

Epidemiology of Blood Pressure and Hypertension in the adult Maltese community

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ABSTRACT

Raised blood pressure is thought to be highly prevalent among the Maltese community. This has been a clinical impression probably partly based on the assumption that the Maltese prevalence rates are consistent with the epidemic rates obtained in most European countries and the United States. A study was undertaken in order to acquire scientific information on blood pressure, hypertension and its awareness among the Maltese population aged between 25 and 64 years. The mean systolic blood pressures were 138 mmHg (SD 16) for males and 138 mmHg (SD 20) for females. The mean diastolic blood pressures were 86.2 mmHg (SD 10) for males and 85.5 mmHg (SD 11) for females. The prevalence of hypertension was 26%. Only about 10% of persons suffering from hypertension had their blood pressure under adequate control.

INTRODUCTION

Hypertension is a major factor among those that increase the risk for developing cardiovascular diseases. Whatever cut-off points are used to define and classify blood pressure, a large segment of the adult population in developed countries suffer from high blood pressure and are consequently subject to excess mortality and morbidity.

In 1987, around 40% of deaths among Maltese in the age group 25—64 years were due to diseases that have a strong association with raised blood pressure. In terms of years of life prematurely lost, in 1987 over 7400 years were lost by persons between the ages of 25 and 64 years because of these diseases (1). In terms of morbidity caused by cardiovascular diseases, the medical, psychological and social disabilities caused are probably immeasurable, while the often attendant elements such as bereavement and fear are certainly imponderable.

Studies around the world and more recently

the INTERSALT study (2,3) involving the screening of over 10,000 individuals in 32 countries, show that a wide spectrum of blood pressure levels exists in different communities. At the lower end of the range, hypertension is not only completely absent in a number of non-industrial societies, but the blood pressure does not rise with increasing age (4). However, when such communities are exposed to, and subsequently adopt Western habits, both the mean blood pressure and the age-related slope of their blood pressure increase. Those who remain remote from Western culture, experience little male/female differences or increases of blood pressure with age (5).

The development of hypertension is related both to genetic factors and environmental influences. Human essential hypertension is a distinct genetic trait that develops under the influence of certain environmental factors. Platt et al., suggested that essential hypertension was a clinical disease entity caused by a single gene with incomplete dominance (6). Pickering et al., basing their studies on the observed unimodal continuous distribution of blood pressure, suggested that blood pressure levels were polygenically and multifactorially determined (7). Miall et al., observed that between 33 and 45% of the variations in systolic blood pressure could be ascribed to genetic factors (8). The familial aggregation of raised blood pressure in first degree relatives, serves to underline the importance of heredity, although the mechanisms involved are yet unclear (9).

The effects on blood pressure of certain environmental factors such as obesity, heavy alcohol intake and stress have been studied extensively with different cultures and lifestyles as background. The most significant correlate with low prevalence or absence of high blood pressure has repeatedly been shown to be low salt intake. Epidemiological differences in the prevalence of hypertension-related diseases such as myocardial infarction and stroke between migrants and people living in their mother

country, have shown the importance of environmental factors (10).

The incidences of myocardial infarction and death were compared between Japanese men living in Japan, Hawaii and California, showing a striking increase among Japanese migrants to the USA, while the increase was more pronounced in those Japanese living in California (11).

METHOD AND SUBJECTS

The observational study consisted of a nationwide population survey which took place in the Maltese Islands from February to June 1984, as the baseline survey of the WHO-MONICA Project (12,16), a project spread over 10 years and co-ordinated by the Cardiovascular Diseases Unit at the WHO in Geneva. The aim of this international project is to monitor and study the trends and determinants of cardiovascular diseases in different communities.

A simple random sample of the segment of the Maltese population aged between 25—64 years was taken, using the October 1983 electoral register as the sampling frame. The Maltese population eligible for inclusion in the survey was then estimated to be 173400 (48% being males and 52% females). The study population had the following characteristics; a total of 3174 individuals were selected, which sample was made up of 1540 males (48.5%) and 1634 females (51.5%). The overall participation rate was 65% and the sample surveyed was made up of 1010 males (49.5%) and 1032 females (50.5%). The screening process for each individual consisted of three parts; the administration of a questionnaire, physical measurements and biochemical measurements. Blood pressure was measured on the right arm, with the subjects in the sitting position and after at least five minutes of rest. Simple mercury column sphygmomanometers were used by trained observers ►

▶ and two consecutive observations of systolic blood pressure (SBP) and diastolic blood pressure (DBP) were recorded to the nearest 2 mmHg. The beginning of Korotkoff phase V was used to determine the DBP. Additionally, participants were asked whether they had ever been told by medical staff that they have hypertension and whether they had been taking drugs aimed at lowering their blood pressure. The criteria used for defining hypertension were a SBP of or above 160 mmHg and/or a DBP of or above 95 mmHg. Systolic blood pressures between 140 and 160 mmHg and/or diastolic pressures between 90 and 95 mmHg were considered as indicative of borderline hypertension (13). Intervention was not part of the study design, but individuals with raised blood pressure levels were informed accordingly and advised to consult the medical practitioner of their choice.

RESULTS

The mean systolic blood pressures for the representative sample of the segment of Maltese community under observation were 138 mmHg (SD 16) for males and 138 mmHg (SD 20) for females. With regard to diastolic blood pressure, the means were 86.2 mmHg (SD 10) for males and 85.5 mmHg (SD 11) for females.

Tables 1a and 1b show that the lowest mean blood pressure levels were related to the youngest decade. In the younger age-groups (25–39 years), the mean SBP was consistently lower in females, which relationship was reversed in the older age-groups (40–64 years). This was in marked contrast with the relationship of trends in the rise of DBP over the years between the sexes, where the mean DBP was consistently higher in males, up to the 55–59 year age-group, when this relationship was reversed. In both sexes, diastolic pressures increased gradually with age to the 55–59 years, and subsequently levelled off; this observation in the Maltese population being consistent with observations in other populations (14,15).

There was a gradual rise in the slopes of both SBP and DBP over the years of age (Figures 1a and 1b).

The mean SBP rose by 17.7 mmHg for males, or about 4.4 mmHg per decade and by 30.4 mmHg or about 7.6 mmHg per decade for females. The mean DBP rose by 5.5 mmHg or just over 1 mmHg per decade for males and by 12.1 mmHg, or just over 3 mmHg per decade for females.

The prevalence of hypertension increased with increasing age in both sexes. The prevalence at the youngest decade (25–34 years) was higher in males (13.6%) than in females (5.2%). This relationship was reversed for the oldest decade, (55–64 years), where the prevalences were 41.9% for males and 54% for females. Figures 2a and 2b illustrate the relationships across the four age

groups. There were no significant differences in the prevalence rates of borderline hypertension between males and females and indeed the rates observed for the age groups 45–54 years and 55–64 years for both sexes were remarkably similar.

The individuals taking part in the study were screened both for awareness and treatment of hypertension. In the population sampled, 26% were found to be hypertensive, while only half of them were previously aware of this fact. Of those persons suffering from hypertension and who were on medication aimed at lowering blood pressure, 34% had their blood pressure under adequate control. Analysis of this relationship reveals that only 10% of those suffering from hypertension fulfilled three conditions; awareness of their condition, on hypotensive therapy and adequately controlled. Figure 3 illustrates the relationship graphically.

DISCUSSION

The population survey that was undertaken confirmed the hypothesis, and indeed the popular impression among health professionals and lay persons that high blood pressure is highly prevalent among the Maltese community. Further, the study tested both for subjective awareness of hypertension, as well as for the prevalence and effectiveness of treatment. The results of the study qualified and quantified the distribution of blood pressure among the sexes at different age groups, therefore permitting accurate comparisons with studies in other populations, as well as serving as a baseline for future research among the Maltese community in order to establish trends over time. There is no doubt that the random sample chosen is an accurate representation of the Maltese community between the ages of 25 and 64 years. This became clear when comparisons were made with regard to the age, sex and population density characteristics evident in the age-standardised Maltese population, the sample selected and the responders. Statistical calculations suggested that at least 200 subjects were needed in each 10 year age and sex group in order to show degrees and expected changes of risk factor levels (16). This statistical condition was fulfilled.

It is accepted that consideration of a single blood pressure measurement is of limited value in an individual, because of the large variation in observed arterial pressure. Such variations are partly biological but may also be due to observer variation. However, even a single casual blood pressure estimation has been found to be as predictive of future cardiovascular disease as a series of measurements (17). In the case of this study, the reported means for blood pressure were based on a mean of two readings for each individual, as this reflected best the situation (18). The persons measuring blood pressure were monitored for intra-observer and inter-observer bias as well as

for digit preferences. Although there was a predictable slight tendency to last digit preference (principally 0, but also 5), this was not significant and is consistent with other screening programmes (19).

There are no natural distinctions separating normal blood pressures, borderline hypertension and hypertension, and the distribution of blood pressures in the Maltese community is similar to other communities in that it follows a normal or Gaussian pattern skewed to the right. The cut-off points used in this study, although arbitrary, are useful practical simplifications that also make comparisons with other studies feasible.

The prevalence rates of hypertension in the Maltese community are similar to the rates that prevailed in the North Karelia district of Finland around 1972, before a systematic hypertension control programme was started. Following this and over a period of 5 years, the rates decreased by 39% (20). Comparison of prevalence rates of hypertension between the Maltese community and those prevailing in Munich, FRG, as observed by the Munich Blood Pressure Study reveals that the Maltese rates are higher for each sex and age-group. This difference was more marked in females, where the Maltese prevalence rates are practically double the German rates (21).

The finding that awareness of hypertension was prevalent in 50% of all the persons suffering from high blood pressure is interesting in its implications not only to the individuals concerned, but also from the public health and health planning points of view. That a lot of hypertension in Malta is undetected is due to a variety of reasons; partly because of the often 'silent' nature of the disease, but also because of a less than adequate detecting process. Lack of contact with medical care and denial of the condition's existence by the patient have also to be taken into consideration. It is also of interest to note that there is more awareness of high blood pressure in females than in males, which finding is consistent throughout all the age-groups studied and is consonant with other studies (21). In considering the number of persons who declared that they were on hypotensive agents, 66% of them had their blood pressures above what is considered to be an acceptable level. This situation is probably multifactorial in causation. Individual variation in compliance to treatment prescribed, misunderstanding between prescriber and patient, and infrequent or inadequate monitoring are few of the facets to this complex problem that also exists to varying extents in all communities studied. Certainly, more research is needed in order to throw more light on this situation. This, not only because of the implications to individuals, but also in order to evaluate the use of health care resources from a benefit/cost point of view.

The high prevalence of hypertension among the Maltese, probably requires a ▶

► community approach rather than simply an at-risk approach. Integrated community approaches among many different populations have proved successful in heightening awareness of hypertension as well as improving blood pressure control (22,23). The essential features of most community based programmes were health education, screening, adequate back-up services and active treatment of established disease. Further research and discussion would also be needed in order to study the implications of modalities of intervention, both on individuals as well as on the health care budget. Adequate monitoring of persons at risk and the establishment of a rational treatment policy will also ensure that the resources presently available are used to a maximum effect. Even a small decrease in the prevalence of hypertension occurring in the Maltese community is likely to have a significant impact on mortality and morbidity from cardiovascular diseases.

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Epidemiology of Blood Pressure and Hypertension in the Maltese Community aged between 25 and 64 years

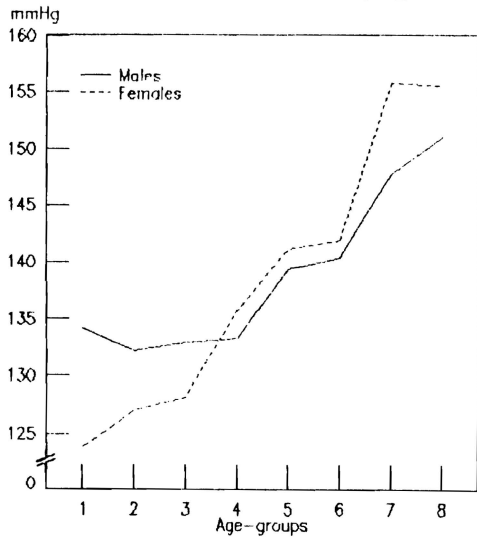
Table 1a Casual systolic pressures (mmHg), by age and sex (Mean of two readings and standard deviation (SD))

Age - Groups	Males		Females	
	Mean	SD	Mean	SD
25 - 34	132.8	9.6	126.3	12.7
35 - 44	133.2	13.4	132.4	14.9
45 - 54	142.0	16.7	142.1	18.2
55 - 64	150.5	20.2	156.7	21.6
25 - 64	138.07	16	138.06	20

Table 1b Casual diastolic pressures (mmHg) by age and sex (Mean of two readings and standard deviation (SD))

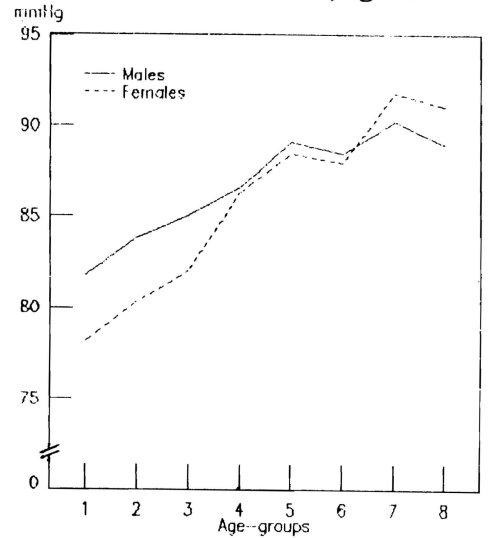
Age - Groups	Males		Females	
	Mean	SD	Mean	SD
25 - 34	83.2	9.4	79.5	8.9
35 - 44	85.3	9.9	84.4	9.5
45 - 54	89.4	9.6	88.0	9.9
55 - 64	88.7	10.5	91.6	11.1
25 - 64	86.17	10	85.5	11

► **MEAN SYSTOLIC BLOOD PRESSURES**
Maltese males and females, ages 25-64



1a

MEAN DIASTOLIC BLOOD PRESSURES
Maltese males and females, ages 25-64

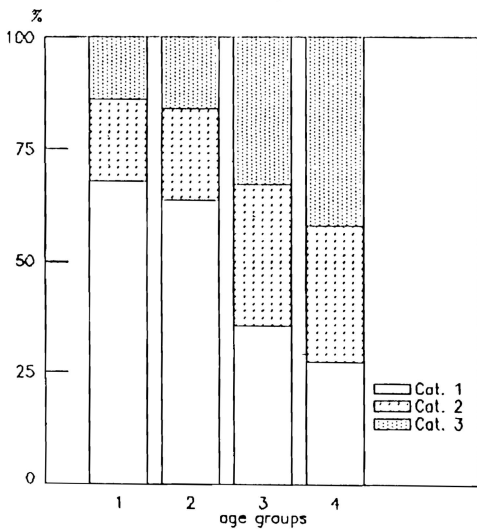


1b

Legend: age groups in years.
 1: 25-29, 2: 30-34, 3: 35-39, 4: 40-44, 5: 45-49, 6: 50-54, 7: 55-59, 8: 60-64.

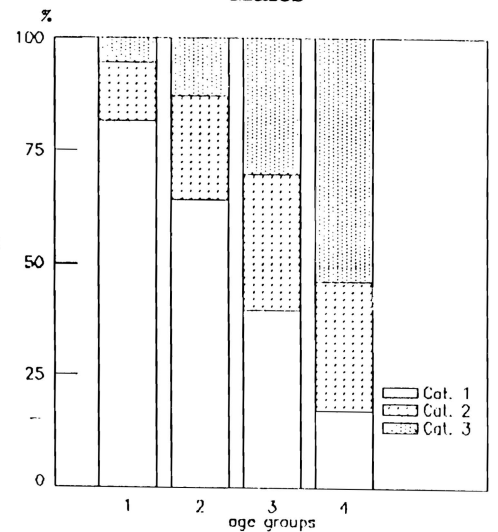
Figures 1a and 1b:
 Variations and slopes of systolic and diastolic blood pressure by sex and age group.

Distribution of B.P. by 3 categories
Females



2a

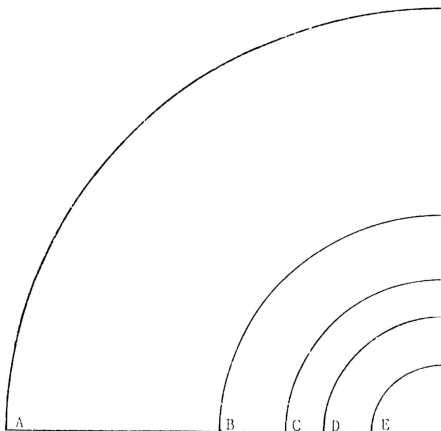
Distribution of B.P. by 3 categories
Males



2b

Legend:
 age-groups in years. 1: 25-34, 2: 35-44, 3: 45-54, 4: 55-64.
 categories:
 1: normal blood pressure.
 2: borderline hypertension.
 3: hypertension.

Figures 2a and 2b:
 Prevalence of normotension, borderline hypertension and hypertension.



- A. Population screened; 100%
- B. Prevalence of hypertension; 26%
- C. Prevalence of awareness of hypertension; 13%
- D. Hypertensives on treatment; 7.5%, (57% of C)
- E. Hypertensives under adequate control; 2.5% (34% of D and 10% of B)

◀ **Figure 3**

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