A COMPARISON OF THE EATING HABITS OF BLACKS WITH AND WITHOUT ESSENTIAL HYPERTENSION FOCUSING ON SODIUM AND FATS

By

SYLVETTA ANNETTE STRIPLIN

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Dedicated to the three people whose guidance,
faith, and love made this possible.

Mr. Sylvester Striplin
my father

Mrs. Rosa Mae Striplin
my mother

and

Mrs. Pauline Cobb
my grandmother

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Thesis Approved:

Esther Winterfeldt

Thesis Adviser

Mary E. Ledbetter

Earl D Mitchell Jr

Norman N Durham

Dean of the Graduate College

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CHAPTER I

INTRODUCTION

Hypertension is one of the most important, if not the most important mass public health problem in the United States today (10, 21, 24, 28, 38). The greatest single cause of death in the United States--about 60,000 annually--can be attributed directly to hypertension and another 250,000 deaths annually can be attributed to the side effects of the disease (10, 28). An estimated 25 to 26 million Americans have hypertension, but fewer than half of them are aware that they have the disease (10, 24, 28, 33). Because it often produces no symptoms until irreversible organ damage, hypertension has been called such various names as "the silent killer," "the quiet assassin," "the silent disease," and "a fooler of a disease." But for the person with hypertension, all of these epithets add up to the same thing: a deceptive sense of perfect health.

Among the black population hypertension is even more devastating. The National Health Survey conducted by the United States Public Health Service from 1960 to 1962 showed that the prevalence of hypertension among blacks was decidedly out of proportion in the American population (21). Specifically, of an estimated 26 million Americans affected by hypertension approximately eight million, 30.7 percent, are black, while blacks only constitute an estimated 15 to 20 percent of the population (24, 38). Moreover, the death rate from hypertensive disease between

1940 and 1966 decreased sharply in all age groups for white males and females; the decreases for black males and females were only two-thirds the decrease for comparable groups of whites (24, 38). "Hypertensive disease is by far the major health problem among American Negroes today, being chiefly responsible for the continuing differentials in life expectancy between black and white adults" (30, p. 9).

Statement of the Problem

The purpose of this study was to determine if there was a relationship between the high incidence of essential hypertension in blacks and the consumption of sodium and fat in the foods eaten by blacks.

Significance of the Problem

Estimates by investigators have shown that at least 25 percent of all blacks in the United States, age 18 years and above, are suffering from hypertension (21, 38). This figure is comparable to 15 percent of the white population of the same age group. Approximately 13,500 deaths each year among blacks can be attributed directly to hypertension.

Definition of Terms

Blood pressure:

> The pressure of blood in the arteries. The pressure when the heart muscle contracts (systole) is called systolic. Blood pressure when the heart muscle relaxes (diastole) between beats is called diastolic (10, p. 195).

Hypertension or hypertensive disease:

> Sustained diastolic (and usually systolic) blood pressure elevation at levels above the normal range. The diastolic elevation may be termed borderline, or possibly abnormal, if it is in the range of 90-94 mm Hg; definite abnormality may

be characterized by a level of 95 mm Hg or greater (38, p. 2).

(a) Hypertensive disease: "When there is no clinically demonstrable disease of the heart or blood vessels in a person with high blood pressure" (38, p. 2).

(b) Hypertensive heart disease: "When cardiac abnormality (for example on X-ray) is demonstrable in association with elevated blood pressure" (38, p. 2).

(c) Hypertensive vascular disease: "When extracardiac vascular disease (such as cerebral, renal fundal, or peripheral) is clinically detectable without heart involvement in association with elevated blood pressure" (38, p. 2).

(d) Hypertensive cardiovascular disease: "When both cardiac and extracardiac abnormalities are found in association with elevated blood pressure" (38, p. 2).

Essential hypertension: An elevated blood pressure from an unknown cause (10, 38).

Primary hypertension: "Another name for essential hypertension" (10, p. 197; 38, p. 3).

Secondary hypertension: "Elevated blood pressure caused by--therefore, secondary to--a specific disease" (10, p. 197).

High blood pressure: "Common name for hypertension" (30, p. 3).

Fats or lipids: "A group of organic substances--fats, oils, waxes, and related compounds--which are greasy to touch and insoluble in water, but are soluble in alcohol or ether" (39, p. 45).

Eating habits: "The way in which individuals or groups of individuals, in response to social and cultural pressures, select, consume,

and utilize portions of the available food supply" (4, p. 46).

Soul food:

Popular in the black community since the days of slavery. The main items of soul food are chitterlings and hog maws (pig intestines), pig's feet, barbecue, fat back, bacon, ham hock, and salt pork (38, p. 15).

Objectives

The objectives of the study were as follows:

1. To survey and examine literature related to the subject.
2. To determine if there was a relationship between eating habits and the high incidence of hypertension in a selected group of subjects.
3. To determine usual intake of calories, sodium, and fat in the diet of subjects.

Hypotheses

The following hypotheses were tested:

1. There is a significant difference in the eating habits of blacks with hypertension and those without hypertension.
2. Blacks with hypertension consume more sodium and/or fats than those who do not have hypertension.
3. Blacks with hypertension eat more "soul food" than those who do not have hypertension.

CHAPTER II

REVIEW OF LITERATURE

As late as the 1930's an elevated blood pressure was viewed by some doctors as a "good thing." It was supposed that hardening and narrowing of the arteries came first and hypertension followed--and that the increased pressure might be the body's way of adopting to the artery hardening, so that blood could be forced through the diseased vessels (10). On this basis, it was thought that lowering pressure might have dire effects because of blood deprivation to the brain and other vital organs. "As a recognized cause of trouble--of heart attacks, strokes, and kidney failure--hypertension is a Johnny-come-lately" (10, p. 13).

Morbidity, Disability, and Mortality Due to Hypertensive Disease

"Hypertensive disease is a serious mass public health problem despite the fact that at any given time a majority of persons with it are symptom-free" (24, p. 5). For decades, insurance companies have been emphasizing that even slight elevation of blood pressure correlates with increased risk of premature death. For example, a study done by the Health Insurance Plan of Greater New York has shown that among men with hypertension who suffer heart attacks, the number dead within a month is twice those with normal pressure before an attack (10). Moreover, compared with men with normal pressure who survive a heart attack,

hypertensive survivors have twice the risk of a repeat attack and more than five times the risk of dying of heart disease during the next five years (10).

A study done by the Society of Actuaries' shows that for men age 35 with a blood pressure reading of 142/90 mm Hg and without any accompanying impairments, the mortality rate over the next 20 years was 19.4 percent, compared to 11.0 percent for nonhypertensive persons (24). Similar findings have been recorded by the Pooling Project (17, 24, 30). The Pooling Project consisted of the following five independent prospective epidemiological research studies carried out in various parts of the country: the Albany Civil Servant, Chicago People Gas Company, Chicago Western Electric Company, the Farmingham community, and Minneapolis-St. Paul business and professional men studies, who combined or "pooled" their findings in a national cooperative. Over the last 20 years, data has been collected on 7,581 white men between the ages of 30 to 59. After exclusion of men with definite coronary heart disease at the first examination, the men were classified based on their diastolic blood pressure levels at that time. Mortality over the next ten years from heart attacks, including sudden death, was twice as high in the group with "mild" hypertension (diastolic pressure 95-104 mm Hg) compared to those with normal diastolic pressure. The increase in risk of coronary death, including sudden death, was more than threefold for the group of men with pressure 105 mm Hg and greater compared to those with normal diastolic pressure.

> For the most straightforward and crucial index available, i.e., death from all causes, the 10-year rate was 60 percent higher for men with diastolic pressures 95-105 mm Hg, compared to normotensives, and 200 percent higher for those with hypertension in the range of 105 mm Hg and greater. Note also the

> 60 percent greater mortality rate from all causes even for men with diastolic pressures of 85-94 mm Hg (24, p. 6).

Increased premature death is not the only problem associated with hypertension. In addition to the loss of life, hypertension also brings great personal, social, and financial problems. Data from the Social Security Administration clearly shows a sizable amount of disability in the labor force attributable to hypertensive disease (30, 32). Overall, 24 percent of the worker disability allowances in 1968 were due to diseases of the circulatory system. The major contributing factor for at least one-third of the disabling coronary cases was hypertension. An even higher proportion of the persons disabled by stroke had hypertension as the contributing cause.

Interviews by the United States Public Health Service during 1957-1958 gave valuable data on morbidity due to hypertension and its complications (30). Data from those interviews led to the estimation that hypertension alone resulted in 99,000,000 restricted activity days per year in the United States. (Restricted activity days were defined as those in which the usual day's activity was curtailed for a whole day because of an ailment.) In addition, heart conditions, a high percentage associated with increased blood pressure, led to 238,000,000 more restricted activity days. Among the working population, 9,500,000 working days were lost solely because of increased blood pressure as well as an additional 16,500,000 working days lost due to heart disease, much of it associated with increased blood pressure.

Extent of Hypertension Disease in the United States Today

Hypertensive disease is widely prevalent throughout the adult population. Several major investigations have extensively demonstrated this fact in recent years. The National Health Survey conducted by the United States Public Health Service in 1960-1962 was one of the most important investigations. This survey confirmed for the whole country the observations repeatedly recorded in local studies, both community and industry based. It was found that the prevalence rates for elevated blood pressure and hypertensive heart disease are generally high in this country and tend to increase with age, particularly over the decades from young adulthood through middle age (21, 30).

From the probability sample of the United States population examined by the National Health Survey, it was possible to estimate the number of persons with hypertension and hypertensive heart disease in the country in 1961-1962. The figures were 17 million adults age 18 to 79 with definite hypertension, plus approximately another 16 million with borderline hypertension (21, 30). "Millions of these persons were young and middle-age, not elderly; e.g., almost 3.8 million age 45-54 with definite hypertension" (30, p. 9).

The estimates for definite hypertensive heart disease are similar to those for hypertension: 10.5 million adults with definite hypertensive heart disease, plus approximately another five million with suspect hypertensive heart disease. Again, young adulthood and middle-age made a very sizable number, for the 45 to 54 age group 2.0 million with definite hypertensive heart disease in a total population of about 20.9

million in this age range (21, 30).

The Problem of Asymptomatic and Inadequate Treatment

In the United States it has been estimated that over half of the hypertensives are undetected (10, 16, 17, 20, 21, 24, 26, 28, 30, 38). Of those aware that they have the disease, half are going untreated and only half of those being treated are receiving adequate treatment (10, 26, 30).

> Not infrequently, by the time a patient reaches help, high blood pressure has been at work 10 years or more, destructively attacking heart and blood vessels, paving the way for strokes, heart attacks, and other consequences (10, p. 35).

One critical aspect of the hypertension problem is that elevated blood pressure does not necessarily produce symptoms. In fact, hypertension is usually an asymptomatic disease in its early phases and will frequently go undetected until serious complications occur usually without any warning (10, 24, 26, 28, 30, 38). If elevation of pressure is to be found early, there must be regular check-ups. But too many people, free of all symptoms and in seeming good health, get no check-ups. Moreover, even those who do get check-ups and are found to have hypertension may or may not, because they have no symptoms, begin treatment. And if they do begin treatment, many quickly give up again due to lack of symptoms.

The important aspects of nondetection and inadequate treatment of the hypertension problem have come into focus because of several surveys. Of these an on-going study in Chicago from November 1967 to May 1972 by the Chicago Heart Association Detection in Industry is representative.

In this study data was collected on 70 percent of industrial workers in 25 companies by a team of trained technicians and nurses (10, 24, 30). In a screening program persons with systolic blood pressure of 160 mm Hg or greater, or diastolic blood pressure of 95 mm Hg or greater, or both were designated as hypertensive. Of the first 4,615 men and women surveyed, 16.4 percent had hypertension. Of these 757 persons, 66.3 percent were unaware that they had the disease. Among those who knew they were hypertensive, 56.2 percent were not receiving treatment. This proportion ranged from a low of 38 percent in women age 40 and over to a high of 81.5 percent in women under 40 (30).

In a study in Baldwin County, Georgia, public health nurses were assigned to make house calls on a random sample of the population (10, 30). Of the 3,084 persons screened, 630 or 17.5 percent of these persons were unaware that they had the disease. Of those persons aware that they were hypertensive, 66.5 percent were not on treatment.

In an Atlanta study, it was found that even among those told they had severe hypertension for almost every one that obtained and continued the treatment, there was one who either never went to a physician or clinic for treatment or discontinued the treatment after seeing the physician (10). An investigator who visited them in their homes and conducted in-depth interviews found that the majority could afford them. But because they felt well they either did not believe or refused to believe that there was any serious problem.

Contributing Factors

Even though most persons with elevated blood pressure have hypertension of an unknown cause, some information is available on factors

related to its occurrence. It should be useful to cite some of those which are significant, since data from the National Health Survey of 1960-1962 and other surveys have shown that when hypertension coexists with certain other factors, the risks are additive (10, 20, 21, 24, 26, 28, 30, 38).

Cigarette Smoking

One of the striking facts that has come out of the Framingham studies is that cigarette smoking is the most impressive single additive, much more so even than elevated blood fats, for increasing the risk of heart attack and stroke for the person with hypertension (8, 10, 24). For both smokers and nonsmokers, the risk of mortality from coronary heart disease increases with increasing blood pressure, and the risk is higher among smokers than among nonsmokers at every level of blood pressure. Data collected from the Pooling Projects show that men originally age 30 to 59 with hypertensive disease as the only risk factor experience twice as high a death rate over the next ten years as men with no risk factors (24). But when hypertension coexisted with cigarette smoking, the risk of mortality was more than trebled.

Obesity

Obesity and hypertensive disease are interrelated. This relationship has been demonstrated over and over again in a number of studies; even though the mechanism is not yet understood (2, 10, 22, 26, 29, 30). Data from the Framingham, Massachusetts study demonstrated this relationship (10). In Framingham people with hypertension were found to be more obese than people with normal blood pressure. Also, the prevalence

of hypertension at all ages increased with relative weight. It made no difference what measures of excessive fat, or adiposity, was used--relative weight, skin fold, or upper arm girth: the average blood pressure level increased with the degree of excessive fat.

Data from the People Gas Company Study illustrated two aspects of the weight-blood pressure relationship: (a) relative weight in young adulthood and weight gain over the next 20-plus years and (b) their relationship to the risk of developing hypertension by age 50 (24, 30). The higher the relative weight initially, the greater the tendency to elevated blood pressure in middle age. And, both for those lean in youth and slightly overweight in youth, the greater the gain in weight from young adulthood to middle age, the greater the tendency to hypertensive disease. Every analysis of this relationship has yielded similar data (29).

Fats

One of the earliest findings of the Framingham studies, was that the risk of suffering from coronary heart disease is greater in the presence of both hypercholesterolemia and hypertension than when either factor is present without the other (6). In the Evans County study, the importance of elevation of serum cholesterol level and blood pressure in predisposing episodes of coronary heart disease was made clear in the white population (31).

Data collected from a study conducted in India showed that a close association between arterial pressure and blood cholesterol exist on the one hand and fecal urobilinogen on the other (18). More evidence, however, is necessary before a statement can be made that the association

between arterial pressure and blood cholesterol level is a factor in the production of hypertension.

It must also be noted that another risk factor, obesity, interacts with two other factors, hypertension and hyperlipidemia (6). Increasing body weight leads to an elevation in blood pressure and produces hyperlipidemia.

> Obesity and elevated serum lipids are among the risk factors for vascular disease and atherosclerosis. At present, there seems to be little dispute that dietary modifications are appropriate for individuals in whom hyperlipidemia, obesity, and hypertension have been identified . . . (19, p. 619).

Sodium

Although salt has been incriminated as one of the factors in the causation of hypertension, the relationship of salt to hypertension is not clear (9, 13, 15, 27, 29). The rice-fruit diet of Kempner has been found to be effective in the treatment of essential hypertension (5, 7, 15). But, it is an unpalatable, monotonous regimen which cannot be administered for prolonged periods of time to most patients. This diet markedly restricts the intake of salt (sodium chloride), protein, fat, and cholesterol. At the present time there is no definite evidence indicating the restriction of any of these elements except the sodium ion which has value in the treatment of hypertensive disease.

Dahl's (7) population studies indicate that higher sodium intakes are associated with a greater incidence of hypertension that is not accompanied by gross accumulation of sodium in tissues. The hypertensinogenic effect of sodium chloride is established in chickens, rabbits, and rats (7, 11, 29). In man, similar studies are few and are concerned

with the effects of large amounts of salt resulting in weight gain, edema, and blood pressure elevation (7, 13, 15).

In the Framingham study an attempt was made to estimate the intake of salt at the time of a diet interview (29). Subjects were asked about their use of salt and on the basis of their answers were rated the following way: (1) low intake--never adds salt at the table and avoids salty foods; (2) average intake--tastes first, adds salt if necessary, and also eats salty food; and (3) high intake--routinely adds salt before tasting and prefers salty food.

On the basis of quartiles of blood pressure levels, the dietary subsample was divided into four equal groups. The percentage of each salt intake rating in each blood pressure group was determined. "No relationship of blood pressure level to salt intake rating on dietary interview could be demonstrated" (29, p. 217).

In addition to the interview method of estimating sodium intake, 24-hour urine values for sodium excretion were measured on 185 men at the time of their fifth biennial examination (29). There was no evidence that the blood pressure of these subjects was related to their 24-hour sodium output.

"The evidence that salt induces permanent and fatal hypertension is direct, quantitative, and unequivocal in the rat" (29, p. 215). But in man the extensive evidence is circumstantial and is therefore almost casually dismissed by some; while others find it a promising environmental factor which might be related to the development of hypertension.

Diet

Diet may affect the blood pressure level, indirectly through its

effect on body weight and directly through the effect of one or several of its nutrients. It has already been established that weight seems to carry a positive relationship with blood pressure (2, 10, 22, 24, 29, 30).

Some investigators feel that the protein content of the diet has no effect on the incidence of hypertension (29). Dublin et al. (29) found no significant difference in the prevalence of hypertension in those consuming a high protein diet and the remainder. Thomas (29) found that blood pressure levels can also be low on an almost 100 percent protein diet.

On the other hand, Roab and Friedman (29) showed that in German monks a vegetarian diet coincided significantly with a lower blood pressure. However, there are other factors such as the different amount of exercise and amount of food eaten which may play an important role in determining the blood pressure of these groups.

Heredity

"The risk of developing hypertension is related to family history. Those who have a family history of this disease are more likely to be hypertensive than those who do not" (24, p. 11). High blood pressure is about twice as common among the brothers and sisters of hypertensives and in the children of hypertensive parents as among relatives of people with normal pressure (10, 24, 29).

Dr. Edward Kass (10) reported that a tendency toward hypertension can be detected as early as the age of two in children of hypertensive parents. Kass and his colleagues measured blood pressures in 83 families with 240 children ages 2 to 14. Even at the age of two, the

children of hypertensive parents had higher-than-normal readings.

Data collected by Dahl suggested that some individuals inherit a susceptibility that can be triggered by such factors as kidney infection, emotional stress, or too much salt in the diet (7, 10, 24).

Age

Data from several different Public Health Surveys show that with increasing age the prevalence of definite hypertension, hypertensive heart disease, and blood pressure elevation rises (20, 21, 23). But, statistics also show that hypertension is not only a disease of the aged. A New Orleans survey showed a six percent incidence of hypertension for ages 20 to 29, a 16 percent incidence for ages 30 to 39, and a 35 percent incidence for ages 40 to 49 along with the 54 percent incidence of hypertension for people over the age of 50 (10).

"Rarely, in fact, does hypertension start after the age of 50, according to investigators who made a point of emphasizing that at a recent national conference on cardiovascular diseases" (10, p. 34). The first indicator of hypertensive disease for most persons starts at an average of 30, and if it goes unchecked, they may die of its complications at an average age of 50 to 55.

A team of investigators from the University of Alabama Medical School and the United States Aerospace Medical Research Institute have shown that blood pressure elevation is not inevitable with increased age, as supposed by many physicians (10). A follow-up study has been done on 1,056 men. They were men who qualified for naval flight training in 1940. All were 24 years old then. All have been examined periodically for 30 years since. Half of the men had had no blood

pressure rise from ages 24 to 54. For the men whose pressures have risen with age, the study showed that when blood pressure does rise with age, it frequently does so in those whose pressures were somewhat elevated--on the high side of "normal" range--at an early age.

Hypertensive disease can also be found in children and adolescents. Of 435 teenagers examined in Evans County, Georgia, 11 percent had high blood pressure (10, 29). After seven years, investigators were able to trace 30 of those who had been found to be hypertensive and who had not had treatment, two had died; three had developed brain and heart symptoms; and five others had markedly elevated blood pressures with no symptoms.

Sex

Data collected from the National Health Survey conducted by the United States Public Health Service from 1960 to 1962 showed that men are more likely to have definite hypertension than women in age groups under 50 years (21). After age 50 the relationship is reversed and women have a higher incidence of definite hypertension as compared to men. Data from other surveys show similar findings (10, 23, 24, 30, 38).

Essential Hypertension and Its Complications

It has been well documented that essential hypertension--more than 90 percent of all cases of hypertension are of essential hypertension, rather than secondary hypertension--is of great medical importance because of its impairment of health and longevity. "Specifically, it

leads to major complications involving key organs--in particular, the heart, brain and kidneys" (30, p. 3).

Heart Disease

It is well known and documented that heart attacks are the number one cause of death and the most important cause of disability in the United States today. In addition to the loss of lives and the personal and social problems created by heart disease, it has been estimated that the total cost for health care exceeds $50 billion.

Many risk factors--cholesterol, saturated fats, too little exercise, stress, hypertension, heredity--have been identified for heart disease. Hypertension is considered the number one risk factor. If a person has any single risk factor, his chances of premature heart attack is increased. A man with blood cholesterol of 260 mg or above, has three times the heart attack risk of a man with a cholesterol level below 200 mg. But a man with mild elevation of blood pressure--a systole of 160 (140 is considered the upper limit for "normal")--has five times the risk of a man with systolic blood pressure under 120 (10).

In three different National Health Surveys, it was found that hypertensive heart disease was the most commonly encountered specific form of heart disease in American adults (20, 21, 23). Some 10.5 million (a rate of 9.5 per 100 persons aged 18 to 79) had definite hypertensive heart disease, and another 4.8 million (4.3 per 100) were estimated to have suspect hypertensive heart disease. Nearly nine out of ten adults diagnosed as having definite hypertensive heart disease had definite hypertensive blood pressures on examination. The remaining cases did not, but they did give a history of hypertension and were

under medication for it.

In the Framingham study a representative population sample of 5,192 men and women was followed for 16 years during which time overt congestive heart failure developed in 142 persons (10, 16). The dominant etiologic factor was hypertension which preceded congestive heart failure in 75 percent of the cases in the age range from 30 to 62. Six times more congestive heart failure developed in hypertensives than in normotensive persons.

Atherosclerosis

Investigators have found an interrelationship between hypertension and the rate of development of atherosclerotic lesions in animal studies (6, 10, 12, 30). In several animal species atherosclerotic lesions can be produced experimentally. It has been shown that the coincident production of experimental hypertension leads to a much more rapid development of atherosclerosis. In these animals, drug treatment for hypertension will prevent the emergence of atherosclerosis. The production of atherosclerotic lesions appears to be related to the height of blood pressure, and it has been thought that the high blood pressure itself facilitates a transfer of lipids beneath the intimal layer of the larger blood vessels. Alternately, it is possible that the high blood pressure causes damage and allows penetration of lipid material in the plasma.

In other animal studies, investigators have been able to show that there is a difference in the rate at which cholesterol is produced in the body in animals with normal blood pressure and those with hypertension (6, 10). Hypertension does something (it is not clear what)

that increases the rate of cholesterol formation in the liver and in artery walls.

In man, the association between hypertension and atherosclerosis can be demonstrated but is less clear. In one study, investigators dissected and extracted the fatty deposits from various arteries of 184 consecutive patients who died (10). They found a significant relationship between the amount of fat in the brain and heart arteries and the blood pressure measured during life.

After performing 500 autopsies to study atherosclerotic lesions, Dr. Campbell, medical director of the American Heart Association, found a marked increase in the incidence and severity of atherosclerosis in coronary and brain arteries in men who had hypertension (10). And, in women with hypertension the incidence and severity was even more marked.

Strokes

> High blood pressure is frequently an underlying factor in stroke, contributing greatly to the 200,000 deaths from stroke each year. And it can be blamed for disabling hundreds of thousands of stroke victims each year (24, p. 11).

No factor has been identified which contributes more than hypertension to the development of cerebrovascular accidents involving the brain, and to the occurrence of atherothrombotic brain infection, the most common variety of stroke (10, 36).

The exact mechanism of hypertension in the occurrence of strokes is incompletely understood. But data from the Framingham study turned up striking evidence that hypertension does play an important role in the occurrence of strokes (10, 16). During 14 years, 65 men and 70 women had strokes. The risk of stroke was four times as high for hypertensives

as compared to normotensives. Out of the study came a clear indication that hypertension, at any age and in either sex, is the most common and potent precursor to strokes.

Kidney Disease

Most people with essential hypertension have a family history of hypertension, but the presence or absence of a family history alone does not clearly discriminate between primary and secondary hypertension (24). An example of this is renovascular hypertension. The diagnosis and effect are known, but the cause is not. Investigators do not know whether hypertension causes the kidney malfunction (essential hypertension) or whether the kidney malfunction causes the hypertension (secondary hypertension) (10, 24).

A prolonged continuance of hypertension may impair blood flow to the kidneys. The arterioles of the kidneys are usually clamped down too. Due to the reduced blood supply, the kidneys can no longer function at full capacity. They become less effective in ridding the body of waste products. There is a tendency for salt to be retained instead of properly excreted. This abnormal fluid retention increases the chances for heart failure to develop.

Kidney damage from hypertension may also include gradual destruction of the nephrons. As more and more nephrons are destroyed, kidney function deteriorates and eventually total kidney failure may follow, with uremic poisoning and death.

The Epidemiological Perspectives of the Black Race

The devastating effects of hypertension--premature sickness, disability, financial loss, and death--have been well documented (10, 16, 17, 20, 21, 23, 24, 28, 29, 30, 38). The extent of the problem in the United States has also been discussed. Among the black population the extent and effect of hypertensive disease are even more destructive.

The National Health Survey of 1960 to 1962 showed that the prevalence of hypertension among blacks was decidedly out of proportion to their percentage in the American population at all ages surveyed (21). Overall, the ratio was found to be about two to one for blacks as compared to whites (21, 24). Specifically, of an estimated 26 million Americans affected by hypertension approximately eight million, 30.7 percent, are black, while blacks only constitute an estimated 15 to 20 percent of the population (28, 38). And, hypertension when present tends to be more severe in blacks than in whites. For example, for severe hypertension (diastolic levels of 115 mm Hg or above) the relative rate is 3.3 times as high for black men as compared to white men (2.3 percent vs. 0.7 percent), and 5.6 times as high for black women as compared to white women (5.0 percent vs. 0.9 percent) (21, 24, 38). Moreover, the death rate from hypertensive disease between 1940 and 1966 decreased sharply in all groups for white men and women; the decreases for black men and women were only two-thirds the decrease for comparable groups of whites (24, 38).

Besides hypertension occurring more frequently and being more severe among blacks, studies also show that it develops earlier in life

and causes mortality at younger ages (10, 38). At the District of Columbia General Hospital the Georgetown University's Cardiovascular Group examined 289 young black women (average age, 23 years) selected at random from patients attending the hospital's birth control clinic (10). One hundred forty-one, 48 percent, had hypertension.

In the District of Columbia 65 percent of the population is black, but 75 percent of the 645 deaths in one year attributed to hypertension occurred in blacks (10, 38). Of the deaths attributed to hypertension, 239 occurred in persons under age 60 and 88 percent of these were blacks.

There is also a difference in morbidity patterns between blacks and whites. These differences are most striking when one compares the incidence of stroke and cardiovascular disease between the two races. Blacks are more prone to strokes at an earlier age than whites (38). A severe cerebrovascular accident which often results in death or premature disability on the first occurrence is also more likely to happen in blacks.

> Blacks are less likely to have bouts of cerebrovascular insufficiency, characterized by transient neurological deficits; thus the premonitory 'warning signals' that a major event is impending may be missed (38, p. 10).

Congestive heart failure has hypertension as a precursor in 75 percent of cases, and the death rate from hypertension complicated by congestive heart failure is seven times that of the general population (17, 38). Blacks develop congestive heart failure more frequently than whites (10, 17, 21, 38).

Theories on Black Essential Hypertension

That blacks have a higher morbidity, disability, and mortality rate

from essential hypertension at all ages and in either sex has been confirmed in almost all surveys on hypertension (10, 16, 17, 20, 21, 23, 32, 36, 38). It has been shown that the progress of the disease is usually faster, more severe, and starts at an earlier age in blacks. The underlying mechanisms which cause blacks to react in such an idiosyncratic manner when afflicted with essential hypertension are still a matter of conjecture. The major theories offered to explain this mystery are as follows:

> The genetic theory: this hypothesis holds that the greater prevalence of hypertension among blacks is, in itself, indicative of the operation of a genetic factor. Pickering has advanced the thesis that the predisposition to hypertension is inherited polygenetically, a position which has gained more supporters than the single gene theory of Platt (38, p. 14).
>
> Environmental stresses theory: this theory explains the enormous psychosocial strains to which black Americans have been subjected since their arrival in 1619. It has been conjectured that the internalization of black American's reactions to the privation, suffering, and frustration which he has endured is now being expressed as hypertension. Others believe just the opposite--that the black slave had no problem with hypertension or any other type of serious illness as long as he remained within the 'protective' custody of slavery; his problem began when he was emancipated and began to live the life of the white man. Still others feel that the hypertensive difference between blacks and whites are caused by the more exacting labor that blacks perform in contradistinction to whites (38, p. 14).
>
> Dietary theory: this is based on the fact that the food consumed by blacks contains a large amount of pork and other high sodium substances. 'Soul food,' popular in the black community since the days of slavery, is an example (38, p. 15).
>
> Skin pigmentation theory: this theory is based on a study conducted by Boyle on over 2,000 residents of Charleston County, South Carolina with respect to the relationship of hypertension, race, sex, body weight, and skin color. He determined that there was a positive correlation between skin pigmentation, as measured by a photoelectric reflectance colorimeter, and hypertension. A significantly greater prevalence of hypertension was found in the darker half of the black population than in the lighter half (1, p. 1638; 34, p. 15).

> Drug resistance theory: in recent years the white hypertensive death rate has decreased more profoundly than the black hypertensive death rate. The declining white death rate is felt to be due to the impact of better hypertension medicines which the physician now has available. If this is so, why are blacks not benefiting from these modern drugs in the same fashion? Howard and Tiedman have attempted to answer this question of differential reactivity to antihypertensive drug therapy between blacks and whites. They theorize that there may be a genetic factor operative in blacks which causes them to be more resistant to therapy. They also theorize that the difference may be due to lack of cooperation by blacks, i.e., lack of consistency in taking medicines, refusal to make regular visits to the doctor's office or clinic, and so forth. Their third thesis is that there may be a differential in the severity of the illness when black and white patients are first seen; many black patients do not receive medical attention until they are far into the accelerated stage and it is well recognized that patients are less responsive to treatment in the more advanced stages of essential hypertension than they are in the early stages (38, p. 15).

Medical Management of Essential Hypertension

The treatment of essential hypertension is necessarily empiric and palliative because its cause and cure are unknown. Nevertheless, data collected by the Veterans Administration cooperative study have conclusively demonstrated that effective treatment will prevent or forestall cardiovascular complications and will prolong life (30, 33, 34). This carefully designed well-controlled double-blind study evaluated combined drug therapy (hydrochlorothiazide plus reserpine plus hydralazine hydrochloride) in two groups of men, one with diastolic blood pressure averaging 115 to 129 mm Hg, the other with diastolic blood pressure averaging 90 to 114 mm Hg. The combination of the three drugs was effective in lowering blood pressure for both groups. A follow-up study done on the group of men with diastolic blood pressure of 90 to 114 mm Hg showed that side effects--mild hypokalemia, hyperuricemia, and

elevated fasting blood sugar--were significantly higher in the treatment group (35). Most important, the two treated groups had remarkedly few cardiovascular-renal complications compared to the men receiving placebo. Thus, for patients whose diastolic blood pressures averaged 115 to 129 mm Hg the study ended earlier than expected when it became apparent that the risk rate increased sharply at these levels of diastolic blood pressure and that the clinical course of such patients was favorably influenced by antihypertensive drug treatment (33).

Positive results were also reported in the treated men with diastolic blood pressures of 105 to 114 mm Hg, but in the treated men with diastolic blood pressures of 90 to 104 mm Hg the "effectiveness of treatment" derived was of relatively small benefit unless they had cardiovascular-renal abnormalities at entry or were over 50 years of age (35). Life table analysis indicated that the estimated risk of developing a morbid event over a five-year period was reduced from 55 to 18 percent by treatment (30, 32). A longer period of follow-up study will be needed to assess the value of treatment in the lower risk--90 to 104 mm Hg--subgroups to weigh the benefits of treatment against the side effects of treatment.

CHAPTER III

METHODS AND PROCEDURES

The procedure for this study was designed to accomplish the following objectives: (1) to determine if there was a relationship between eating habits and the high incidence of hypertension in a group of black adults and (2) to determine usual caloric, sodium, and fat intakes. Data were obtained by interviews with the subjects and a mailed questionnaire to physicians in the Stillwater, Oklahoma area.

Selection of the Subjects

Subjects for the study were obtained on a voluntary basis. The subjects were from three different areas--Tulsa, Stillwater, and Langston, Oklahoma. Subjects were selected on the basis of race and age. They were black and 21 years of age and older. A total of 30 subjects participated. Of the participating subjects, 10 were hypertensive while 20 were normotensive. The number of subjects in each group is presented in Table I.

Development of the Questionnaires

Three sections were included in the subjects' questionnaire. Section I consisted of personal data to obtain background information on the subjects; Section II, a 24-hour recall, to obtain calorie, sodium, and fat intake for a day; and Section III, a dietary questionnaire, to

obtain the subjects' longer term eating habits, especially their sodium and fat intake (Appendix B).

TABLE I

DISTRIBUTION OF SUBJECTS BY AGE AND BLOOD PRESSURE

Age Group	Hypertensives	Normotensives
21-29 years old	5	12
30-39 years old	0	2
40-49 years old	0	2
50-59 years old	1	3
60 years old and older	4	1

A standardized form was used for the 24-hour recall. Modifications were made in the standardized form used for the dietary intake to test the hypotheses stated in the study (5). A separate questionnaire was designed for the physicians to obtain background information on medical treatment of persons with hypertension.

Administering the Questionnaire

Each of the subjects was interviewed separately. The time and place of the interview were decided on by the subject. Each question was read aloud by the interviewer to the subject. The subject then answered each question orally and the response was recorded by the

interviewer. The time of each interview varied from 30 minutes to an hour.

Questionnaires were mailed to 19 doctors with a cover letter explaining the purpose and a self-addressed-return envelope (Appendix B). The 19 doctors selected were from the Stillwater, Oklahoma area. Physicians were selected from the Stillwater telephone directory on the basis of their specialty area--areas that most likely included treatment of hypertensives. Fourteen physicians responded to the questionnaire.

Analyzing the Data

Thirty interviews with subjects were completed and the results analyzed. The analysis of data consisted of two parts. The first part of the analysis was done by hand and consisted of totaling the calorie, fat, and sodium intakes of each subject. Composition of Foods (37) and Food Values of Portions Commonly Used (3) were used to calculate the calorie, sodium, and fat intakes. The second part of the analysis was done by computer. From the computer data the following comparisons were made: (1) calorie, fat, and sodium intakes of hypertensives and normotensives; (2) relationship between obesity and hypertension; (3) number of subjects with a history of hypertension occurring in their family; and (4) instructions of physicians for hypertensives concerning diet.

The questionnaires from the 14 responding physicians were tabulated and results are reported in Table VI.

CHAPTER IV

RESULTS AND DISCUSSION

Thirty black adults from the Langston, Stillwater, and Tulsa, Oklahoma areas participated as subjects in the study. Ten were hypertensive while 20 were normotensive. Information was obtained on the relationship between eating habits and the high incidence of hypertension in blacks and on the calorie, sodium, and fat intakes through interviews with the subjects. The accuracy of information gathered from subjects was somewhat questionable when dietary questionnare input was compared with that of the 24-hour recall. Further information on the medical treatment of hypertensives was obtained by a mailed questionnaire to physicians regarding medical treatment of other patients of the physicians. The findings from the interview and mailed questionnaire are presented and discussed in this chapter.

Calorie, Fat, and Sodium Intakes

Calorie, fat, and sodium intakes for each of the subjects were calculated from both the 24-hour recall and the dietary questionnaire. A mean for both groups--hypertensives and normotensives--was computed for calorie, fat, and sodium. Intakes from the 24-hour recall and the dietary questionnaire are shown in Table II and Table III. The intake values for the selected nutrients from the 24-hour recall ranged from a minimum of 873 calories to a maximum of 2490 calories; 30 to 115 gms

TABLE II

INTAKES OF SELECTED NUTRIENTS BY 24-HOUR RECALL

Subjects	Calories	Fat (gm)	Sodium (mg)
Hypertensives			
Mean	1688	79	1866
Minimum-Maximum	873-2490	30-115	339-3902
SD	553	35	1157
Normotensives			
Mean	2135	93	2901
Minimum-Maximum	859-3818	15-240	481-6709
SD	902	56	1711

TABLE III

INTAKES OF SELECTED NUTRIENTS BY DIETARY QUESTIONNAIRE*

Subjects	Calories	Fat (gm)	Sodium (mg)
Hypertensives			
Mean	2254	140	3341
Minimum-Maximum	715-4783	21-329	1092-7702
SD	145	108	2208
Normotensives			
Mean	1421	66	1877
Minimum-Maximum	183-3571	5-223	93-4679
SD	701	52	1125

*Represents average daily intake.

fat, and 339 to 3902 mg sodium for the hypertensives. For the normotensives the ranges were 859 to 3818 calories, 15 to 240 gms fat, and 481 to 6709 mg sodium. Intake values for the selected nutrients from the dietary questionnaire ranged from a minimum to maximum of 715 calories to 4783 calories, 21 to 329 gms fat, and 1092 to 7702 mg sodium for hypertensives and 183 to 3571 calories, 5 to 223 gms fat, and 93 to 4679 mg sodium for normotensives. A comparison of mean intakes of nutrients for hypertensives and normotensives is shown in Table IV.

TABLE IV

COMPARISON OF MEAN INTAKES BY METHOD OF COLLECTION

	24-Hour Recall	Dietary Questionnaire*
Calories		
Hypertensives	1688	2254
Normotensives	2135	1421
Fat (gm)		
Hypertensives	79	140
Normotensives	93	66
Sodium (mg)		
Hypertensives	1866	3341
Normotensives	2901	1877

*Represents average daily intake.

As shown in Table II the calorie, sodium, and fat intakes were higher for normotensives than the hypertensives on the 24-hour recall which measured one day's intake. However, the dietary questionnaire

revealed higher calorie, sodium, and fat intakes for hypertensives when measured on the basis of weekly intakes as shown in Table III. The 24-hour recall measured the intake value of the subjects for a day and was specific as to preparation and amount of servings for the one day. The dietary questionnaire measured intake values on a weekly basis and was an average of the foods listed for each item. Mean intakes of sodium and fat for hypertensives were 79 gms of fat and 1866 mg of sodium by the 24-hour recall method and 93 gms of fat and 2901 mg of sodium for the dietary questionnaire. Figures from the dietary questionnaire indicate that hypertensives do consume more calories, fat, and sodium when determined over a longer period of time than the normotensives.

Hypertensives did not consume more soul food items than normotensives as shown in Table V. The consumption of soul food seemed to be a personal preference and was unrelated to a hypertensive or normotensive characteristic. The findings in this study contradict some aspects of the dietary theory stated in Chapter II. Black hypertensives did consume more sodium and fat than normotensives, but it was from other food items and not soul food.

Relationship of Obesity and Hypertension

The interrelationship of obesity to hypertension demonstrated in other studies was evident in this study. The highest intakes were observed among the hypertensives which does appear to be consistent with higher intakes, obesity, and hypertension. The correlation was demonstrated by the fact that all of the hypertensive subjects were overweight. The weight ranges can be seen in Table VI.

TABLE V

INTAKE OF SOUL FOOD FOR NORMOTENSIVES AND HYPERTENSIVES

Food Item	Number of Hypertensives	Number of Servings per Week	Number of Normotensives	Number of Servings per Week
Bacon	7	21	10	30
Bacon Drippings	7	23	9	24
Bacon Rind	1	1	2	4
Bar-B-Que	5	6	8	8
Brains	1	1	0	0
Chitterlings	0	0	0	0
Cracklin	0	0	0	0
Fat Back	0	0	0	0
Hog Jowls	1	1	0	0
Hog Maws	0	0	0	0
Neck Bones	2	2	1	1
Pig Ears	0	0	0	0
Pig Feet	0	0	0	0

TABLE V (Continued)

Food Item	Number of Hypertensives	Number of Servings per Week	Number of Normotensives	Number of Servings per Week
Pig Tails	0	0	0	0
Salt Pork	6	15	8	18

TABLE VI

AGE, POUNDS OVERWEIGHT, AND PERCENTAGE OVERWEIGHT FOR HYPERTENSIVES

Age	Pounds Overweight	Percentage Overweight
21	25	19
21	33	22
24	70	58
27	11	9
28	30	17
51	82	73
64	58	46
65	64	49
69	26	20
70	10	8

As shown in Table VI, eight of the subjects were more than 15 percent overweight and would be classified as obese. Age seemed to have no effect on this factor as both younger and older subjects were obese.

Family History

Studies have shown that the risk of developing hypertension is related to family history and those who have a family history of this disease are more likely to be hypertensive than those who do not. This relationship of family history to hypertension was demonstrated in this study. Nine of the ten hypertensive subjects had one or more family

members who have or have had hypertension. The family relationship for each subject is shown in Table VII.

TABLE VII

FAMILY MEMBERS OF HYPERTENSIVES WITH HYPERTENSION

Subject	Members of Family with Hypertension
1	Grandmother Grandfather
2	Grandmother
3	Aunt
4	Father Aunts (4)
5	Father Aunt
6	Mother Uncles (3)
7	Mother Sister Brother
8	Mother
10	Daughter Mother Brothers (3)

The Doctors' Questionnaire

Of the 19 questionnaires sent out to doctors, nine replies were received complete enough to be reported. The percentage of hypertensive

patients the doctors treated in their practice ranged from a low of 2 percent to a high of 50 percent. Most of the doctors contacted did not have an appreciable number of black patients. The highest percentage of black patients in a practice was 20 percent and the lowest 0.5 percent. The number of black hypertensives treated by these physicians ranged from a low of 0.25 percent to a high of 41.5 percent. It was also found that seven doctors had black hypertensive patients with other medical problems associated with hypertension. The three age groups treated most often for hypertension were the 40 to 50 years, the 50 to 60 years, and the 60 years and older.

Responses from the questionnaire showed that these doctors do give some dietary counseling to their hypertensive patients. Doctors' response to the questions are shown in Table VIII.

TABLE VIII

DOCTORS' RESPONSES TO QUESTIONNAIRE FOR HYPERTENSIVE DIETARY TREATMENT

Question	Yes	No
Do you usually give dietary counseling to persons having hypertension	9	0
Do you usually restrict the dietary sodium intake	8	1
Do you restrict the amount of fat in the diet	9	0
Do you restrict the amount of pork in the diet	9	0
Do you recommend that a hypertensive patient be at his "ideal" weight	8	1
Do you restrict the calorie intake, when applicable	9	0
Do your black hypertensive patients usually have some other medical problem associated with hypertension	7	1

CHAPTER V

SUMMARY AND RECOMMENDATIONS

Calorie, fat, and sodium intakes were determined for a group of black adults from the Langston, Stillwater, and Tulsa, Oklahoma areas. Interviews containing a personal background section, 24-hour recall, and a dietary questionnaire were obtained from the subjects. A mailed questionnaire was sent to doctors in Stillwater, Oklahoma to obtain background information on medical treatment of persons with hypertension.

Calorie, fat, and sodium intakes were higher for normotensives than hypertensives on the 24-hour recall which measured a day's intake. However, the dietary questionnaire revealed a higher calorie, sodium, and fat intake for the hypertensives when measured on a weekly basis. The consumption of soul food was a personal preference which had no relationship to blood pressure.

The interrelationship of obesity to hypertension was demonstrated. All of the hypertensive subjects were overweight and eight were classified as obese.

The importance of family history was also demonstrated. Nine of the ten hypertensive subjects had relatives with hypertension.

Dietary counseling to hypertensive patients was given by the physicians. Most restricted sodium, fat, and pork in the diet of their hypertensive patients. Seven physicians had black hypertensive patients with other medical problems associated with hypertension.

Evidence was shown that black hypertensives may consume more calories, fat, and sodium than normotensives over a long-term period. More studies of a longitudinal nature are needed before this can be proven or disproven in a more conclusive manner.

For future studies, it is recommended that researchers increase the number of subjects, study intake for a longer time span, and use a more specific weekly dietary questionnaire. Further comparisons of calorie, fat, and sodium intakes for blacks and whites would be helpful. Another recommendation is that physical examinations and biochemical tests be included with the dietary intake data to obtain a total picture of the problem.

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APPENDIXES

APPENDIX A

CORRESPONDENCE

Oklahoma State University

Department of Food, Nutrition and Institution Administration

STILLWATER, OKLAHOMA 74074
(405) 624-5038

November 15, 1976

Dear Dr. :

I am a student working on my M.S. thesis in the Food, Nutrition, and Institution Administration Department at Oklahoma State University. The study is planned to ascertain if there is a correlation in the eating habits of blacks and the high incidence of hypertension occurring among blacks.

I would appreciate very much having the information on the enclosed questionnaire, as I would be interested in determining the extent of the problem and some of the present approaches in treatment.

My advisor is Dr. Esther Winterfeldt, Head, Department of Food, Nutrition, and Institution Administration, Room 412 Home Economics West, 624-5039.

I would appreciate very much having this information, if possible. Thank you for your interest, time, and assistance. Should you have any questions, please do not hesitate to call me, 372-3340.

Respectfully yours,

Sylvetta A. Striplin

Sylvetta A. Striplin

APPENDIX B

QUESTIONNAIRES

DOCTOR'S QUESTIONNAIRE

DIRECTIONS: Please answer the following questions to the best of your ability. The percentages do not have to be calculated, but rough estimations as close as possible.

1. Percentage of patients with hypertension. _____

2. Percentage of patients who are black. _____

3. Percentage of black patients with hypertension. _____

4. Percentage of black hypertensive patients that are overweight. ____

5. Which age group in your practice has the highest incidence of hypertension? (Please check one.)

   18-30 years _____ 50-60 years _____

   40-50 years _____ 60 years and over _____

6. Do you usually give dietary counseling to persons having hypertension? Yes ____ No ____

7. Do you usually restrict the dietary sodium intake for patients with hypertension? Yes ____ No ____

8. Do you usually restrict the amount of fat in the diet of a hypertensive patient? Yes ____ No ____

9. Do you usually restrict the amount of pork in the diet of a hypertensive patient? Yes ____ No ____

10. Do you usually recommend that a hypertensive patient be at his "ideal" weight? Yes ____ No ____

11. When applicable, do you restrict the calorie intake of your hypertensive patients in any way? Yes ____ No ____

12. Do your black hypertensive patients usually have some other medical problem(s) associated with hypertension? Yes ____ No ____

PATIENT'S INTERVIEW

I need to get some information from you. Would you please answer the following questions for me as best you can?

Personal Data:

Name: _____

Age: _____ Sex: _____ Weight: _____ Height: _____

Do you have high blood pressure? Yes ____ No ____

Questions:

1. How many years have you had high blood pressure? _____
2. How old were you when you found out you had high blood pressure? _____
3. Are you on a "special diet"? Yes ____ No ____ If yes, what type of "special diet"? _____
4. Was your "special diet" recommended by a doctor? Yes ____ No ____
5. How long have you been on this "special diet"? _____
6. Are you on any type of medication for your high blood pressure? Yes ____ No ____
   If yes, do you take it daily? Yes ____ No ____
7. Did the doctor tell you not to eat certain foods? Yes ____ No ____ If yes, list the foods _____
   _____
8. Are there any members of your family who have or have had high blood pressure? Yes ____ No ____ If yes, list _____
   _____
9. Do you have any other medical problems? Yes ____ No ____
   If yes, list _____
10. When was your last visit to the doctor? _____
11. When was the last time your blood pressure was checked? _____
    _____
12. Was your blood pressure check by a member of the medical team? Yes ____ No ____

24-HOUR RECALL

Name _____ Date and time of interview _____

Length of interview _____ Date of recall _____

Day of the week of recall _____
1-M 2-T 3-W 4-Th 5-F 6-Sat 7-Sun

I would like you to tell me everything you ate and drank from the time you got up in the morning until you went to bed at night and what you ate during the night. Be sure to mention everything you ate or drank at home, at work, and away from home. Include snacks and drinks of all kinds and everything else you put in your mouth and swallowed. I also need to know where you ate the food.

What time did you get up yesterday? _____

Was it the usual time? _____

What was the first time you ate or had anything to drink yesterday morning? (List on form that follows.)

Where did you eat? (List on form that follows.)

Now tell me what you had to eat and how much. (List on form that follows.)

Was intake unusual in anyway? Yes ____ No ____ If answer is yes:
Why? _____ In what way? _____

What time did you go to bed last night? _____

Do you take vitamin or mineral supplements? Yes ____ No ____ If yes:
How many per day? _____ How many per week? _____
What kind? (Insert brand name if known.)
Multivitamins _____ Ascorbic Acid _____
Vitamin A and D _____ Iron _____
Other _____

FOOD INTAKE RECORD

Time	Where Eaten*	Food	Type and/or Preparation	Amount

*Code: H--Home
R--Restaurant, drug store, or lunch counter
Cl--Carried lunch from home
CC--Child care center
OH--Other home (friend, relative, baby sitter, etc.)
S--School, office plant, or work
FD--Food dispenser
SS--Social center (e.g., senior citizen, etc.)

DIETARY QUESTIONNAIRE

Name_____ Date of interview _____

1. How many days a week do you eat?
   a morning meal? _____ an evening meal? _____
   a lunch or mid-day meal? _____ during the evening or night? _____

2. How many days a week do you have snacks, and what do you have then?
   in mid-morning _____
   in mid-afternoon _____
   in the evening _____
   during the night _____

3. When do you usually eat your meal?
   Morning _____ Mid-day _____ Evening _____

4. How many times a week do you usually eat away from home? _____

5. Would you say your appetite is: good ____ fair ____ poor ____

6. Do you add salt to your food at the table? Yes ____ No ____

7. How many times a week do you eat the following foods (at any meal or between meals)? Circle the appropriate number:

Bacon _____	0 1 2 3 4 5 6 7 > 7	specify _____
Pork Liver _____	0 1 2 3 4 5 6 7 > 7	specify _____
Fresh Ham _____	0 1 2 3 4 5 6 7 > 7	specify _____
Cured Ham _____	0 1 2 3 4 5 6 7 > 7	specify _____
Sausage _____	0 1 2 3 4 5 6 7 > 7	specify _____
Salt Pork _____	0 1 2 3 4 5 6 7 > 7	specify _____
Bones (neck or other) _____	0 1 2 3 4 5 6 7 > 7	specify _____
Spareribs _____	0 1 2 3 4 5 6 7 > 7	specify _____
Pork Chops _____	0 1 2 3 4 5 6 7 > 7	specify _____
Chitterlings _____	0 1 2 3 4 5 6 7 > 7	specify _____
Hog Maws _____	0 1 2 3 4 5 6 7 > 7	specify _____
Short Ribs _____	0 1 2 3 4 5 6 7 > 7	specify _____
Pig Feet _____	0 1 2 3 4 5 6 7 > 7	specify _____
Pig Ears _____	0 1 2 3 4 5 6 7 > 7	specify _____
Pig Tails _____	0 1 2 3 4 5 6 7 > 7	specify _____
Pork Steak _____	0 1 2 3 4 5 6 7 > 7	specify _____
Bar-B-Q (any type) _____	0 1 2 3 4 5 6 7 > 7	specify _____
Brains _____	0 1 2 3 4 5 6 7 > 7	specify _____
Pickled Pig Feet _____	0 1 2 3 4 5 6 7 > 7	specify _____
Hog Jowls _____	0 1 2 3 4 5 6 7 > 7	specify _____

8. How many times per week do you use the following foods to season with (at any meal or between meals)? Circle the appropriate number:

Bacon Drippings (for bread, vegetables) _____ 0 1 2 3 4 5 6 7 > 7 specify _____
Salt Pork (e.g., beans) _____ 0 1 2 3 4 5 6 7 > 7 specify _____
Ham Bone _____ 0 1 2 3 4 5 6 7 > 7 specify _____
Bacon Rind _____ 0 1 2 3 4 5 6 7 > 7 specify _____
Ham Pieces _____ 0 1 2 3 4 5 6 7 > 7 specify _____
Fat Back _____ 0 1 2 3 4 5 6 7 > 7 specify _____
Cracklin _____ 0 1 2 3 4 5 6 7 > 7 specify _____

9. How many servings per day do you eat the following foods? Circle the appropriate number:

Bread (including sandwich), toast, rolls, muffins (1 slice or 1 piece is 1 serving) _____ 0 1 2 3 4 5 6 7 > 7 specify _____
Milk (including on cereal or other foods) (8 ozs. is 1 serving) _____ 0 1 2 3 4 5 6 7 > 7 specify _____
Sugar, jam, jelly, syrup (1 tsp. is 1 serving) _____ 0 1 2 3 4 5 6 7 > 7 specify _____
Butter or margarine _____ 0 1 2 3 4 5 6 7 > 7 specify _____

10. How many times per week do you eat the following foods (at any meal or between meals)? Circle the appropriate number:

Fruit juice _____ 0 1 2 3 4 5 6 7 > 7 specify _____
Fruit _____ 0 1 2 3 4 5 6 7 > 7 specify _____
Cereal--dry _____ 0 1 2 3 4 5 6 7 > 7 specify _____
Cereal--cooked of instant _____ 0 1 2 3 4 5 6 7 > 7 specify _____
Pancakes or waffles _____ 0 1 2 3 4 5 6 7 > 7 specify _____
Potato _____ 0 1 2 3 4 5 6 7 > 7 specify _____
Other cooked vegetables _____ 0 1 2 3 4 5 6 7 > 7 specify _____
Raw vegetables _____ 0 1 2 3 4 5 6 7 > 7 specify _____
Macaroni, spaghetti, rice, or noodles _____ 0 1 2 3 4 5 6 7 > 7 specify _____
Ice cream, milk pudding, custard or cream soup _____ 0 1 2 3 4 5 6 7 > 7 specify _____
Sweet rolls or doughnuts _____ 0 1 2 3 4 5 6 7 > 7 specify _____
Crackers or pretzels _____ 0 1 2 3 4 5 6 7 > 7 specify _____
Cookies _____ 0 1 2 3 4 5 6 7 > 7 specify _____
Pie, cake, or brownies _____ 0 1 2 3 4 5 6 7 > 7 specify _____
Potato chips or corn chips _____ 0 1 2 3 4 5 6 7 > 7 specify _____
Candy _____ 0 1 2 3 4 5 6 7 > 7 specify _____
Soft drinks, popsicles or koolaid; sherbets _____ 0 1 2 3 4 5 6 7 > 7 specify _____
Instant Breakfast _____ 0 1 2 3 4 5 6 7 > 7 specify _____
Artificially sweetened beverage _____ 0 1 2 3 4 5 6 7 > 7 specify _____
Coffee or tea _____ 0 1 2 3 4 5 6 7 > 7 specify _____
Beer _____ 0 1 2 3 4 5 6 7 > 7 specify _____
Wine _____ 0 1 2 3 4 5 6 7 > 7 specify _____
Whiskey, vodka, rum, scotch, gin _____ 0 1 2 3 4 5 6 7 > 7 specify _____

APPENDIX C

SUBJECTS' INTAKE OF CALORIES, FAT, AND SODIUM

SUBJECTS' INTAKE OF CALORIES, FAT,

AND SODIUM

	24-Hour Recall			Dietary Questionnaire		
Subject*	Calories	Fat (gm)	Sodium (mg)	Calories	Fat (gm)	Sodium (mg)
1	3178	153.4	5817	7566	238.7	10374
2	2178	20.5	481	12128	527.7	13823
3	2043	69.4	3627	10842	310.3	10763
4	2204	95.2	1255	8776	280.9	10696
5	2010	68.9	1907	10736	795.4	19843
6	3735	162.6	6709	24977	1169.5	32752
7	3818	106.4	3882	5065	67.1	5808
8	1017	48.0	2017	16850	1565.4	32448
9	1026	46.0	871	10577	364.1	10733
10	1274	50.0	2455	9570	356.1	11112
11	1357	55.6	2951	9007	596.2	14013
12	944	33.6	636	8882	290.7	8848
13	3028	154.7	3865	14018	622.0	17409
14	1884	99.2	4665	9738	441.3	12671
15	2504	127.2	2753	25721	2420.3	30209
16	859	15.4	1529	10135	258.8	11165
17	3010	132.0	3866	8558	356.4	10119
18	1898	239.9	4312	8347	488.0	14118
19	2096	86.6	1342	3131	76.6	4102
20	2628	103.6	3084	8782	374.2	11388
21	883	29.9	1392	5006	142.8	7648
22	2075	113.5	3273	33480	1468.7	35274
23	1933	114.8	2675	18105	681.5	16133
24	1754	98.4	339	30262	2304.2	53917
25	2359	112.3	3902	8003	557.4	13956
26	1369	40.5	968	8767	592.5	16441
27	873	36.4	940	22029	2172.0	43106
28	2490	111.9	2248	14126	968.7	22529
29	1534	73.7	1996	6286	267.3	10294
30	1614	61.0	923	11704	674.9	14559

*Subjects 1 through 20--Normotensives; 21 through 30--Hypertensives.

APPENDIX D

PERSONAL DATA ON SUBJECTS

PERSONAL DATA ON SUBJECTS

	Normotensive	Hypertensive
Number overweight	11	10
Number underweight	1	0
Age range	21-68	21-70
Number on special diet	0	4
Number on medication for hypertension	0	7
Number with certain foods restricted	1	7
Number of family members with hypertension	14	9

VITA

Sylvetta Annette Striplin

Candidate for the Degree of

Master of Science

Thesis: A COMPARISON OF THE EATING HABITS OF BLACKS WITH AND WITHOUT ESSENTIAL HYPERTENSION FOCUSING ON SODIUM AND FATS

Major Field: Food, Nutrition and Institution Administration

Biographical:

Personal Data: Born in Tulsa, Oklahoma, January 12, 1949, the daughter of Mr. and Mrs. Sylvester R. Striplin, Jr.

Education: Graduated from Booker T. Washington High School, Tulsa, Oklahoma, 1967; received Bachelor of Science degree from Oklahoma State University with a major in Food, Nutrition and Institution Administration, July, 1972; completed the requirements for the Master of Science degree at Oklahoma State University in May, 1977.

Professional Experience: Computer Trainee, Skelly Oil Company, Tulsa, Oklahoma, summer, 1967; taught Mathematics and Science at the Street School, Inc., Tulsa, Oklahoma, 1974; Assistant Manager, Food Service Department, Oklahoma State University, 1974-1976; Food Production Manager, Philmont Scout and Explorer Ranch, Cimarron, New Mexico, summer, 1975; Teaching Assistant, Langston University, Langston, Oklahoma, summer, 1976; presently Instructor in the Department of Home Economics at Langston University.

Professional Organizations: Alpha Kappa Alpha Sorority.