# Hypertension *the Silent Killer*

## Part II

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# ارتفاع ضغط الدم .... "القاتل الصامت"

يعتبر مرض ارتفاع ضغط الدم من أهم الأمراض الخطيرة التي تترك تأثيرات سلبية على أعضاء عديدة في جسم الإنسان. وبالرغم من أن علاج المرض والتحكم فيه يقلل من احتمالات المضاعفات الجسدية إلا أن الوقاية تعتبر أفضل وسيلة لحماية المريض من المضاعفات. حيث أن المضاعفات تعتبر مكلفة جداً للمريض والمجتمع والدولة لأنها قد تؤدي إلى مرحلة طويلة من الإعاقة الجسدية.

لقد أوضحت الدراسات بأنه عندما يتم تخفيض ضغط الدم بنسبة 5 إلى 6 مليمترات من الزئبق فإن ذلك يؤدي إلى انخفاض نسبة الوفاة الناتجة من المضاعفات الدماغية بنسبة 35 إلى 40% ومن الموت الناتج من المضاعفات القلبية بنسبة 23%.

لذا لابد من بذل المزيد من الجهود للوقاية من مرض ارتفاع ضغط الدم وذلك عن طريق توعية المجتمع والتحكم الجيد في المرض.

هذه الدراسة عبارة عن مراجعة للأدبيات العلمية الخاصة بمدى انتشار المرض وسبل الوقاية من المضاعفات الخطيرة.

**Key words:**

- "Hypertension, Economic impact, Prevention, Life style

# **Hypertension** ***the Silent Killer***

**Abstract:**
Hypertension is one of the non-communicable diseases that are very common world wide, especially in the developing countries. Such diseases form the biggest challenge to the public health services in the Eastern Mediterranean Region, as they constitute 47% of the whole burden of disease, a figure expected to rise to 60% by the year 2020. The incidence of hypertension in the Eastern Mediterranean Region countries can reach up to 25% in the adult population, while its incidence in the American continent ranges from 14% to 40% among those 35 to 64. The prevalence of hypertension and obesity in this region, especially the Gulf Cooperation Council countries, is increasing tremendously.

Although it is well known that with proper control of hypertension the risk of complications is reduced, preventive measures should be taken before any sign of hypertension develops. The complications of hypertension are very costly to society, families, and individuals because they lead to long periods of disability, premature mortality, and expensive diagnosis and care. Studies have shown that lowering blood pressure by even 5-6 millimeters of mercury can reduce mortality from cerebrovascular disease by as much as 35%-40%, from cardiovascular causes by 23% and from ischemic heart disease, by 15%-20%.

Economically, the non-communicable diseases also put a great burden on countries' assigned health budgets and policies, especially in the poor ones.

In conclusion, greater efforts should be made for prevention of hypertension by community awareness and effective blood pressure reduction. However, it has to be highlighted that the risk relationship between blood pressure and cardiovascular diseases is continuous and progressive, and studies have shown that complications may occur even in people who are labeled as normotensives. Nonetheless, this fact should not deter policy makers from implementing strategic plans to overcome the problem of hypertension.

This review highlights the extent of the problem, its definition, the major risk factors and complications and effective methods of controlling and preventing hypertension.

## Economic Impact of hypertension:

Management of hypertension and efforts to reduce its prevalence will need not only national policies and expertise but sufficient budgetary expenditure to implement such policies. Overcoming this problem will not happen without having effects on the socioeconomic conditions of the society and individuals which will be more obvious in the developing and poor countries. Bakris, 2007, estimated that the total cost that is related to hypertension in the USA may reach $49.3 billion (27).

Dr Hussein Gezairy, EM regional director for the WHO, in explaining the economical impact of hypertension stated *"since hypertension is associated with cardiovascular disease and diabetes, management and control is potentially costly".*

The EMR countries are facing challenges of burden of illnesses not only due to noncommunicable diseases but also the communicable diseases. However, the noncommunicable diseases are dominating the scene of health problems in these countries. The economic impact of noncommunicable diseases does not only affect the costs to health services, but results in indirect costs such as loss of productivity. These may exceed the direct costs (33), since it is a fact that a major part of the cost of health care falls on patients and their families. Although the noncommunicable diseases could be prevented, without national strategic action, deaths occurring from them are expected to increase by 17% from 2005 to 2015 (7). The EMR countries are facing more constraints as well due to financial limitations which would increase the health burden increased morbidity, disabilities and mortality due to NCDs. The increased cost of prevention and expensive diagnosis and interventions in different population groups limits any health prevention strategies because usually such strategies require changes in behavior and attitude and modification of social factors that cost money (7). The poor are usually more disadvantaged because they are more prone to get noncommunicable diseases and have difficulty in gaining access to health care. In addition they do not have enough financial resources for obtaining the necessary drugs in the required dosage. For example anti-hypertensive medications can cost up to US$ 100 per month, making them inaccessible for the poor in some countries where the average monthly income may be only $50 to $200.

The World Health Organization reported that the prevalence of hypertension is some countries is three to six times higher among the uneducated than among those with higher education (34).
A study in Saudi Arabia showed that in Alkhobar the total direct cost of hypertension care for patients registered in primary health care represented only 6.32% of the estimated cost of treating the expected number of patients. Such findings indicate that most hypertensive patients use other health facilities (35). Managing hypertension is not only costly in the developing countries but it takes a major chunk of the health budget of the developed ones as well. In the United States, the total cost of cardiovascular diseases is on the order of 2% of the gross domestic product while in Canada 21% of all health care costs are attributable to cardiovascular disease, for a total of US$12 billion annually. These costs include treatment, consultations, and indirect costs, such as loss of income due to disability and death (9).

## Prevention of hypertension:

*Primary prevention is the most cost-effective approach to containing the emerging hypertension epidemic.* Hussein A. Gezairy, WHO Regional Director for the EMR

Since complications occurring during the course of hypertensive illnesses can be prevented, primary prevention by early diagnosis and management should be the main goal and objective of any intervention program. Primary prevention is aimed to target on lifestyle modifications through engaging in physical activity, adopting a proper diet, and quitting smoking and drinking alcohol. Patients with hypertension should be encouraged to adopt these modifications in life style which may lead to reduction in the amount and dosage of the antihypertensive medications needed. In developing countries which are at an epidemiological transition stage, prevention of hypertension should also be the goal because of the cost associated with diagnosing and treating hypertension and managing its complications.

Prevention and control of NCDs require long-term non-pharmacological and pharmacological interventions. Since studies have shown that the incidence of hypertension could be reduced by 20% to 50% if primary prevention measures, which include weight loss and sodium restriction, were implemented (36,37), many hypertensive persons can improve their condition through diet and exercise alone. It is well-known hypertension is an important risk factor for ischemic heart disease and cerebrovascular disease (21), both of which can be prevented by preventing and controlling primary risk factors.

Altering some behavioral norms in a society and promoting common community health attitudes will lead to the spread of information about healthy practices across the whole population that will be beneficial for avoidance of complications of high blood pressure.

## Barriers to prevention:

Prevention of NCD in general and hypertension in particular is not an easy task and has many difficulties and constraints. The most important barriers are the followings:

- Cultural norms which in many cases are very difficult to change.
- Lack of responsibility of health care practitioners for giving enough health education for the prevention of hypertension.
- Lack of reimbursement for health education services.
- Lack of access to places to engage in physical activity. Poor countries have no resources to develop such facilities.
- Lack of exercise programs in schools.
- Changes in eating habits all over the world and particularly in the developing countries with more dependence on fast food.
- Lack of availability of healthy food choices in many schools, worksites and restaurants
- Large amounts of sodium added to foods either due to cultural norms or by the food industry.
- Higher costs of food products that are low in sodium and calories (16).

## Life style Modification:

The promotion and later adoption of a healthy life style in a community may not be an easy task; it requires behavioral changes and habit modifications that should take into consideration the society's cultural beliefs.
The following lifestyle modifications help greatly in the prevention and or management of hypertension:

- Performing 30 min to 60 min of aerobic exercise four to seven days per week
- Maintaining a healthy body weight (body mass index of 18.5 kg/m2 to 24.9 kg/m2) and waist circumference (less than 102 cm for men and less than 88 cm for women); limiting alcohol consumption to no more than 14 standard drinks per week in men or nine standard drinks per week in women

- Changing the diet to reduce intake of saturated fat and cholesterol and increase fruits, vegetables
- Restricting salt intake
- Adopting stress management programs (38).

Table 1 shows how changes of life style could reduce blood pressure.

| Modification | Recommendation | Approximate systolic BP reduction |
|---|---|---|
| Weight reduction | Maintenance of normal body weight | 5–20 mmHg/10 kg |
| healthy eating plan | Consumption a diet rich in vegetables, fruits, and low-fat dairy products with a reduced content of saturated and total fat | 8–14 mm Hg |
| Dietary sodium | Reduction dietary sodium intake to no more than 2.4 g sodium | 2–8 mmHg |
| Physical activity | Engagement in regular aerobic physical activity at least 30 minutes daily, most days of the week | 4–9mmHg |

**Table 1. Recommended lifestyle modifications to reduce BP (adopted from EMR0 Technical Publications Series (16)**

## Body weight:

Obesity is a major problem worldwide especially in the developing countries. Among adults its prevalence ranges from 30% to 60% (10). There is a direct relation between obesity and increased prevalence of hypertension (39). Therefore, weight reduction would help in reducing blood pressure in most hypertensive patients. Research indicates that for every kilogram of weight loss the blood pressure is lowered by 1.6/1.1 mmHg (16).

## Alcohol intake:

There is a linear relationship between alcohol consumption, blood pressure levels and prevalence of hypertension in populations (16). Regular intake of alcohol raises blood pressure in both men and women. Studies have shown that reducing alcohol consumption in hypertensive patients and even in people with normal blood pressure helps in decreasing systolic and diastolic BP (20).

## Physical activity:

Inactive people with a normal BP have a 20-50% higher risk of developing hypertension (40). It is reported that regular exercise lowers Bp by 5-10 mmHg (41) with a mean reduction in systolic Bp by 6.4 mmHg and a mean reduction in diastolic

Bp by 6.9 mmHg. Randomized controlled studies have shown that by doing lower extremity aerobic exercise, patients can reduce the systolic and diastolic BP is reduced by a 3 mmHg (42).

**Sodium moderation:**

Another important factor that contributes to increased blood pressure is the dietary sodium intake (43,44). A study of black and elderly hypertensive individuals with a sensitivity to salt reduction, showed that people BP could be reduced by 4.9/2.6 during a one to two month period of daily sodium intake reduction of 56 mmol to 105 mmol (45). Another study reported that reducing dietary sodium intake to not more than 100 mEq/L (2.4 g sodium or 6 g sodium chloride) will help in the reduction of blood pressure by an average of 4–6 mmHg (17). Therefore, an average daily intake below 6 g/d of sodium chloride should be the aim to avoid hypertension (44).

**Tobacco:**

People with hypertension who smoke have a two to threefold greater incidence of stroke and coronary heart disease than hypertensives with comparable blood pressures who do not smoke. Quitting smoking rapidly reduces this risk (46).

**Lipids:**

High serum cholesterol, high low-density lipoprotein cholesterol, and low high-density lipoprotein cholesterol levels increase the risk of atherosclerotic complications of hypertensive patients.

**Diabetes:**

Most of the measures taken to change lifestyle such as regular exercise, moderate weight reduction, diet that are low in fat, high in carbohydrates and fiber could improve insulin sensitivity and may help in reducing the contribution of insulin resistance to increased blood pressure.

**Eating habits:**

There are direct relationships between type of food consumed and quantity and the occurrence of obesity and hypertension. Adopting healthy life style eating habits could help in controlling blood pressure in hypertensives. Fruits and vegetables are very beneficial in prevention of various illnesses, among which is hypertension.

**Cocoa ingestion:**

Meta-analysis studies suggest that blood pressure responds favorably to cocoa. It is reported that the phenols in cocoa are rich in Procyanidins, which are active in reducing BP. Taubert et al (2007), studied the effects of consuming cocoa products, black and green tea for at least 7 days on BP. It was found that those participants who drank 100g/day of chocolate experienced a drop in their systolic and diastolic BP, while no differences were seen in the BP of those who consumed tea in the range of 4 to 6 cups (Table 2). The study concluded by stating that 'although the magnitude of the hypotensive effects of cocoa is clinically noteworthy; it is in the range that is usually achieved with monotherapy of β-blockers or angiotensin-converting enzyme inhibitors." (29).

| Blood Pressure | Pooled Change* (mm Hg) | *P* |
|---|---|---|
| Cocoa | | |
| Systolic | -4.7 | .002 |
| Diastolic | -2.8 | .006 |
| Tea | | |
| Systolic | 0.4 | .63 |
| Diastolic | -0.6 | .38 |

Table 2. Change in Blood Pressure between those who drank tea and those who drank coca (obtained from Taubert et al 2007 (31).

## Diagnosis and assessment:

**Blood pressure measurement**

Measuring BP needs special techniques and skills in order to avoid bias in readings. For an accurate measurement, factors which are either related to the patient, the physician or the environment must be considered as all may induce false readings if not accommodated. Therefore, it is advised that before measuring BP the following conditions should be met" (47).

- The patient should be seated for several minutes in a quiet room.
- Arm muscles should be relaxed.
- The cubital fossa should be at heart level.
- Tight sleeves should be avoided.
- The BP reading should be repeated if BP is greater than 140/90, and both values should be recorded.

- On the first visit the BP should be measured on both arms.
- A suitable size BP cuff should be used as inadequate cuff size may result in overestimation of the true BP
- Mercury sphygmomanometers should be used, as they are most reliable

It has been reported that few physicians take the above recommendations seriously and follow the standard completely, while many use various different techniques for routine BP measurement. Such practices may affect the diagnosis and ultimately the treatment of hypertension (48).

In a Canadian study (48) on a group of physicians to find out their commitments to following the standard methods in BP reading, the following was reported. :

- 96% of them supported the arm.
- 91% did measurement to 2 mmHg.
- 86% put the patient in a sitting position.
- 83% used a mercury sphygmomanometer.
- 58% waited more than or equal to 1 minute between readings.
- 57% palpated to assess systolic BP before auscultation.
- 56% checked accuracy of home BP monitor;
- 44% did bilateral measurements on initial visit.
- 41% had small cuff available.
- 38% > or = 2 readings in patients with atrial fibrillation.
- 13% had a large cuff available.
- 8% checked the accuracy of the monitor used for home visits.

One of the main factors for false BP readings is the "white-coat" effect. All efforts are to be made to avoid such effects (47). In Spain it was reported that the prevalence of white coat hypertension was 3.6% overall and 12.8% in hypertensive patients (49).

**III-History Taking**

Physicians should obtain from any patient suspected of having hypertension an adequate and complete history including social, present, past and family history. A study done in Riyadh showed that age, gender, presence of diabetes, level of medical care, blood glucose, lipid levels and drugs used for management of hypertension were sufficiently recorded. However, smoking history, body mass index and family history of ischemic heart disease were poorly recorded (50). Such lack of information would significantly affect the management of hypertension.

## IV-Clinical assessment of people with hypertension

While taking care of hypertensive patients, the physician's main objectives in clinical assessment should be to:

- confirm a persistent elevation of blood pressure
- assess the overall cardiovascular risk
- evaluate existing organ damage or concomitant disease
- search for possible causes of the hypertension

Furthermore, the possibility of secondary hypertension should be considered if it develops; in young patients; if the patient is on drugs such as oral contraceptives, liquorice, carbenoxolone, nasal drops, non-steroid anti inflammatory drugs, etc; if there are episodes of sweating, headache, anxiety (phaeochromocytoma); in patient suffering from episodes of muscle weakness and tetany (hyperaldosteronism) and in patients with a family history of renal disease (polycystic kidney) and if there is evidence of renal disease, urinary tract infection or haematuria;

## V-Laboratory investigations

The younger the patient, the higher the pressure, and the faster the development of hypertension, the more intensive are the laboratory investigations required. There are many laboratory tests are to be considered; however the ones recommended are: urine analysis, plasma creatinine and/or blood urea nitrogen, plasma potassium, random blood glucose, serum cholesterol, heamatocrit, electrocardiogram, fasting plasma triglycerides and high-density lipoprotein cholesterol, plasma uric acid, chest X-ray and echocardiography.

## Treatment

*Good management of hypertension is central to any strategy formulated to control hypertension at the community level. Randomized trials of drugs that lower and control blood pressure clearly show a reduction in mortality and morbidity.*

*Hussein A. Gezairy WHO Regional Director for the EMR*

It has been reported by the Multiple Risk Factor Intervention Trial (MRFIT) follow-up data that *"even under optimal conditions, the treatment and control of hypertension will influence no more than 70% of the blood pressure-related cardiovascular disease in the community"* (51). But this should not deter physicians from effectively managing hypertension, because good control of BP reduces complications, disabilities and mortality in people with hypertension. It has been estimated that reduction of as little as 2 mmHg in systolic blood pressure is likely to

reduce the annual mortality from stroke, coronary heart disease and all other causes by 6%, 4% and 3%, respectively (28).

However in many occasions the cost of therapy may deter physicians from prescribing or patients adhering to the therapeutic regimen. Salman *et al*, in 1999 in their study highlighted the doctors' attitudes to prescribing. They found that when they knew the cost of the drugs as many as 60% of family physicians and 87% hospital physicians would prescribe fewer more expensive ones, especially for their younger patients. They also found that family physicians preferred the less expensive drugs for their elderly patients. Results of this study clearly indicate that knowledge of the price of the drugs may affect physicians' prescription decisions (52). A study in Bahrain reported that the general pattern of antihypertensive prescription is in accordance with the guidelines of the WHO and the Joint National Committee issued in the 1990s, and usually doctors prefer conventional and monotherapy rather than trials of newer classes of drugs. (53)

**Conclusion:**

Hypertension is a serious problem that could be called "the silent killer". Its prevalence is high especially in the GCC countries. Effective efforts ought to be taken in order to prevent, discover and treat hypertension. Such efforts will collectively help in the reduction of mortality and morbidity. The greater the cumulative risk of cardiovascular events and other adverse outcomes, the greater the benefit of effective blood pressure reduction and, therefore, the greater the need for early and effective intervention. Because the risk relationship between blood pressure and cardiovascular diseases is continuous and progressive, complications may occur even within the conventionally defined normotensive range.

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