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High blood pressure: the ambushed raider. Introductory remarks

La hipertensión: el asaltante emboscado. Observaciones introductorias

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Everything changed for humanity when nomad tribal life, based on hunting and gathering activities, was abandoned and food was acquired through agriculture and livestock once human communities settled in villages and cities and gave rise to civilized life. A dialectical contradiction arose when our genetic inheritance and lifestyle imposed by civilization clashed abruptly. From this phenomenon came out the so-called «diseases of civilization»,[1] infrequent ailments during the Stone Age, that in modern times are the most crucial factors of death and disability around the world.[2]

Systemic high blood pressure (HBP, also known with the somehow physically inappropriate name of «systemic arterial hypertension» or simply «hypertension», terms that despite any critical view are deeply rooted in the medical and popular imaginary and language) is doubtlessly a very clear example of these maladies, which are the result of the interaction between the expression of certain genes and environment. HBP is beyond any doubt the most frequent cardiovascular risk factor.[2] Frequently associated with other major risk factors like dyslipidemia, tobacco consumption and diabetes, HBP is behind the appearance of acute and chronic vascular syndromes (in the brain, coronary bed, and peripheral systemic arteries), left ventricular hypertrophy, systolic and diastolic ventricular dysfunction, overt heart failure, valvular heart disease, kidney damage, arrythmias (as atrial fibrillation), some eye diseases, and vascular dementia, among others.[2,3]

This text, focused on every important aspect of HBP, has been written by a pleiad of talented and diligent physicians for whom HBP is one of the most relevant cardiovascular problems, given its clinical, epidemiological, and socioeconomic importance. Without putting aside scientific rigor and depth, the chapters of this text were written to assist the practice of those medical colleagues who, day after day, conduct the task of discovering and treating HBP, on the front line of medical care.

Frequently, not only in Mexico but worldwide, remarkable HBP pathophysiological, structural, clinical, and therapeutic facts are ignored or downplayed by many health care providers. The result has been a failure in early diagnosis and inadequate treatment and control rates, with ominous clinical consequences. We have repeatedly said that the path of prevention necessarily passes through awareness and information. GRETHA is aware that only when the joint efforts of our group and sister medical societies and academies, the majority of clinical practitioners, the state health and social security institutions, the pharmaceutical and food industries, the citizen organizations, and the entire civil society be able to generate and consolidate a powerful alliance and unite their efforts in just a bundle of wills and actions, the flagellum of HBP and other cardiovascular risk factors will be contained, diminishing their serious complications.

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What are the reasons for considering HBP one of the most important disease factors? To begin with, HBP is remarkably prevalent in modern communities.[4] Secondly, as it was stated above, HBP is armed with a set of mechanisms of vascular damage,[5] leading to lethal or incapacitating parenchymal lesions in vital organs. HBP prevalence increases with age, or it can even appear *de novo*, in elderly subjects who were not hypertensive during most of their adulthood. In Mexico, one out of two elders[6] is hypertensive, and a vast proportion of them show the modality of isolated or predominant systolic hypertension. It has been solidly established that as people of modern societies age fatally occur some structural changes in the elastic arteries (atherosclerosis, calcification, and extracellular matrix dystrophy), which are responsible of a faulty arterial distensibility.[7-9] These changes lead to the generation of early reflection waves that augment the peak of systolic pressure, rising also differential or pulse pressure. The increase of cyclic hemodynamic stress is responsible for left ventricular and vascular hypertrophy, the fracture of vulnerable atherosclerotic plaques, and the rupture of the Charcot-Bouchard brain microaneurysms. Age itself is not the cause of the increase of BP in elderly subjects. Different studies on tribal people that still live under the norms of hunters o fishers-gatherers communities show that HBP seldom occur in them, including the elders.[10] On the contrary, it seems that is the unhealthy lifestyle of civilized societies the responsible of the occurrence of this and other «civilization diseases».

Paradoxically, while blood pressure (BP) level and HBP prevalence have diminished in recent decades in most of the western and Asia Pacific highly industrialized nations, both parameters have risen in East, South and Southeast Asia, Oceania, sub-Saharan Africa, and Central and Eastern Europe countries.[4,11] In general, prevalence reduction has been moderate in most of industrialized nations, but in a great proportion of low and middle-income countries it has increased or remained unchanged.[12] Conflicting conclusions about the BP levels and HBP prevalence in the Caribbean and Latin America nations, including Mexico, arise from the paucity of reliable reports, or uncertainty of data collected from epidemiological surveys.[13] For example, in our country, several governmental probabilistic national surveys show striking differences of HBP prevalence in Mexicans aged 20 years or more, since the beginning of this century. The ENSA 2000 (National Health Survey in the year 2000),[14] as the 2006[15] and 2012[16] versions of the ENSANUTs (National Health and Nutrition Survey) estimated a very consistent HBP prevalence of 30.7%, 30.8%, and 30.0%, respectively. But the so-called ENSANUT MC (National Health and Nutrition Survey «Halfway»)[17] carried out in the middle of the previous federal administration found (with a different measure methodology), a prevalence of just 25.5%. ENSANUT 2018-2019[18] only reported the percentage of respondents who knew they had HBP (about 18.4%), datum that alone lacks certainty and credibility. Finally, the so-called ENSANUT 2018 100K,[19] in population who live in towns under 100,000 inhabitants, found, using the cutoff values of 140/90 mmHg (ciphers accepted by NOM-030-SSA2-2009,[20] the national norm on hypertension, of mandatory observance in Mexico) a total prevalence of 31.6%. But when they used the newer cutoffs of 130/80 mmHg, proposed by the American Heart Association/American College of Cardiology and other associations[21] (that have not been accepted by cardiologic and hypertension societies of everywhere,[22,23] including, some medical organizations of the United States, stating certain methodological shortcomings and conflict of interest[24]), a stratospheric prevalence rose to 49.2%. The worst of all is that the same group of epidemiologists, using identical data from ENSANUT 2006, produced documents showing different results. The official version of that survey, inform a combined gender prevalence of 30.0%, while in a paper published in 2010, the reported prevalence was estimated in 43.2%.[25]

According with the best designed and executed ENSANUTs, some non-governmental, academic studies, with huge but non-probabilistic samples have shown that the prevalence of HBP in adult Mexicans goes from 25 to 35%, which has not changed in the last 20 years.[6,26,27] As other cardiovascular risk

factors, HBP has a mosaic-type geographical distribution along our territory, with a northern-southern gradient, according to which, some northern federative states have the highest prevalence rates of HBP, in contrast with some of the southernmost states that show the lowest values. These differences probably signal the effect on BP of the westernized lifestyle adopted by the urbanized acculturated population living in the more developed and industrialized federative states *(Figure 1)*.[15]

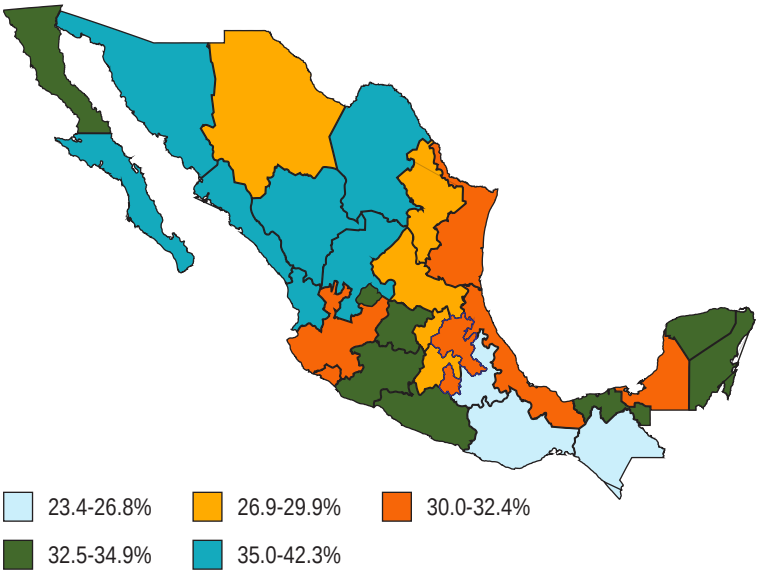

Figure 1: Geographical distribution of the prevalence of HBP in Mexico. Data from ENSANUT 2006.[15]

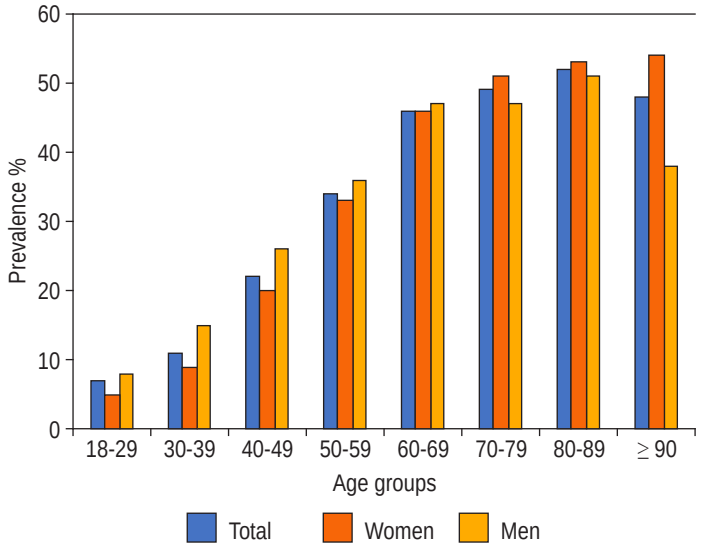

Figure 2: Prevalence of HBP in Mexico, according with age and gender. Modified of Meaney E et al.[6]

As it is well known, prevalence of HBP increases with age. Data from the FRIMEX *(Figure 2)* study[6] show that while prevalence is very low at young ages, it increases every decade, from 8-10% in the youngest, to 34% in the age group of 50-59 years, to a maximum of 52% in octogenarians. In nonagenarians, prevalence falls to less than 50%, maybe because, hypertensive men, are already dead. In those orders of ideas, prevalence is greater in men than in women up to the age of 59 years. Both genders have the same prevalence in the 60-69 years group, but from the age of 70 years women are a little more hypertensive than men, probably because hypertensive men die more than women.

In Mexico, overweight or obesity (O/O) affects more than 70% of our adult population.[26,28] Therefore, HBP is associated in a vast proportion of patients to O/O and more than 50% of them fill the criteria of the so-called metabolic syndrome,[25] whose best denomination would be «dysmetabolic overweight or obesity».

Consequently, in a great proportion of our overweighed or obese hypertensive patients underlies the insulin resistance syndrome, with all its conglomerated damaging factors, as hyperinsulinism, inflammation, and atherogenic dyslipidemia (the association of hypertriglyceridemia, hypoalphalipoproteinemia [low HDL cholesterol], and an increase of small and dense LDL particles).[29] There is evidence signaling that this type of dyslipidemia together with HBP, are the most important causes of myocardial infarction in our society.[30]

The relationship between HBP and insulin resistance in a wide proportion of Mexican hypertensives requires a particular management of the BP disorder in our population. Those antihypertensive drugs that increase insulin resistance, such as high-dose of thiazide diuretics or poorly selective β-blockers, are not recommended as first-line drugs. Contrariwise, as HBP in patients with O/O is commonly associated with an overexpression of the renin-

Table 1: Awareness, treatment, and control in Mexican hypertensives.

Study	Prevalence %	Awareness %	Treated %	Control in treated %	Total control %
ENSA 2000	30.1	39	51	21	5
Lindavista	32.0	68	84	38	20
FRIMEX	26.5	49	74	36	13

Data from references 35 (recalculated), 6 and 26.

angiotensin-aldosterone system (RAAS) and an overactivity of the noradrenergic system, the modulators of the axis (ACE inhibitors and antagonists of the At1 receptors) are highly recommended, as well as third-generation vasodilator β-blockers. Even most important is the recognition that a main mechanism of HBP in obesity is not insulin resistance but the renal compression by extra and intra renal fat that secondarily activates the RAAS.[31] For that reason, the treatment of obesity is mandatory in this kind of patients.

A marker of the quality of medical knowledge and care, as well as the proof of the success or not of preventive public policies in a particular community or nation, is the so-called «law of the halves», coined in the 70s of the past century,[32] which describes the fact that half of the hypertensive patients are not aware that suffers the disease, while half of those who are aware indeed are not treated, and finally, that half of those who are treated are not well-controlled. The consequences are a high rate of morbidity and mortality of HBP. In many countries, the improvement of medical care and social awareness have changed this old *dixit*, to the point that a new paradigm has come out and it is expressed in the so-called «the law of the three-quarters»,[33] according to which, 75% of hypertensive patients should be aware of their ailment, 75% of them would be treated, and other 75% would be controlled. Unfortunately, these goals are still far from being achieved. As HBP is a «silent» (asymptomatic) disease, healthcare providers must diagnose it proactively by the simple rutinary measurement of BP, in every medical examination. Frequent mass screening programs conducted in public spaces, building offices, and factories, also would be helpful, along with sustained campaigns of medical and social education. The low rates of treatment and good control are more complex phenomena, whose explanation is beyond the scope of this introduction. In what situation is Mexico regarding the law of halves? Again, ENSANUTs data are absent or misleading. *Table 1* concentrate estimations done on the rate of awareness, treatment, and control of HBP in several studies and surveys.

The data from ENSANUT 2012 and ENSANUT 2019 K100 have been left out for having clear inconsistencies between the text and some of the tables, and the latter also because it uses estimated data with the new AHA/ACC classification, which contravenes the current official Mexican hypertension norm, of obligatory use in the country.[34,35]

The most important marker in the «law of the halves» estimation is the percentage of the total mass of hypertensive subjects that have controlled BP (< 140/90 mmHg). The uncontrolled segment encompasses those patients unaware of their disease, plus those who knowing it are not treated, and those who despite the treatment are not controlled. The data exposed in *Table 1* point to the incontrovertible fact that in Mexico HBP is not well diagnosed or treated, for countless reasons, the analysis of which is beyond the limits of this text. Even in the Lindavista study cohort, composed by middle-class urban, educated, inhabitants of Mexico City, covered by a somehow generous social security system, just one out of five hypertensive patients

had controlled BP ciphers. The country has not yet reached even the very modest levels originally described by the «law of halves». The modification of these unacceptable low rates of awareness, treatment, and control is a task that the Mexican State, but also the medical community, owe to our people.

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