COMMUNITY SURVEY OF HYPERTENSION IN SEMARANG

R. Boedhi Darmojo *


Prevalence of hypertension in the community have been reported from developed countries (a.o. Prineas et al 1973, Kimura 1973 Me Call et al 1973, Hawthorne et al 1974, Marmot et al 1975), figures estimated being in the range of 10 – 20 percent (WHO 1974). Kimura (1973) has found a prevalence of 15–22 percent in Kyushu, Japan. In the U.S.A. 15–20 percent of adults have hypertension, whereas more than half of these people have hypertensive heart disease. The black community in the U.S.A. yielded even more than 20 percent prevalence (Nat. Health Survey, Inter Society Commission for Heart Disease Resources, 1971).

Only a few prevalence studies in the community have been done in developing countries a.o. 9.3 percent of Taipei urban population (Cheng et al 1972), 15.4 percent among the Druses in Israel (Manelis & Shasha 1973), 20 percent in Singapore urban population (Lee et al 1974), 4.4 – 36.0 percent among Poly-nesian population (Prior 1973), 15.5 percent in Cuba (W.H.O. 1975), 5–10 percent in the Peoples Republic of China (Wu 1976).

Arterial hypertension is an important risk factor in ischemic heart disease, too. This is, evidenced by the high prevalence of hypertension in patients with myocardial infarction, being 75.1 percent in West Malaysia (Balasundaram 1972), 34.4 percent in Semarang, Indonesia (Boedhi-Darmojo 1975).

Knowing that hypertension appears to be a common disease and often without complaints (Waters 1971, Lancet 1970, Weiss 1972), but could be treated relatively easily (Veterans Administration Cooperative Study Group 1967, 1970), information on its real prevalence in the community, in urban as well as in rural areas, in the low as well as in the high socio economic level of the society, should be collected. This means a more active case finding and early treatment rather than to wait till the symptoms and complications have fully emerged.

In the light of the present knowledge, hypertension in the community can be regarded as an "ice-berg", the large proportion of patients without complaints lying beneath
the water level, while only patients with complaints and/or complications are visible. Those cases without complaints and the borderline ones are just which have to be looked for, if severe hypertension with fatal complications is to be prevented, Fig. I. and Fig II.

HYPERTENSION WITH COMPLICATIONS

HYPERTENSION WITHOUT COMPLAINTS

Fig. 1 Hypertension in the Community as an "Iceberg"

MATERIALS AND METHODS.

An urban population of one subdistrict of Semarang, the capital city of Central Java, attendants of Semarang Fair 1976 (urban), a rural population of Kalirejo Ungaran, 25 km south of Semarang, a rural population of Randublatung, 125 km east of Semarang and a rural population of the island Karimunjawa in the Java Sea, 150 km north of Semarang, were selected as the survey population.

In the sub-district of Semarang chosen, the main portion of the population comprised of government officials and laborers with low and middle socio economic levels (Pindrikan sub district).

In the Semarang Fair 1976, which is held every year to promote regional development, a hypertension-pavilion for case finding and information about hypertension was opened. Kalirejo is a rival village, Randublatung is a village located among the forests, while the island of Karimunjawa represented a fishermen's village.

As recommended by the W.H.O. (1962, 1973) only adult people 20 years or more were examined. Either house to house examinations were done or the people were collected in a certain place (usually a village hall or a school building) after which a house-to-house visit was paid to find the non-respondents. Calling the people with a "tong-tong" (wooden alarm bar) which was extended throughout the whole village appeared to be very practical.

A casual blood pressure measurement was
done with carefully calibrated mercury sphygmo-manometers. (W.H.O. 1962). The examining team comprised of residents of the Department of Medicine, Diponegoro University/Dr. Kariadi hospital and senior students from the Faculty of Medicine, supervised by an internist/cardiologist. Before the measurement, a medical and family history regarding the person examined and a short questionnaire of complaints and other possible associated factors in hypertension, were filled in by the students. To minimize inter and intra observer’s error as far as possible, a training prior to the action was organized.

Population statistics from the latest census in early 1976 were used. (Census for the General Election in 1977).

A fair to good coverage of the whole population could be reached (table 1). Only for the village Randublatung a 10 percent random sample survey was done.

These surveys were all done together with a comprehensive health delivery action, which had a very positive effect as evidenced by the good response it yielded. This may be called the "sugar coating" approaches to the community. After the data have been compiled the Chi square test was applied for statistical analysis.

RESULTS.

The prevalence of hypertension in the 5 population groups are shown in table 1, depicting also the sex distribution. The percentages of borderline hypertension, mild hypertension, awareness of hypertensive status, newly discovered cases, treated cases and adequately treated cases are shown in table 2.
Table 1. Prevalence of hypertension

<table>
<thead>
<tr>
<th>Place of survey</th>
<th>no of population</th>
<th>coverage percent</th>
<th>male</th>
<th>prevalence percent</th>
<th>f + m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semarang (urban)</td>
<td>1636</td>
<td>81.5</td>
<td>7.5</td>
<td>10.9</td>
<td>9.3</td>
</tr>
<tr>
<td>Semarang Fair (urban)</td>
<td>1126</td>
<td>-</td>
<td>7.6</td>
<td>10.0</td>
<td>8.2</td>
</tr>
<tr>
<td>Kalirejo Ungaran (rural)</td>
<td>711</td>
<td>92.7</td>
<td>0.9</td>
<td>2.7</td>
<td>1.8</td>
</tr>
<tr>
<td>Randublatung (rural)</td>
<td>6784</td>
<td>10.1 (r.s)</td>
<td>6.0</td>
<td>11.6</td>
<td>8.6</td>
</tr>
<tr>
<td>Karimujawa (island/rural)</td>
<td>2015</td>
<td>61</td>
<td>11.2</td>
<td>12.2</td>
<td>11.8</td>
</tr>
</tbody>
</table>

*) r.s. = random sampling.

Table 2. The percentages of borderline hypertension

<table>
<thead>
<tr>
<th>Hypertension percent</th>
<th>Semarang (urban)</th>
<th>Semarang-Fair (urban)</th>
<th>Randublatung (rural)</th>
<th>Kalirejo Ungaran (rural)</th>
<th>Karimun Jawa. (island/rural)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Borderline Hyp.</td>
<td>15.5</td>
<td>9.9</td>
<td>13.6</td>
<td>4.8</td>
<td>16.3</td>
</tr>
<tr>
<td>(140/90 – 159/94 mm Hg)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mild hyp.</td>
<td>72.2</td>
<td>85.9</td>
<td>83.6</td>
<td>100.0</td>
<td>82.8</td>
</tr>
<tr>
<td>(diast. BP 95–105)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Awareness of hypertension</td>
<td>56.0</td>
<td>54.4</td>
<td>1.7</td>
<td>10.0</td>
<td>6.9</td>
</tr>
<tr>
<td>state</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Newly discovered cases</td>
<td>44.0</td>
<td>45.6</td>
<td>98.3</td>
<td>90.0</td>
<td>93.1</td>
</tr>
<tr>
<td>Treated cases</td>
<td>21.7</td>
<td>21.7</td>
<td>0.0</td>
<td>10.0</td>
<td>1.9</td>
</tr>
<tr>
<td>Adequately treated cases</td>
<td>4.1</td>
<td>6.3</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

W.H.O. estimation: awareness of hypertensive status 50 percent, treated cases 25 percent, adequately treated cases 12.5 percent.

Prevalence of hypertension according to age (in decades) and sex distribution are shown in table 3. It appeared that the prevalence did not differ significantly between the city and village dwellers.

The figures from the village Kalirejo Ungaran, however, in comparison with the others very low (1:8 percent p < 0.01). Also it was apparent that the prevalence in women were in general higher than in men, either as a whole population or divided into age groups (n.s).

The prevalence rate of hypertension according to the height of diastolic pressure can be seen in table 4. This table shows the prevalence of mild (diastolic blood pressure 95 – 105 mm Hg) and borderline hypertension (blood pressure ranging 140/90 – 159/94 mm Hg) as shown in table 2.

Overweight (using Quetelet's rule height in cm 100, if more than 10 percent beyond this weight) appears to be an important factor to accompany hypertension (P < 0.01), especially in women. This was true at least in the Semarang urban population, while among the rural areas dwellers this was not apparent.

Finally, comparing associated complaints between normo and hypertensives among the city dwellers of Semarang the following complaints were significantly more present among hypertensives: occipital headache (P < 0.01), headache (P < 0.01 among men and P < 0.05 among women), irritability (P < 0.05), easy tiredness (P < 0.05 for men and P < 0.01 for...
Table 3 Prevalence rate of hypertension by sex and age (percent).

<table>
<thead>
<tr>
<th>Age distribution (years)</th>
<th>Rural area</th>
<th>Urban area</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ungaran</td>
<td>Randublatung</td>
</tr>
<tr>
<td></td>
<td>M F Total</td>
<td>M F Total</td>
</tr>
<tr>
<td>20 - 29</td>
<td>0.0 0.0 0.0</td>
<td>1.5 10.8 6.1</td>
</tr>
<tr>
<td>30 - 39</td>
<td>0.0 1.2 0.6</td>
<td>3.3 9.9 6.7</td>
</tr>
<tr>
<td>40 - 49</td>
<td>0.0 1.7 0.9</td>
<td>7.1 13.2 10.2</td>
</tr>
<tr>
<td>50 - 59</td>
<td>0.0 3.5 1.7</td>
<td>9.2 11.9 10.2</td>
</tr>
<tr>
<td>60</td>
<td>11.1 25.0 16.3</td>
<td>11.4 15.8 13.0</td>
</tr>
</tbody>
</table>

Whole population 0.9 2.7 1.8 6.0 11.6 8.6 11.2 12.2 11.8 7.5 10.9 9.3 7.6 10.0 8.2

Table 4 Prevalence rate of hypertension according to diastolic blood pressure (percent).

<table>
<thead>
<tr>
<th>Dist. Bl. Pressure (mm Hg)</th>
<th>Rural area</th>
<th>Urban area</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ungaran</td>
<td>Randublatung</td>
</tr>
<tr>
<td></td>
<td>M F Total</td>
<td>M F Total</td>
</tr>
<tr>
<td>≤ 94 *)</td>
<td>100 50 63.6</td>
<td>29.4 45.6 40.5</td>
</tr>
<tr>
<td>&gt; 95 — 99</td>
<td>0 50 36.4</td>
<td>5.9 13.6 11.5</td>
</tr>
<tr>
<td>100 — 104</td>
<td>0 0 0</td>
<td>35.3 25.0 27.9</td>
</tr>
<tr>
<td>105 — 109</td>
<td>0 0 0</td>
<td>5.9 2.3 3.3</td>
</tr>
<tr>
<td>110 — 114</td>
<td>0 0 0</td>
<td>17.7 9.1 11.5</td>
</tr>
<tr>
<td>115 — 119</td>
<td>0 0 0</td>
<td>0 0 0</td>
</tr>
<tr>
<td>120 — 124</td>
<td>0 0 0</td>
<td>0 4.6 3.3</td>
</tr>
<tr>
<td>125 — 129</td>
<td>0 0 0</td>
<td>0 0 0</td>
</tr>
<tr>
<td>130 — 134</td>
<td>0 0 0</td>
<td>5.9 0 1.6</td>
</tr>
<tr>
<td>135</td>
<td>0 0 0</td>
<td>0 0 0</td>
</tr>
</tbody>
</table>

*) only systolic BP = 160 mmHg

women), insomnia (P < 0.05 for men and P < 0.01 for women). Among the rural population only occipital headache was a significant finding in hypertensives.

DISCUSSION

The coverage of the whole community surveys are regarded as fair to good, in one of these even as high as 92.7 percent. According to Rose & Blackburn (1968) such community surveys should reach a coverage of not less than 80 percent. As expected, the male population was more difficult to reach due to their activities outside their homes. This was more apparent in the male population of the island Karimunjawa, which might be the cause of the coverage of only 61 percent. Except for this, this fair to good results could be ascribed to the comprehensive health delivery action which always accompanied the surveys. This was done by opening mobile out-patients clinic, free of charge, giving useful information about health care (esp. personal and environmental hygiene) etc., in the form of groups or general meetings using also audio-visual aids such as pictures, slides or films. Motivation to promote health, esp. to key persons of the village (village head, teachers, paramedical, personnels, religion leaders etc) appeared to be of very much help.
From this survey the willingness to seek medical treatment of the people was surprisingly excellent in spite of their very busy daily work in the field or on the sea. Moreover, the impression that doing such surveys in the city is much more difficult to accomplish than in the rural areas.


With the exception of the village Ungaran, no clear differences existed between figures from urban and rural areas. The Ungaran village, having a prevalence of only 1.8 percent is a socio-economically better situated area enjoying two rice crops yearly. Whether this and also the famous peaceful mind and calm nature of the Javanese, esp. from Central Java, was really the explanation, remains to be proved. Data collection from other parts of the Indonesian archipelago is being done. In a sample survey along the Raniu river in Papua N. Guinea, Stanhope (1973) has found among the population also a prevalence of only 2 percent.

Prevalence rates of hypertension in these studies appeared to be higher in women than in men. This was found in rural as well as in urban population a fact that is in contrast with most western figures which generally showed a higher prevalence among men (Mc Call et al 1973, U.S.A. Dept. of Health, Education & Welfare 1960 – 1962, Prineas et al 1973, Hawthorne et al 1974). Prior (1973) found among Polynesians in the Pacific similar higher prevalence of hypertension among women. Manelis & Shasha (1973) have found the same fact among the Druses in Israel. Findings however, in this study showed no significant difference (P > 0.05).

Whether urinary infection which tends to occur more easily in women could be the cause of this higher prevalence, needs further investigation.

It was fortunate that the large portion of the hypertensive population belonged to the mild hypertensives (diastolic BP 95 – 104 mm Hg, Freis 1974), being between 72.2 – 100 percent (see table). Whether these people with mild hypertension should be treated or not, controversial views still exist. The same applies for the borderline cases, which in our series ranged between 4.8 – 16.3 percent (Cheng et al 6.2 percent, Freis 10 – 15 percent). Waiting further positive results from prospective studies, the best thing to do is to keep an eye on this mild and borderline cases, without using drugs unless the blood pressure is going to increase to higher levels and target organ damage is going to occur. This is also suggested by Miall & Chinn (1974), WHO (1974) and Doyle (1976).

Comparing figures estimated by the WHO (1974) and that of Hawthorne et al (1974) with findings from Semarang about the awareness of hypertensive status, newly discovered cases, treated cases and adequately treated cases, the figures were somewhat comparable (fig II). This does not apply, however, with figures from the rural areas. This is because the rural population unlike the city dwellers, for the most part could not enjoy a fair health service yet, so that the newly discovered cases were as high as 90 percent or more, the percentage of the treated cases ranging between 0 – 10 percent (table 2). That this was not the only cause to explain the bad results of finding and treating the hypertensive was evidenced by the figures in developed countries where the prevalence of undetected cases in the community are still high, too, (Hawthorne et al 1974, WHO 1974). Also the percentages of already known cases which remain untreated and adequately treated cases are still unsatisfactory.

Moreover, Miall & Chinn (1974) stated that 64 percent of the treated men and 32 percent of the treated women have been under treatment only after the complications had occurred. The Inter Society Commission for Heart Disease Resources (1971) stated that several studies have suggested that only 15 – 20 percent of patients with hypertension are under adequate medical management. This
proportion is small because: many patients are asymptomatic and unaware of their hypertensive status, they are not told or do not understand the need for long term hypertensive therapy and the results of psychological, physical and financial barriers.

In this study in Semarang (urban population), doctor’s advice seemed to play an important role for the continuation of therapy among the regularly treated patients (Boedhi - Darmojo 1975). Since the opening of the hypertension clinic, this was fortunately the experience too, at least in places where medical facilities and financial factors etc. permit it.

Results of control by the general practitioners are promising, while information of control by the Health Centres are still to be collected. In these rural areas shortage of medical facilities, the socio-economical, logistical, and transportation difficulties might influence the result of a case detection and control program of hypertension, but ignorance and neglect together with lack of knowledge are important factors as well. Even in developed countries treating the hypertensives is less than satisfactory (Miall & Clinn 1974).

This ignorance and neglect is demonstrated to be present among doctors, too. In a cardiovascular survey, 100 doctors in Semarang were examined aged 35 years and over. (Boedhi-Darmojo 1973). A prevalence of 34.4 percent was found, whereas nearly one third of these doctors did not know about their hypertensive status prior to the health examination.

In a previous report about complaints found among hypertensives and the normotensives in Semarang, occipital headache, headache, irritability, easy tiredness and insomnia were significantly found more among hypertensives. (Boedhi – Darmojo 1975). Among the rural population however, none of the complaints except occipital headache (P < 0.05), differed significantly. According to Freis (1974) a typical occipital headache in the morning is characteristic only of severe or malignant hypertension.

Waters (1971) did not find significant correlation between headache and high blood pressure, while Weiss (1972) has found the same non significant results regarding headache, epistaxis, tinnitus, dizziness and fainting.

SUMMARY

Community prevalence of hypertension have been reported from developed countries, figures estimated being in the range of 10 – 20 percent. From developing countries however, such figures are still scarce.

Knowing the existence of the “ice-berg” phenomenon in arterial hypertension, a more active case finding should be done, followed by an early treatment. All efforts should be done in the form of surveys on selected groups and samples of whole communities, in urban as well as in areas. To get a high coverage, studies should be done in the frame of a comprehensive health delivery action, using such a the so-called “sugar coating” approaches. Key-persons of those villages and medical students appeared to be of much help.

Using methods as recommended by the WHO (1962) among people 20 years and older, survey of hypertension in Central Java, in 2 urban and 3 rural communities showed the prevalence figures being between 8.6 – 11.8 percent.

These figures resemble from other developing countries but lower than the western ones. No clear difference exists between urban and rural figures. However, prevalence of only 1.8 percent in one of the socio economic better situated village (Ungaran). The prevalence figures in women were higher than in men.

In the urban area, percentages of awareness of hypertensive status, newly discovered cases, treated cases and adequately treated cases, were some what comparable with that of the WHO estimation. In rural areas however, the figures were much less.

Constraints in control and prevention were a.o. ignorance and neglect, lack of knowledge, shortage of medical facilities, transportation problems and financial barriers.
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