INTRODUCTION

Until few years ago, there was no information about the epidemiology of hypertension in Egypt. The exact magnitude of the prevalence of hypertension at a national level, rates of awareness, treatment and control and presence of hypertension risk factors were not known. This information is important both for local health planners and for the international scientific community. The recognition of differences in hypertension prevalence rates between different populations and between different groups in the same population may help in identification of some factors: genetic, behavior and/or environmental that might be related to the development of hypertension.

In Egypt and other developing countries there is a significant change in health profile. Eradication of many infections, nutritional and parasitic diseases, and the decline in infant mortality lead to an increase in average life expectancy. The average life expectancy in Egyptians changed between the years 1960 and 1990(1).

In both males and females, there was an increase in longevity. It increased in males from 51.6 to 62.8 years and in females from 53.8 to 66.4 years. Aging of the population will contribute to the increasing prevalence of disease of old age, namely hypertension, cardiovascular disease and diabetes. Cardiovascular diseases constitute now the main cause of mortality in Egyptians (1).

In 1970, cardiovascular disease were responsible for only 12.4% of deaths, infections and gastrointestinal for 3 2.8%.

Two decades later, cardiovascular diseases caused 42.5% of deaths, while infections and gastrointestinal diseases were responsible for 14.1%. It is expected that this trend will increase and possibly, we will be facing an epidemic of cardiovascular diseases in this year were due to cardiovascular.

Adoption of western life style, increased rates of obesity, cigarette smoking and other cardiovascular risk factors are definitely contributing factors.

The data about the epidemiology of hypertension in Egypt were collected during the Egyptian NHPI Survey in the years 1991-1994(2,3). This was a joint project between the Egyptian and US governments. Different organizations participated in the project.

The Egyptian Ministry of Public Health and Cairo University from the Egyptian side, The National Heart, Lung and Blood Institute and Johns Hopkins University from the US side.

EPIDEMIOLOGY OF HYPERTENSION IN EGYPT

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In this review, I will discuss the methodology, the population characteristics, blood pressure distribution, hypertension prevalence, rates of awareness, treatment and control and some of the hypertension risk factors.

METHODS

The survey was conducted in 21 sampling locations in six Egyptian governorates representing all Egyptian geographic areas and socio-economic groups.

The survey sites were Port Said Governorate at the northern end of the Suez Canal representing coastal Governorates; El-Sharquia in the middle of Nile Delta representing the Delta Governorates; Beni Seif, 100 miles South of Cairo, representing Northern Upper Egypt. Aswan, 800 miles South of Cairo, representing Southern Upper Egypt. El-Wadi El-Gadid, an oasis in the Western Sahara, representing the Frontier Governorates, and Cairo, The Capitol of Egypt, with the main urban concentration. After a preparatory stage of 10 months; field survey was conducted in two phases during the period of December 1991 to May 1993. During Phase I, all households in the sample, 25 years and older were visited by data collection staff. These were newly graduated doctors, questionnaire forms were filled and blood pressure was measured four times according to a standardized protocol. In Phase I, hypertensive were identified. Phase II followed immediately Phase I. It was conducted at local health centers in different sampling locations, Hypertensive identified in Phase I with gender matched controls were recruited for detailed clinical and laboratory evaluation including standard 12-lead ECG, echocardiography studies, optic fundus examination, blood chemistry, 12 hours urine and measuring skin color reflectance.

Q QUESTIONNAIRE FORMS

Data collected in questionnaire forms examined demographic and behavior characteristics and medical history of the population.

Demographic Characteristics included: Family size and parity, housing conditions, SES and level of education, marital condition, employment, skin color, migration and religion.

Behavior Characteristics included: Social and dietary habits, occupational stress, drugs and cigarette smoking.

The third set of data collected in questionnaire forms covered medical history, hypertension awareness and treatment, previous blood pressure measurement, hypertension risk factors, hypertension complications and other cardiovascular risk factors.

Persons were considered hypertensive if they meet one of the following conditions:

1) DBP greater than or equal to 90 mm Hg.

2) SBP greater than or equal to 140 mm Hg.
3) Currently taking antihypertensive medications regardless of their actual BP measurement.

**POPULATION CHARACTERISTICS**

- **Response Rate**: In the sample frame the target numbers for households was 3600 and for individuals was 7915. Response rate at the household level was 93.3% and at the individual level was 85%.

- **Age & Gender Distribution**: Age range in the sample was 25-95 years, mean age was 45.6 years. Females were more common constituting 56.5%.

- **Housing Conditions**: 21% of individuals in the sample lived in mud houses, 26.9% had no running water and 2% had no electricity.

- **Residence**: 73.3% were living in urban areas while 26.7% lived in rural areas.

- **Education level**: Individuals were categorized into low education group, i.e., illiterate or just reads and writes. And this constituted 64.7% and a high education group, i.e. finished high school, college or a university graduate were 35.3%.

- **Skin Color**: 5% of the individuals in the sample had black skin, 2% white or blonde and 93% mixed or dark.

**BLOOD PRESSURE DISTRIBUTION AND HYPERTENSION PREVALENCE**:

- **Systolic Blood Pressure Frequency Distribution**: About 50% of Egyptians had SBP in the range 110-129 mm Hg. In 2.7% SBP was above 180 mm Hg and in 3.3% it was less than 110 mm Hg.

- **Diastolic Blood Pressure Frequency Distribution**: More than 60% of Egyptians had DBP in the range 70-89 mm Hg. DBP was above 110 mm Hg in 1.5% and less than 60 mm Hg. In 3.3%

- **Age and Gender Distribution**: There was a progressive increase in SBP level with advancing age, the increase was greater in women than men after the age of 50 years.

- **Hypertension Prevalence**: The national estimate of the prevalence of hypertension in Egyptians was 26.3%, slightly more prevalent in women 28.9% than in men, 25.7%. Prevalence of hypertension increased progressively with aging reaching a peak in the age group of 65-74 where more than 50% of individuals have high blood pressure. Before the age of 45 years, hypertension was more prevalent in men while the reverse was true after 45 years.

  Systolic hypertension was present in 17.2% of the population, also more common in women than men. There was a sharp increase with aging reaching a plateau at age decade of 65-74 years. Diastolic hypertension was more common in men than in women in all age groups. Its prevalence increased progressively to reach a plateau between ages 45-65 years followed by a sharp decline that was more evident in women than in men.
According to JNC V Guidelines, 58.3% of Egyptians have normal blood pressure. 17.5% high normal, 17.4% stage I and 6.2% Stage II. Thus in the majority of hypertensives, hypertension was in the mild to moderate range.

• **Hypertension Prevalence in Different Egyptian Regions:** The highest rate was in greater Cairo area, 31%, and the lowest rate was in the frontiers 19.9%. These data underscore the role of environmental factors in relation to hypertension.

**AWARENESS, TREATMENT AND CONTROL:**

At a National level, 37.5% of Egyptians were aware of being hypertensives, 23.9% were receiving treatment and in only 8%, hypertension was controlled.

Also, rates of awareness varied among different Egyptian regions. The highest awareness rates in Cairo and Coastal areas greater than 50%, the lowest in Northern Upper Egypt, about 20%. Hypertension control rates were the best in Cairo and Coastal regions (15%) and were very low in Northern Upper Egypt (2%).

**HYPERTENSION RISK FACTORS**

**Obesity:** Defined as body mass index (BMI) greater than 30 Kg/m2 was more common in hypertensives than normotensives, 39.8% vs. 26.5%. Obesity was very common in hypertensive women present in 50.3%.

**Waist / Hip Ratio:** Used as an index of body fat distribution was greater in hypertensives than normotensives and as expected more in men than women.

**Social Stress:** We examined a number of parameters that might be associated with increased social stress: Social isolation, low levels of education and unemployment, 2.3% of the individuals in the sample were living alone. Hypertension was present in 59.7% of these living alone and in 30% of those who were not living alone.

**Lower Levels of Education:** Were more common in hypertensives in comparison to normotensives: 72% vs. 61% and more in Egyptian women than men. Unemployment rate was higher in hypertensives than in normotensives, 30.2% in comparison to normotensives, 12.9%.

**Skin Color:** Black skin color was associated with higher prevalence rate of hypertension in most of the age groups.

**Family History:** A family history of hypertension was slightly more common in hypertensives (35%) than normotensives (32%).

**Urinary Sodium Excretion:** 12-hours urinary Na excretion was used to represent salt intake. Levels of urinary Na excretion varied in different Egyptian regions, 125m Eq/L in Cairo, 99 m Eq/L in Aswan and 56 m Eq/L in Oasis. These correlated with the prevalence rates of hypertension.

**COMMENT**
The Egyptians National Hypertension Project (NHP), provides for the first time data about the magnitude of hypertension problem nationwide in an Arab country. The prevalence rates of hypertension in Egypt are among the highest in the world with a national estimate of 26.3% in adult population. There is an impressive increase in prevalence rates with aging, approximately 60% of individuals above the age of 60 years suffer from hypertension. The study also showed that rates of hypertension awareness, treatment and control are very low. These observations should encourage the development of national campaigns in order to increase public awareness and should alert health planner to start prevention programs and improve physician education and training. The establishment of the Egyptian Hypertension Society was a direct by product of the results of the Egyptian NHP.

The results of the survey underscore the role of environmental factors in development of hypertension. The variable prevalence rates of hypertension between different geographic areas in Egypt in spite of the same racial and ethnic background should invite investigators to examine the role of environment. Dietary salt intake expressed in urinary Na excretion was more than double in Cairo area with the highest hypertension prevalence rate in comparison to Frontiers (Oasis) with the lowest prevalence rate. Racial difference have been shown to affect salt sensitivity. Egyptians seem to belong to the salt sensitive group. Limiting dietary salt intake should be encouraged and be part of nationwide hypertension prevention program.

A major problem in Third World Countries is lack of data. The design and execution of the Egyptian NHP should serve as a model for similar surveys in developing countries.

REFERENCES

