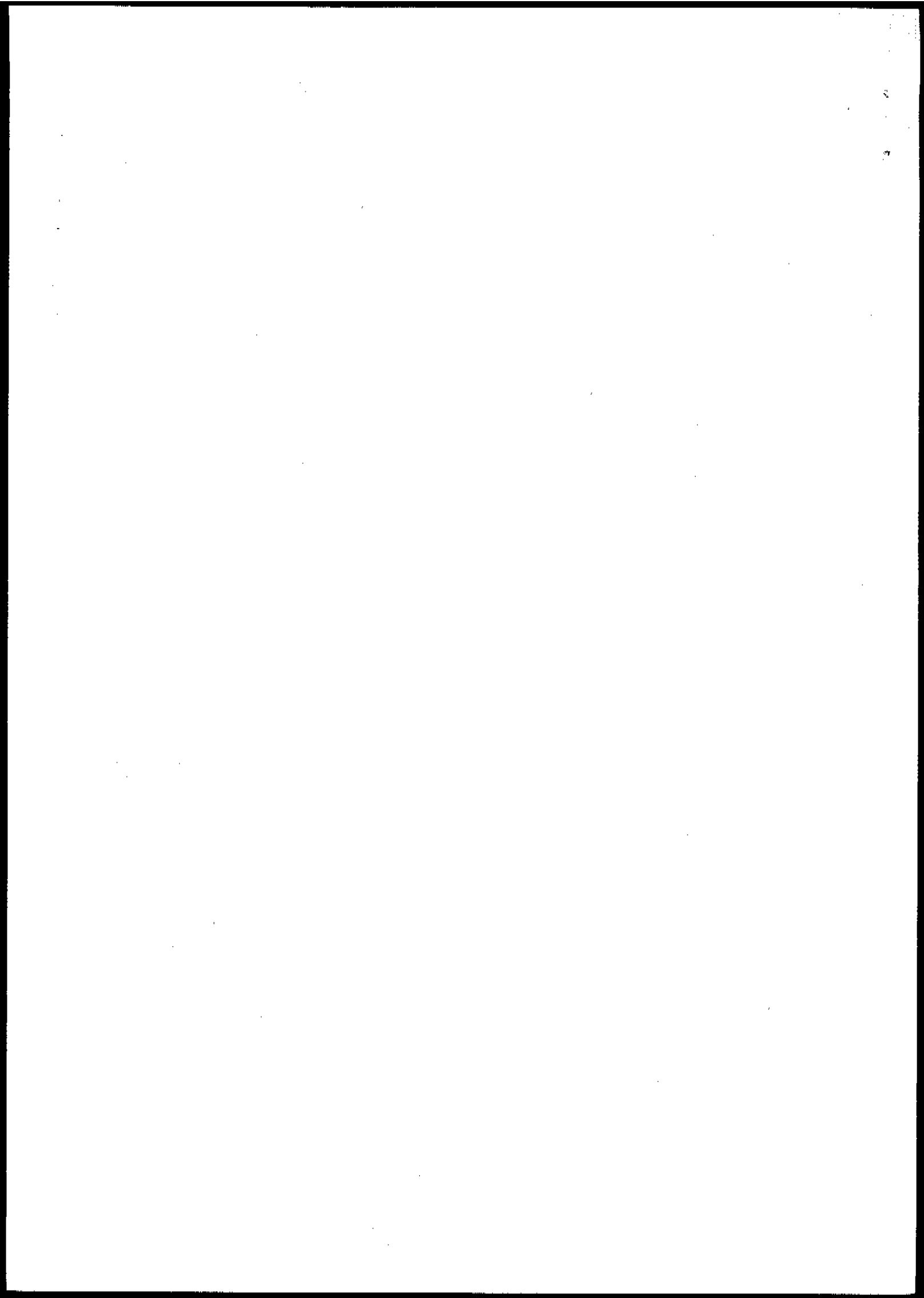
Bulgaria:	Dr N. Vassilevski Professor L. Ivanov
Canada:	Dr D. McLean Dr A. Petrasovits* Dr S. Stachenko
Czech Republic:	Dr P. Svoboda
Estonia:	Dr O. I. Volozh Professor N.V. Elshtein
Finland:	Professor P. Puska
Israel:	Dr R. J. Viskoper
Lithuania:	Dr J. Klumbiene
Poland:	Professor W. Sapinski
Portugal:	Professor M. Carrageta Professor F. de Padua
The Russian Federation:	Dr R. Potemkina Professor Y.O. Nikitin Professor O. Kalev
Slovakia:	Dr A. Egnerova
Spain:	Dr H. Pardell Dr R. Tresserras
Yugoslavia:	Dr M. Planojevic¹
WHO Regional Office for Europe	Dr I. Glasunov Dr A. Shatchkute*

* Editors

¹ Data on study started in 1984



APPENDIX II



QUESTIONNAIRE ON HYPERTENSION CONTROL

CINDI Centre: _____

Date: _____

Name of Director: _____

Please provide the following information, if available:

1. DATA ON HYPERTENSION AT POPULATION LEVEL

- Stroke mortality data for males and females (mortality from cerebrovascular diseases, 0-64 and all age/100 000), latest year available; if possible, the trends. Please indicate whether the data reflects the national level.
- Stroke incidence rates for males and females - (0-64 and all age/100 000), latest year available. Please indicate whether the data reflects the national level or the CINDI demonstration area level. Should the requested data not be available, please provide the information on any age/sex group.
- Prevalence of high blood pressure - for males and females, age group 25-64; blood pressure > 160/95 mm Hg and persons on antihypertensive treatment. Please indicate whether the data reflects the national level or the CINDI demonstration area level. Could you also provide data on the trends?
- Do you have the same information on any other age groups? (e.g. in persons over 65 years of age) If yes, please provide it.
- prevalence of high blood pressure (> 140/90 mm Hg) in girls and boys, age group 12-16. Please indicate the year of survey and the population (e.g. national data, CINDI area). Could you also provide data on trends?
- The average levels of systolic and diastolic blood pressure - for males and females, age group 25-64. Please indicate the year of survey and the population (e.g. national data, CINDI area). Could you also provide data on trends?
- please provide the same information for persons over 65 years of age
- for adolescents (12-16 years of age)
- Do you have any information on the population awareness on hypertension?
- If yes, please provide information on the proportion of the population being ever told having high blood pressure. Please indicate the year of the latest survey, age and sex group.

- Do you know which proportion of your population (25-64 years of age) have had their blood pressure measured within one year and can state whether their blood pressure was normal or high.

2. CONTROL OF HYPERTENSION

- Please provide information on which proportion of hypertensives (males and females) in the age group 25-64 receive adequate treatment of hypertension (maintain a blood pressure < 140/90 mm Hg). Please indicate the year of the survey and the population screened (national level, CINDI demonstration area).
- Which percent of those with blood pressure >160/95 mm Hg are taking medication to control it?
- Which percent of those with hypertension continue the treatment within the first year?
- How prevalent are other risk factors (high cholesterol, smoking, obesity, diabetes) in persons with high blood pressure? Please provide this information for males and females, age group 25-64. If the information is not available on the requested age group please provide that information on any age/sex group. Please indicate the year of the survey and the population screened (national level, CINDI demonstration area).
- Do you conduct surveys on patient awareness and knowledge on hypertension control?
- If yes, please inform which proportion of the persons with high blood pressure take actions to help controlling their high blood pressure (actions include taking medicaments, losing weight, cutting down on salt, exercising, reducing alcohol consumption). Please indicate the year of the latest survey, age and sex group and the population screened (national level, CINDI demonstration area).

3. INDICATORS OF QUALITY OF LIFE IN HYPERTENSIVES

Are you collecting data in this area? If yes, please specify.

4. ECONOMIC ASPECTS

Do you have data on economics of hypertension control? If yes, please specify.

5. INTERVENTION ACTIVITIES

- 5.1 How is professional education (general practitioners and nurses) on hypertension prevention and control arranged? (E.g. is there a course on preventive cardiology during undergraduate training? How is the postgraduate training arranged? Do you have a national society/league on hypertension?)
- 5.2 Do you have any national/regional coalition on hypertension control? (E.g. national association of physicians, national league on hypertension, national heart foundation, institutes of public health, research institutes of cardiology, ministry of health working together to improve the control of blood pressure).

- 5.3 Do you have a community-based hypertension control programme? If yes, please give a short description on the goals, the principles (the way it is organized and conducted), and major activities.
- 5.4 If you have a programme can you say that the control of high blood pressure in the population is better? If yes, please provide a short description of the successful results.
6. What are the areas of major concern in the hypertension prevention and control actions?
- Data collection
 - Pharmacological treatment
 - Non-Pharmacological treatment
 - Compliance
 - Community-based programmes
 - Intersectoral collaboration
 - Mass-media
 - Health professionals
 - Health education