CARDIOVASCULAR RISK FACTORS IN NORMOTENSIVE AND HYPERTENSIVE EGYPTIANS: PRELIMINARY RESULTS, EGYPTIAN NATIONAL HYPERTENSION PROJECT (NHP)

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Introduction

Following eradication of many infectious and parasitic diseases and the sharp decline in infant mortality rate, cardiovascular disease constitutes now the main cause of morbidity and mortality in many third world countries [1,2]. Death secondary to cardiovascular causes have increased more than threefold and they are now responsible for more than 40% of deaths in Egyptians in comparison to reports of 12.4 % two decades earlier [3]. A number of demographic, social, and environmental factors might also contribute to this change in health profile. These include rapid urbanization, inadequate shelter and crowding, increased consumption of junk food, more sedentary lifestyle, and other social stress [4]. It is not known whether these social and demographic changes are associated with higher prevalence rates of the established cardiovascular risk factors such as hypertension, dyslipidemia, obesity, diabetes, and cigarette smoking. Recent data from the Egyptian National Hypertension Project (NHP), the first cross-sectional national survey in a developing country showed that hypertension is very common in Egyptians and constitutes a major health problem [5]. On the other hand, clustering of cardiovascular risk factors has been shown in studies from Western countries to occur in hypertensive patients [6]. It is not known whether this increased cardiovascular risk profile is present in hypertensives living in developing countries with possibly different life styles, dietary habits, and demographic characteristics. Also it is not known whether borderline elevations, or high normal levels of blood pressure are associated with increased prevalence of risk factors. The present study is based upon preliminary data collected during the Egyptian NHP Survey and has three main objectives: first, to identify the prevalence of a number of important cardiovascular risk factors in normotensive and hypertensive Egyptians; secondly, to find the relationship between minimal elevations of blood pressure in the high normal range and the prevalence of risk factors; and finally, to examine the effect of demographic characteristics on risk factor prevalence.

Methods

Data were collected during the Egyptian NHP Survey. The details of the methodology were
discussed in previous communications [7,8]. Briefly, the survey was conducted during the period 1991-1994. The sample design was a multistage probability sample of clusters of households in geographically defined areas. The 26 governorates of Egypt were stratified into five strata and governorates were subjectively selected. Twenty-one sampling locations were selected in six Egyptian governorates that represent all Egyptian geographic regions and socioeconomic groups. Field survey consisted of two phases for each governorate. In Phase I, the whole sample in the survey site was interviewed by the data collection staff, filling questionnaire forms that address the demographic variables, socioeconomic characteristics, dietary habits, smoking, parity, and education. Blood pressure was measured four times according to a standardized protocol using a regular mercury sphygmomanometer. Pressure was recorded to the closest 2 mmHg after 5 minutes rest in the sitting position using an appropriate cuff size. Phase II followed Phase I by 1-2 weeks where all hypertensives, i.e. those whose average systolic blood pressure (SBP) ≥ 140 mmHg, and/or average diastolic blood pressure (DBP) ≥ 90 mmHg, or those receiving antihypertensive medications, were reevaluated together with gender-matched normotensives in specialized local centers for detailed clinical and laboratory investigations. The latter included fundus examination, standard 12-lead electrocardiograms, echocardiographic studies, urine and blood tests, 12-hour urine collection for creatinine, and electrolyte estimation. Blood pressure was measured twice following the same protocol. Weight, height, and waist and hip circumferences were measured. Blood samples were collected after 12 hours of fasting for blood sugar and serum lipids, samples were processed locally, frozen at -30°C and then transported to Cairo for batch analysis. Samples (10 ml blood) were taken in the field free of hemolysis, collected in clean dry tubes with rubber stopper. At the central biochemical laboratory in Cairo, all frozen samples were thawed and then analyzed by a semiautomated autoanalyzer. Twelve cuvettes were run in one tray batch measurement. The first three cuvettes were left for blank, high standard, and low standard; the rest of the 9 cuvettes were used for sample analysis. Reagent (0.7 ml) (according to test performed) was added and put in the analyzer to incubate, mix, and read the results within 3 minutes. Quality control was done on 5% of the sample by repeating the analysis by the same operator and on 5% by a different operator in a control-certified laboratory. Calibration was done daily and in each run.

Based upon the average of six arterial pressure (AP) readings measured on two separate occasions, individuals in the sample were classified into the groups: normotensives (NT): average AP readings less than 130/85 mmHg; high normal (HN): AP readings between 130-139/85-89 mmHg; and hypertensives (HT): average AP equal to or greater than 140/90 mmHg.

A total number of 2,313 individuals had detailed clinical and laboratory evaluations. The prevalence of the following risk factors were examined in 1,733 individuals who were not receiving medications: body mass index (BMI: body weight in kg/height in m²), waist/hip ratio, fasting and 2-hour postprandial blood glucose, current cigarette smoking, total serum cholesterol, high density lipoprotein (HDL) cholesterol, triglycerides, and low density lipoprotein (LDL) cholesterol.