Hypertension and chronic kidney disease in Turkey

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Worldwide, both hypertension and chronic kidney disease are major public health problems, due to their epidemic proportions and their association with high cardiovascular mortality. In 2003, the first Prevalence, awareness, treatment, and control of hypertension in Turkey (the PatenT) study was conducted in a nationally representative population ($n = 4910$) by the Turkish Society of Hypertension and Renal Diseases, and showed that overall age- and sex-adjusted prevalence of hypertension in Turkey was 31.8%. The PatenT study also reported that overall awareness (40.7%), treatment (31.1%), and control rates (8.1%) of hypertension were strikingly low. Only 20.7% of the patients who were aware of their hypertension and receiving treatment had their blood pressure controlled to $<140/90$ mm Hg. In the Chronic Renal Disease in Turkey (CREDIT) study ($n = 10,748$), the overall prevalence of chronic kidney (including all stages) disease was 15.7% and increased with advancing age. In the same population, the prevalence of hypertension, diabetes mellitus, dyslipidemia, obesity, and metabolic syndrome were reported as 32.7%, 12.7%, 76.3%, 20.1%, and 31.3%, respectively. The prevalence and awareness of hypertension in CREDIT population was 32.7% and 48.6%, respectively. According to the data obtained from national surveys, the prevalence of hypertension and chronic kidney disease in Turkey is alarmingly high. To improve prevention, early diagnosis, and treatment of these major public health problems, appropriate health strategies should be implemented by the government, together with medical societies, non-governmental organizations, industry, health-care providers, and academia.

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Worldwide, both hypertension and chronic kidney disease are major public health problems, due to their epidemic proportions and their association with high cardiovascular mortality. World Health Organization has drawn attention to the fact that hypertension and other chronic diseases have become important health problems in developing countries.[1] World Bank (2010) defines countries with gross national income per capita of US$12,195 or less as developing countries. Turkey is a developing Euroasian country—with US$10,410 of gross national income per capita—situated in the Eastern Mediterranean region, straddling the Middle East and the Balkan Peninsula of Europe. According to the *Results of Address-Based Population Registration System*, Turkey has a population of $\approx$76 million, with a characteristic dominance of young age (50% of population is under the age of 30 years).[2] Hypertension remains a global health problem affecting more than 25% of the world's population and the most important preventable risk factor for stroke, cardiovascular, and renal disease. Most of the population ($>80\%$) lives in developing countries, where most of the worldwide burden of hypertension occurs. It is estimated that almost 75% of people with hypertension will be living in the developing countries by 2025.[3]

MAGNITUDE OF HYPERTENSION AND CHRONIC KIDNEY DISEASE IN TURKEY

Hypertension and its cardiac, cerebrovascular, and renal complications are the most important causes of morbidity and mortality, and poor hypertension control is an important factor in the rising epidemic of cardiovascular disease in the developing countries. As in the rest of the world, cardiovascular disease is the leading cause of death in Turkey.[4] However, little was known about the distribution of cardiovascular risk factors before 2003 in Turkey, and reliable information was urgently needed for the development of national health policies on chronic diseases, such as hypertension and chronic kidney disease.

In 2003, the first Prevalence, awareness, treatment, and control of hypertension in Turkey (The PatenT) study was conducted in a nationally representative population ($n = 4910$) by the Turkish Society of Hypertension and Renal Diseases, and showed that overall age- and sex-adjusted prevalence of hypertension in Turkey was 31.8%.[5] The PatenT study also reported that overall awareness (40.7%), treatment (31.1%), and control rates (8.1%) of hypertension

were strikingly low. Only 20.7% of the patients who were aware of their hypertension and receiving treatment had their blood pressure controlled to $<140/90$ mm Hg. These findings are consistent with the other regional surveys reporting the prevalence of hypertension between 24.2 and 44% in Turkey.[6–11] After 4 years of follow-up, the Hypertension incidence in Turkey (HinT) study ($n=3768$), an epidemiological cohort surveyed in the same population as the PatenT study, demonstrated that the overall 4-year incidence of hypertension was 21.4% in Turkey. In multivariate analysis, age, obesity, alcohol consumption, and living in rural areas were found to be significant predictors of hypertension.[12]

The most important finding from the PatenT study was the alarmingly high percentage of people (32.2%) who had never had their blood pressure measured.[5] The non-measurement rate is $<2\%$ in developed countries.[13] The Turkish Society of Hypertension and Renal Diseases repeated this national survey (the PatenT 2 study) in 2012 (unpublished data). When we compared the recent prevalence data with the PatenT study (2003), the prevalence of hypertension may have reached a plateau (30.3%) in our country. According to the results of PatenT 2 study, 54.7% of hypertensive patients were aware of their diagnosis in 2012 compared with 40.7% in 2003. Hypertension treatment rate increased from 31.1% in 2003 to 47.4% in 2012, and control rate in hypertensives increased from 8.1% in 2003 to 28.7% in 2012. The rate of hypertension control in treated patients improved significantly between 2003 (20.7%) and 2012 (53.9%).

Prevalence of hypertension among adults varies widely but is consistently highly prevalent (23–52%) among middle-income countries.[14] In a recent review by Ibrahim and Damasceno,[15] the prevalence of hypertension in developing countries with national surveys has been reported between 16 and 36.9%. Pereira *et al.*[16] reported that there were no significant differences in mean prevalence of hypertension between developed and developing countries, apart from a higher prevalence in men in developed nations. Compared with other national surveys in the developing and developed countries carried out in adults since the year 2000, the rates of prevalence, awareness, treatment, and control of hypertension in Turkey are similar to those found in most other developing countries in the Arab world[17,18] and Southern Europe,[19–21] but lower than the rates in developed countries, such as the United States of America,[22] Canada,[23] England,[24] and Denmark[25]. For example, the awareness of hypertension was around 80% in the United States of America, 82.5% in Canada, 63.5% in England, and 69.9% in Denmark with control rates of 64.4%, 79%, 52%, and 73.6%, respectively.

Although the PatenT 2 study demonstrated improving rates of awareness (54.7%), treatment (47.5%), and control (28.7%) of hypertension in the past 10 years in Turkey, these findings still highlight the need for a specific national program to improve the detection and control of hypertension in Turkey. This national initiative should develop programs, guidelines, and policies to facilitate hypertension prevention, detection, awareness, and treatment. As the blood pressure of nearly one-third of the Turkish adult population (age >18 years) has never been measured, this very high 'non-measurement' rate needs to be decreased to raise the awareness of hypertension. In addition, in order to reduce the average blood pressure, special preventive efforts should be planned on lifestyle modifications.

Another factor leading to high prevalence and incidence of hypertension in Turkey is high salt consumption. In 2007, Salt Intake in Turkish Population (SALTURK) study demonstrated that daily urinary sodium excretion was 308.3 ± 143.1 mEq per day (18.01 g per day salt intake) in a nationally representative sample of the adult Turkish population ($n=1970$, age >18 years).[26] Salt intake was higher in obese participants, rural residents, people with lower education levels, and the elderly, and it was positively correlated with systolic and diastolic blood pressures. Bread is an important component of meals in our country (400 g per day per person) and an average bread consumption results in 7.28 g per day of salt intake[27] that exceeds the current recommended amount for both the general population and people with hypertension. In a subgroup of PatenT 2 study population ($n=657$), dietary recalls and 24-h urinary Na values were obtained in 2012 as well (unpublished data). It has been found that daily sodium excretion decreased to 252.97 ± 92.2 mEq per day (14.82 ± 5.42 g per day salt intake). In this population, most (55.5%) dietary sodium came from salt added in home cooking (42.62%), preserved or processed foods (10.75%), and naturally found in the foods (2.15%). The rest of the dietary sodium came from bread (31.9%) and table salt (12.6%) (unpublished data). Dietary habits of our population including consumption of traditional salty foods, such as white cheese, olives, pickles, home-made pasta, and fermented cereal foods, along with high consumption of bread (400 g per day per person),[27] may account for the high salt intake in Turkey. Campaigns in sodium restriction along with efforts to increase public awareness of the adverse health effects of salt consumption will therefore be extremely important in preventing and controlling hypertension. Regulations for the food industry to reduce salt intake in populations should be enforced as well. As an initial effort, the Turkish Ministry of Food, Agriculture, and Livestock has taken a significant step toward setting out a timetable for reducing salt content of bread by a regulation issued in July 2013.

Defined by the recent classifications, chronic kidney disease has also become a significant public health problem. Worldwide, the prevalence of chronic kidney disease is estimated to be 8–16%.[28] In the CREDIT study ($n=10{,}748$), the prevalence of chronic kidney disease in Turkey, and the relationship between chronic kidney disease and other cardiovascular risk factors were evaluated.[29] In this study, as markers for chronic kidney disease, serum creatinine levels, estimated glomerular filtration rate, and spot urine microalbuminuria were determined. Modification of diet in renal

disease formula was used to calculate the estimated glomerular filtration rate.[30] Mean age of the study population was 40 ± 16 years. Using estimated glomerular filtration rate of less than 60 ml/min/1.73 m^2 as a definition for chronic kidney disease, the prevalence was 5.2%. The prevalence rates for chronic kidney disease stages 1 and 2 were 5.4% and 5.2%, respectively. Microalbuminuria and macroalbuminuria were observed in 10.2% and 2% of the subjects, respectively.[29] The overall prevalence of chronic kidney (including all stages) disease was 15.7% and increased with advancing age. In the CREDIT study, the causes of kidney disease were not determined. Our prevalence estimated for any chronic kidney disease was higher than those other estimates from developed countries such as the United States of America (13%),[31] Canada (13.4%),[32] and Europe (4.7–8.1%).[33] In the developing world, in a representative sample of Chinese adults (age $\geqslant$18 years), the prevalence of chronic kidney disease was 10.8%, and only 12.5% of the patients were aware of their condition.[34] Despite well-organized efforts to increase awareness through dissemination of clinical practice guidelines among practitioners, awareness of chronic kidney disease (around 5.3–12.5%) even in patients with stage 3–5 chronic kidney disease (12%) remains unacceptably low in both developed and developing countries.[32,34] Unfortunately, we do not have the data on awareness of chronic kidney disease among patients and health-care providers in Turkey.

In the CREDIT study population, prevalence of hypertension, diabetes mellitus, dyslipidemia, obesity, and metabolic syndrome, which are the important risk factors for chronic kidney disease, were reported as 32.7%, 12.7%, 76.3%, 20.1%, and 31.3%, respectively.[29] The awareness of hypertension in the CREDIT population was 48.6%.[35] Among hypertensives, treatment and control rate of hypertension was 31.5% and 16.4%, respectively.[35] In patients with chronic kidney disease (15.7% of the CREDIT population), prevalence of hypertension was 56.3%, and awareness (61.9%), treatment (44.2%), and control (16.3%) rates were suboptimal as well.[35] Importantly, the prevalence of hypertension is closely associated with the level of kidney function, and the proportion of patients with hypertension increases with reduced levels of kidney function.[35] Having one of the highest prevalence rates of chronic kidney disease and its risk factors, levels of awareness and knowledge among patients and health-care providers must be improved to promote the early diagnosis of chronic kidney disease through a national program in Turkey. In 2013 the first workshop was launched by the Ministry of Health to establish a national prevention program in chronic kidney disease in 2013 (http://www.saglik.gov.tr), but more needs to be done.

Although the recent data around the world indicate that the rate of incident end-stage renal disease has stabilized in Westernized countries,[36] end-stage renal disease rates appear to be growing in many developing countries, including Turkey.[37,38] Before the year 2000, chronic glomerulonephritis was reported as the leading cause of end-stage renal disease in Turkey, which has decreased in the past 10 years with the leading role taken over by diabetes and hypertension.[38,39] Preventive strategies directed toward earlier diagnosis of chronic kidney disease and its risk factors are likely to offer the greatest promise for reducing the incidence of end-stage renal disease and its associated mortality. This is especially worth noting because of the relatively young age of Turkey's adult population.

In conclusion, hypertension and chronic kidney diseases have become the major public health problems in Turkey today, reaching epidemic proportions. A two-pronged strategy is needed to tackle this major health problem. First, a vigorous education and public awareness campaign to encourage healthy lifestyle emphasizing restricting dietary salt intake, preventing weight gain, and smoking cessation needs to be launched. There is a great opportunity to achieve big gains by this approach in a country like Turkey with a young population. Lifestyle modification in young age is likely to reduce the rates of hypertension, obesity, metabolic syndrome, and have a favorable impact on the rate of chronic kidney disease. Second, health-care providers need to be educated and empowered to engage in early screening of kidney disease and initiate measures to help slow progression of kidney disease in individuals in early stages of chronic kidney disease. Appropriate screening and management strategies to reduce burden and cost related to chronic kidney disease and hypertension need to be included in national programs. Because of a shortage of nephrologists in Turkey, general practitioners, internists, and trained nurses must be involved in caring for patients with chronic kidney disease and hypertension. The government, together with medical societies, non-governmental organizations, industry, health-care providers, and academia, should organize and promote preventive programs aiming to improve public awareness and educate health professionals. Regulations should be put in place to compel the food industry to reduce salt intake in populations.

DISCLOSURE

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