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HYPERTENSION
IN
AN
URBAN ENVIRONMENT

PLAN B

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Introduction

Hypertension (high blood pressure) is the elevation of blood pressure. It is one of the most widely occurring diseases and can attack any age or racial group. However, it is more prevalent among older people, and occurs the most among the black population. In addition, there have been numerous studies conducted to determine the relationship between blacks and hypertension; however, no one has been able to determine the specific relationship. Nevertheless, hypertension has been known to be one of the contributory factors in the deaths of several people.

Hypertension is an asymptomatic - without symptoms - disease. Therefore, an individual could have the disease and may not be aware of it. Many people often complain of headaches and dizziness; but these are not symptoms of hypertension.

It can range from mild to severe. High blood pressure can be controlled with proper medication and dieting depending upon its severity. There are certain obvious factors associated with an increase in blood pressure and some not so obvious factors of the occurrence of hypertension among certain ethnic groups or in certain geographical areas. In other words, there are several factors associated with increased blood pressure.

This paper addresses the etiology of hypertension and explains the association of the disease with certain risk factors. Also, this paper will concentrate on the geographical distribution of hypertension and screening programs designed to control the problems of hypertension in an urbanized society.

DEFINITION OF HYPERTENSION

Definition of Hypertension

Hypertension can be medically defined as persistently high arterial blood pressure. It is the substained elevation of blood pressure. Blood pressure reading consist of two measurements:

- 1) systolic (sys-tol-ic) pressure (SBP), is the force exerted by your blood against the walls of your arteries when your heart is pumping or beating.
- 2) diastolic (dia-stol-ic) pressure (DBP), is the force exerted by your arteries when your heart is refilling or at rest. Therefore, blood pressure is the force exerted by your blood against the walls of your arteries during the two major functions of the heart.¹

High blood pressure is approximately 20 mm Hg (diastolic and systolic) above the normal blood pressure reading of 120/80 (SBP/DBP). In order to determine the blood pressure, whether it is high, low or normal, a blood pressure measurement is necessary. A "sphygmomanometer" is a device used to measure blood pressure along with a stethoscope, which is an instrument used to listen to sounds in the body. As in the case of several other diseases, there are many types of hypertension. However, the two most common forms of hypertension are: 1) Essential and 2) Secondary.

- 1) Essential hypertension is a formal way of describing an amorphous group of cases with many things wrong but for which there is no apparent explanation. People with essential hypertension have a heart that pumps too much blood or a normal heart output but narrowed blood vessels.

- 2) Secondary hypertension may be attributed to several organic causes, such as hardening of the arteries, kidney diseases or obstructions to kidney flow, heart and brain.²

Hypertension can be detrimental to a person's health (life) if it is not controlled. Therefore, once an individual has been screened as hypertensives, proper medical care should be considered. It can lead to many other cardiovascular diseases and complications which may eventually become fatal if the disease is not controlled. There are several ways of controlling this disease. Basically, it depends upon the severity, in which case, controlling hypertension can range from reduction of salt intake to oral medication.

One of the major reasons why physicians encourage regular blood pressure measurement is to detect any untreated hypertensives. The increase of exercises can reduce body fat which can attribute to reducing the risk of developing hypertension. Factors which are known to be related to the development of hypertension are: obesity, sodium intake, smoking, caffeine, etc.

ETIOLOGY OF HYPERTENSION

Etiology of Hypertension

There are several risk factors contributing to the occurrence of hypertension. In fact, recent studies have also associated caffeine with hypertension.

Today, many of these associated risk factors can be life-threatening if hypertension is not controlled.

This section of the paper will focus on some of these associated risk factors of hypertension - - obesity, sodium intake, smoking, and caffeine.

Hypertension is a serious chronic disease. Many variables can lead to a person having hypertension. Also, some people with hypertension believe if they feel well, there is no need to take their medication. However, internal body organs can be damaged if medication is prolonged.

These associated risk factors, in many instances, can be controlled. Therefore, an individual with hypertension and any of the risk factors can lead a normal life.

Associated Risk Factors

Obesity

Obesity can be described as extremely overweight. It is very harmful to an individual's health and is one of the leading factors associated with the development of hypertension and other chronic disorders. Studies have shown that increased weight can increase blood pressure level. In fact, "the association with the risk of having hypertensive disease is several times as great for overweight persons as it is for persons not overweight."³

Hereditary

There have been several discussions comparing the relationship between family history and hypertension. Many studies have concluded that a positive relationship exists between the two variables. The risk of developing hypertension may be positively correlated with family history. According to Iawo Moriyamo, in his book, "Cardiovascular Diseases in the United States, (p. 142)

Those who have a family history of the disease are more likely to be hypertensive than those who do not. This have been shown repeatedly. If both parents are involved, the risks are especially great. The fact is not only potentially meaningful in terms of unsolved problems of possible mechanisms, it can also help to find hypertensive persons early in life.

Sodium Intake

Another contributory factor to hypertension is sodium intake. This is commonly known as "table salt". High sodium intake is known to influence blood pressure and body functions related to the cardiovascular system. In other words, an increase in blood pressure occurs because salt intake which may cause the body to retain water is being stored, instead of circulating. Therefore, if a person is genetically predisposed and consumes an excessive amount of salt he/she is more likely to develop hypertension.

The average American diet contains at least four grams of sodium; by omitting salty foods and added salt at the table and in cooking, this amount can be reduced to about one gram of sodium per day. There is no doubt that

rigid sodium restriction to 0.5 grams of sodium per day will reduce the blood pressure in a considerable proportion of hypertensive.⁴

Exercise/Diet

There are other forms of hypertension (i.e. mild) which requires reduction of certain factors to improve the hypertensive state. For example, exercise and dieting can reduce the risk of developing hypertension. Studies have shown that changing the diet and exercising can lower the blood pressure.

Smoking

Cigarette smoking is another risk factor associated with the development of hypertension. It is hazardous to an individual's health and can cause death and/or disability from coronary disease. "In pharmacological experiments, it was found that nicotine raises the blood pressure, through stimulation of both the vasoconstrictor center and the peripheral autonomic ganglion".⁵

Caffeine

One drug which is habitually used by millions of persons is caffeine. It is the one drug which is obtained as part of a normal diet. The average cup of coffee or tea contains 100-150 mg of caffeine.⁶

There is a positive correlation between caffeine intake and hyper-
Several studies have proven this hypothesis to be true. In fact, Robertson et al, noted in their study on the effects of caffeine in

in blood pressure, that their subjects had an elevation in both systolic and diastolic pressures minutes after the administration of caffeine.

According to Freestone et al,

Nicotine and caffeine are each known to elevate blood pressure in experimental situations. Cigarette smoking increases blood pressure by an average 10/8 mm Hg. but only for approximately 15 minutes. Caffeine (250mg) causes a rise in blood pressure of up to 14/10 mm Hg, lasting for at least 2½ hours. Likewise, the combination of smoking and caffeine had a significant increase in blood pressure.⁷

These are a few of the associated risk factors involved in the development of hypertension. However, there are some people who will never experience the development of this disease, even if they encounter any of these risk factors. In other words, everyone's body react differently to different circumstances. Therefore, one individual may develop hypertension whereas, another does not develop the disease if for instance, they are both caffeine and nicotine lovers.

Basically, there are hosts of other related factors that determine an individual's risk of developing hypertension. Nevertheless, hypertension still remains prevalent among certain groups of individuals.

STRESS

"Stress can be caused by environmental factors. It is an affective behavioral and physiological response to diversive stimuli."⁸ According to Norman M. Kaplan, M.D., in his article, "Stress, the Sympathetic Nervous System and Hypertension", (p. 30, 1978):

People exposed to repeated psychogenic stresses may develop hypertension more frequently than people who do not experience psychogenic stress:

- Air traffic controllers; who work under tremendous psychological stress, annually develop hypertension at a rate of 5.6 times greater than do non-professional pilots who were initially comparable in physical characteristics
- Men repeatedly stressed by high levels of noise have significantly higher blood pressures and more hypertension
- Nuns have lower pressures than women working outside a sheltered environment
- In at least 22 instances, populations living in small, cohesive protected societies have been found to have low blood pressures which do not rise with aging; those who abandon such an environment and migrate to more urbanized, modern, disorganized societies have high blood pressures which rise with aging. Obviously, other environmental factors may be responsible, but in some of these groups, the association between hypertension and social disorganization seems strong.

College students are more likely to develop hypertension than any other students. In a recent study of college freshmen, researchers found that they had developed hypertension by the time of their graduation. In many instances, the development of hypertension depends upon how the person works under stress.

Stress is not always a problem for some people. In fact, there are several people who can work better under stress. In other words, some people perform much better in a stressful situation. Therefore, stress may not be detrimental to their health and they may not develop hypertension. At any rate, there is a positive relationship between stress and high blood pressure. When a person experiences stress, the blood pressure tends to increase.

One of the best methods to control stress is through relaxation. This can alleviate the possibility of developing hypertension. In the Detroit Project, Harburg et al, were able to conclude a positive relationship existed between stress and hypertension.

CROWDING

Crowding

Crowding has a variety of meanings, depending upon the context. Some writers emphasize physical density or number of people per unit of space, others stress subjective feelings, while others focus on physiological responses.⁹

It can be defined as little space relative to the number of people. Also, it is the perceptual response to limited space. In his article, "The Perception of Crowding", Daniel Stokols noted that crowding is a syndrome of stress resulting from the disparity between one's supply of and demand of space. Crowding within an urban area can cause many environmental problems.

Cities themselves differ considerably in the amount of space available per person. Whereas rural areas might have ten people per square mile, even small towns have population densities in the hundreds. Suburban areas and larger cities have many hundred or several thousand per square mile. While big cities typically have population densities in the thousands, even they differ considerably.¹⁰

Several studies have been conducted in reference to the affects that crowding has on people. There have been relatively few studies that indicate an association between the two variables. One such study conducted by Freeman et al, believes that crowding does not have a negative effect on human behavior. However, the majority of the studies support the hypothesis that a relationship exist between hypertension and crowding. For example, David D'Atri explains in his article, "Crowding in Prison" (1981):

Research conducted in man suggests that crowding may be deleterious. Ecologic studies, for instance, have found positive associations between persons per acre or persons per room and mortality, psychiatric, hospitalization, crime, delinquency and illegitimacy.¹¹

Harburg et al (1970, 1973), have observed that blood pressure of certain subgroups was greater in areas of "high stress", one characteristics of which was high density. They studied the effect of stress on blood pressure in overcrowded ghetto and suburban conditions in Detroit and found that:

the proportions of persons with hypertensive-level blood pressures were significantly greater in the overcrowded stressful tracts than in the suburban tracts. The analysis of the data implicates the psychological construct of suppressed hostility as the mechanism of coping response which is characteristic of those persons with the highest blood pressure levels.¹²

Wohlwill et al stated:

Environmental factors determines how people will react in crowded situations. People raised in an urban environment probably develops a different set of approaches to high density situations than the rural people.¹³

Crowding does not only occur within the cities but, it can occur within a given environmental situation. Individuals can experience crowding in a work situation, school setting, prisons, etc. One of the most widely discussed topics in reference to crowding is the overcrowded situation in prisons. D'Atri et al (1981) were interested in determining

the relationship between housing mode change and blood pressure among prisoners. Therefore, they conducted an experiment to determine this relationship. The prisoners were from a county correctional institution for men located in a northeastern state. All eligible participants were interviewed and experiments were conducted in terms of relocating the prisoners in different cells which produced a crowded situation. Their blood pressure was measured and hypertension was observed. After analyzing the data, D'Atri et al proved their hypothesis (relationship between crowding and blood pressure is positive) to be true.

There have been numerous other studies that have tested and proved the hypothesis was true. In fact, more studies actually support that a relationship exists between the two variables. For example, Larry Dean et al examined a different population group (enlisted Navy men) and their data yield the same results as the previous study. An association exists between crowding and the effects on health.

Crowding is a complex subject. It is difficult to overcome crowding especially in prison setting. However, there are other situations whereby crowding can be reduced. Some people can cope with crowding and others can not handle the pressure. Those individuals that can not cope with crowding detriment their health. In addition, this type of situation can very easily lead to the development of hypertension.

DISTRIBUTION OF HYPERTENSION

Distribution of Hypertension

One of the mainstays of epidemiologic research has always been the study of geographical differences. With regard to blood pressure, there is no adequate evidence to prove that geographic and cultural factors have a significant effect on the frequency of essential hypertension.¹⁴

Many studies have examined the relationship between geographical location and the development of hypertension. Some researchers believe that there is a significant effect on the frequency of hypertension and geographic area. However, some researchers believe the opposite.

This section of the paper will focus on some of the various types of distributions of hypertension, namely: national geographic distribution, ethnic distribution, and intra-urban distribution.

National Geographic Distribution

Hypertension is a nationwide chronic disease. It is more prevalent among the black population. In terms of the national geographic distribution, the development of hypertension may have the tendency to occur more in areas where the black population is concentrated. For example, several black people inhabitant in the southern states of the United States. Therefore, a pattern showing the distribution of hypertension may be more defined in these areas. In other words, this pattern develops because a cluster of black people are living in the area and the prevalence of hypertension is higher in the black population.

Several researchers have examined hypertension studies by geographic area. Their findings vary depending upon the population group evaluated. For example, in the tropical areas, blood pressure is much lower than in New Guinea. Likewise, blood pressure is higher in Western countries than among villagers in other countries. As stated previously, hypertension is more prevalent among obese people. Also, the diet in many countries are different. Therefore, there is a tendency of blood pressure being lowered in those countries with a lower average weight.

Lifestyles vary in different parts of the world. Therefore, hypertension occurring in a geographical area is attributed, more than likely to environmental factors. Several studies have shown that people in the Western countries, on the average, have higher blood pressure.

Ethnic Distribution

Hypertension is more prevalent among the black population. It is the number one "killer" disease for blacks. There are certain types of diseases which affects specific ethnic groups. Even though, hypertension affects all ethnic groups, it is more commonly known to occur among blacks than any other racial group. In fact, it affects approximately one out of every four blacks. Numerous studies on hypertension have proven this hypothesis is indeed true. Even though certain groups of Indians (i.e. Pima) have been evaluated and detected for increased blood pressure, the rate occurs faster among blacks.

Negroes residing in high stress (economically deprived, densely populated, high incidence of family instability, high crime rate) and low stress census tracts in Detroit, Michigan Harburg, et al, reported a significantly greater prevalence of hypertension in the high stress tracts.¹⁵

Blood pressure is higher in blacks of all age-sex groups than whites. Studies have been conducted among black and white populations in order to detect the rate of hypertension. Many of those studies prove that hypertension occurs mainly among blacks. However, some studies state that environmental factors in terms of race will determine the development of hypertension. For example, D'Atri (1975) stated that in the prison setting (housing situation) the development of hypertension is the opposite.

This finding, although surprising may be accounted for by the facts that black inmates were younger, taller, lighter in weight and much more likely to be recidivists than their white inmates.¹⁰

Few studies support the hypothesis that hypertension among blacks is lower. Basically, the findings of a study depends upon the variables evaluated. Nevertheless, blood pressure rises higher in blacks; there are no recent studies to explain this rate. However, some researchers believe that the prevalence is higher in blacks because of their body's composition and intake of salt (factor related to increase in blood pressure). At any rate, there are ongoing studies presently attempting to determine why this relationship exists.

Intra-Urban Distribution

Hypertension is more prevalent in the urban environment than in the rural areas. Likewise, suburbanians experience hypertension less than urban dwellers.

There is a significant difference in the development of hypertension in urban areas compared with other areas. Researchers suggest several reasons for this pattern. For example, in other areas there tends to be more space per person. Therefore, crowding does not exist in these areas as in urban areas. As stated previously, there is a relationship between crowding and hypertension. Other researchers state that socioeconomic status can contribute to an individual's health. The health status of people within a city can vary. For instance, people living in the ghetto may have higher percentages of hypertension compared with those in the central city. People in low social class have slightly higher blood pressures than among the other social classes. Furthermore, there are some differences (blacks higher) when inner city ghetto children are compared to children residing in a more middle class, higher socioeconomic neighborhoods.

It was hypothesized that the more urban experience occurred by Negroes migrating from the South to Chicago slums, the more conflict will exist between any increased aspirations and their objective social situation. Therefore, it was further hypothesized, migrants of longer Chicago residence would be under greater psychological stress and - if there is any relationship between long term stress of everyday life and risk of hypertension - they should have higher age-specific prevalence rate of the disease.¹⁷

Kotchen et al (1974) found that a number of genetic and environmental variables are associated with the height of the blood pressure in urban adolescents. Similarly, Burns et al (1980) found that inner city black males and females had higher blood pressures than black males and females in suburban areas. This pattern also existed among white males. However, there was no significant difference in the inner city or suburban white females.

Futhermore, several hypertension studies have been conducted in terms of the distribution of high blood pressures in the city. As a result, the majority of these studies conclude that individuals living in well - established environments have lower blood pressures than those living in a low economic status (ghetto). Therefore, within an urban environment, blood pressure is higher in those areas where the socioeconomic status is lower.

HYPERTENSION SCREENING PROGRAMS

Hypertension Screening Programs

The control of hypertension is highly effective in terms of preventing complications, morbidity, disability and premature death caused by high blood pressure. Hypertension is a serious disease. Also, there are medical problems associated with this disease which can cause severe complications. The three most common problems associated with hypertension are: cardiovascular (heart) disease, kidney disease, and cerebrovascular (stroke) disease.

Cardiovascular disease involves the heart and blood vessels. High blood pressure can make the heart pump harder than necessary causing the arteries to become less elastic. Hypertensive disease is the most prevalent detectable cardiovascular disease among the population.

Kidney disease is the prime target of hypertension. Hypertensive disease is associated with progressive changes in renal (kidney) functions. In most hypertensive patients, the kidney functions more slowly. However, the progress may accelerate. Therefore, in the great majority of patients when this rapid pace supervenes, it usually results in death from renal insufficiency.

"Cerebrovascular (stroke) disease comprise any disease in which one or more of the blood vessels of the brain are primarily implicated in a pathologic process".¹⁸ A hypertensive person is more probable to have a stroke than persons with normal blood pressure.

During the past ten years an increasing number of reports in the medical literature have indicated: (1967)

- 1) Hypertension can be controlled in the majority of patients.
- 2) Hypertension should be treated early.
- 3) Many of the complications of hypertensive disease can be minimized or eliminated.¹⁹

Hypertension is definitely one of the major causes of death in the United States because of its fatal complications involving the kidneys, brain and the heart. However, death can be prevented if treatment is seek in the early stages of hypertension. If a person is not treated for the disease, it will impair their life expectancy. In other words, longevity is reduced as blood pressure increases. However, physicians agree that effective treatment is needed to reduce mortality and morbidity.

The only means of detecting hypertension people is to screen for high blood pressure.

The first criterion to be met by a screening program for any disease should be that the natural history of the condition can be improved as a result of the earlier diagnosis achieved. Screening for hypertension meets this criterion. A number of major randomized controlled trials have recently reported evidence of the benefit conferred by treating hypertension at a stage before symptoms have developed and; since there is a wide choice of effective and well tolerated antihypertensive drugs available, the case for detecting and treating symptomless hypertension is now very strong.²⁰

Many people have hypertension and are unaware of it. It is more prevalent among the black population --- one out of every four blacks have hypertension. Basically, the body is being damaged (i.e. kidneys, brains, heart) inside these hypertensive people. Blood pressure measurements will determine the hypertensive population.

Numerous hypertension control studies have been done nationwide. The screening process is similar in all hypertension programs. For example, screenees are asked a battery of questions regarding their health. Their blood pressures are then measured (depending on the protocol, blood pressure measurement can be taken one to several times). If the screenees are classified as hypertensive, he/she is recommended for further evaluation.

Stamler et al reported, in their article, "Hypertension Screening of One Million Americans, that there was a large percentage of individuals with either undetected, untreated or uncontrolled hypertension. This study attracted the majority of its participants in the shopping centers of forty-two states. Their blood pressure was measured and; they were classified as hypertensive if their blood pressure measurement exceeded that identified in the protocol of the study. Consequently, a group of individuals were identified as hypertension and would not have been if screening was not done.

Recent studies among high school students have indicated a need to increase screening in the high schools.

If people are treated for hypertension early in life, it eliminates some of the medical complications associated with it. Kotchen et al

screened a population of urban adolescents in two high schools in Washington, D.C. Through the screening process, they were able to identify a large number of students with hypertension, especially in one of the schools where the majority of students either had the disease or were probably developing the disease. Also, in the Detroit Project, Harburg et al reported a greater prevalence of hypertension among the black population. They would not be able to detect these findings, if they had not screened for high blood pressure.

In the abovementioned examples, the data indicates a large sample of hypertensives were identified after being screened. Therefore, screening is an important concept in the determination of detecting high blood pressure.

Many of the screening programs are successful in terms of identifying people with high blood pressure. The main incentive of these hypertension screening programs is to detect hypertension. Generally, a follow-up is conducted after a population has been identified as having high blood pressure, if for instance, they are involved in a study for research. Screening usually takes place in a centrally located area to attract more people. For example, in the Chicago study, the majority of the screening was done in the shopping malls. In essence, the success of hypertension screening programs is to locate them in areas that are more accessible to the public. If people have to travel far to participate in a screening program, more than likely, they will not participate unless an incentive is involved. Nevertheless, screening has been found to be successful in terms of locating people with the disease from the population screened.

The screening of a large number of people in the general population, such as the middle-aged adults on a group practice list, can be made more convenient for both the practice and the patients if it is properly planned.²¹

Once a hypertensive person has been identified, he/she is recommended to seek further medical attention if the state of hypertension is severe. Basically, the screeners are given certain recommendations based upon the severity of the disease, the choice to follow-up on this advice is up to that individual. Therefore, the major problem results when this hypertensive person does not comply with the recommendations. In fact, this could cause the disease to get worst. Therefore, it is very important that once an individual has been diagnosed as being hypertensive, immediate medical

attention is sought. This disease is serious and if it is not treated, it can lead to death. Even though, the mortality rate for hypertension has reduced due to the outstanding hypertension screening programs, it is still a major health problem. In fact, the number of people who actually die from hypertension is underestimated because of the information provided on the death certificate.

Conclusion

Hypertension is a serious chronic disease that accounts for many people's lives. There are many complicating factors associated with severe forms of hypertension that can cause death, if not treated. Therefore, if an individual has been screened and diagnosed as having hypertension, he/she should seek further medical attention. There are many types of medications that doctors can recommend to control hypertension. Once medication has been prescribed, it is important to take as suggested. One important factor is keeping blood pressure down and avoiding any probable complications.

People with hypertension can lead a normal life if their blood pressure is being controlled. There are several people unaware that they have hypertension. One of the major reasons is because they have never been tested for high blood pressure.

Hypertensive disease affects all age groups but, it increases with age. Several environmental factors can influence the development of hypertension. Urban residents, especially those living in crowded conditions are more likely to develop hypertension than suburban and rural residents. Crowding is also associated with the development of increased blood pressure. Some studies have shown that blood pressure is higher among certain groups of adolescents compared to their counterparts based upon, not only environmental factors, but also family history and socioeconomic status.

Footnotes

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²⁰W.E. Miall, Northwick Park Hospital Middlesex, "Screening, Screening for Hypertension," *British Journal of Medicine*, June 27 (6), 1977, p. 592.

²¹*Ibid*, p. 598.

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