

THE EFFECTS OF SUPERVISOR INTERVENTION  
ON HYPERTENSIVE EMPLOYEES' BLOOD PRESSURE  
IN AN INDUSTRIAL HYPERTENSION PROGRAM

by

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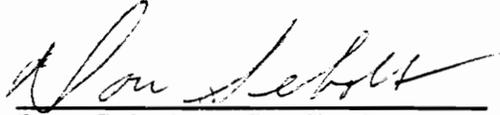
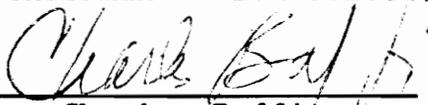
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## Chapter 1

### INTRODUCTION

Hypertension is an important risk factor in cardiovascular disease. It is a chronic, prevalent condition which affects nearly 60 million Americans (AHA, 1987). In 1985, 152,710 Americans died from stroke (Editorial, JAMA, 1987) while many more suffered and died from diseases associated with hypertension, such as heart attack or kidney failure.

Perhaps the most frightening aspect of hypertension lies in its symptomless nature. An individual may walk around for years with high blood pressure without ever knowing it because there are no symptoms associated with the condition. The current national estimate reports only 11% of all hypertensives have it under control (JNC, 1985). It remains largely uncontrolled; thereby laying the foundation for stroke, heart attack, kidney disease, and atherosclerosis.

The purpose of this study was to attempt to lower hypertensive employees' blood pressure by having plant supervisors educate them on their blood pressure. The supervisor provided a source of continuous, onsite information, and education for those employees with elevated blood pressure.

### Statement of the Problem

The Framingham study (Kannel, 1971) showed that men who have high blood pressure above 160/95 have two to three times the coronary heart disease rate of those with pressures less than 140/90. The Hypertension Detection and Follow-Up Program (HDFP, JAMA, 1979) demonstrated that mortality for those with mild hypertension could be significantly decreased with treatment. These studies were instrumental in support of the evidence that early detection and control of hypertension can reduce cardiovascular morbidity and mortality. In the early 1980's the Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure redefined the threshold for high blood pressure from 160/95 to 140/90. This move was also a result of the Hypertension Detection and Follow-up program. This investigator advocates use of the new threshold and all references made to hypertension will be based upon that measurement criteria.

Compliance is the most difficult problem in the treatment of hypertension. Because there are usually no symptoms, adherence to a regimen to control hypertension is low. In addition, complications from hypertension may not manifest themselves for many years, and those who are afflicted with the condition are poorly motivated to continue with treatment (Fries, 1978). Of the 32 million Americans who are aware they have high blood pressure, 13

million are treated for the condition but don't have it under control (JNC, 1985).

The economic impact of uncontrolled or poorly controlled hypertension on business and industry is staggering. According to Kuller (1982) hypertension is one of the three most important determinants of mortality in the United States population. Half of all Americans with elevated blood pressure are members of the labor force (Alderman, 1984), and it is reported (Kristen, 1982) that hypertension costs American companies \$18 billion dollars yearly and accounts for 29 million lost workdays. This represents over 2\$ billion dollars in lost earnings for the American worker.

Because of the prevalence of hypertension in the workplace, it is a convenient location to address this major issue. Men and women who are employed spend nearly 30% of their waking hours at the workplace and it offers accessibility to large groups of high risk people. In addition, the workplace is an important force influencing lifestyle because it is a place where much time is spent, where the greatest functional activity occurs, and where the closest social contact exists (Castillo-Salgado, 1984).

The Health Belief Model suggests that the probability of a person taking preventive action is a function of one's perceived susceptibility to a disease, the perceived severity of the disease, and the perceived benefits and

barriers related to the preventive action (Kirscht, 1977). The health belief model may be applied in the education of hypertension and its treatment, influencing a person's beliefs about his or her own vulnerability to the consequences of hypertension, and influencing beliefs about the effectiveness of compliance to a prescribed regimen. Employee motivation, interaction with his employer, and social interaction can also influence compliance (Alderman, 1984). Worksite treatment provides support and motivation for the hypertensive employee as well as continuous access to education and follow-up.

One major assumption of successful hypertension control programs is the availability and access to a trained occupational health nurse or a plant physician. Many times agencies or volunteers may provide assistance in the mass screening but are usually not involved any further. Industrial sites and businesses may have a nurse or physician on call, but because physicians cannot or often do not give the time and attention needed to hypertensive patients, it has been suggested (Finnerty, 1978) that others be trained to educate, motivate and provide support; a lay treatment network (DHEW, 1979).

In this study 46 hourly employees of Federal Mogul, an industrial bearing manufacturing plant with hypertension were randomly assigned to two groups. The experimental group received supervisor intervention in the form of

hypertension education while the control group received no structured education.

### Research Hypotheses

In this investigation, the following null hypotheses were tested:

1. There was no difference in blood pressure among those hypertensive employees who received supervisor intervention and those employees who did not receive supervisor intervention.

2. There was no difference in perception of social support for those hypertensive employees who received supervisor intervention and those employees who did not receive supervisor intervention.

3. There was no difference in blood pressure knowledge among those hypertensive employees who received supervisor intervention and those employees who did not receive supervisor intervention.

### Significance of the Study

Hypertension is a costly, symptomless condition which puts millions of Americans at risk of an early death or serious disability. Higher mortality and morbidity from hypertension can be reduced by lowering of blood pressure as evidenced by clinical trials by the Veterans Administration

(JAMA, 1970) and results of the Hypertension Detection and Follow-Up Program (JAMA, 1979; JAMA, 1982).

Medical care accounts for nearly 10% of the gross national product in which American business and industry pay over half of the bill. It is reported that General Motors spends more on health care than on steel from its principal supplier (Castillo-Salgado, 1984). As a result, business is becoming more involved in health care matters, particularly, health promotion.

With half of all hypertensives being members of the labor force (Alderman, 1984), and because of the economic impact on business and industry, the workplace has become an appropriate setting for hypertension control programs.

Many hypertension control programs are highly successful, reporting lowering employee blood pressure, and control rates of up to 80% (Alderman, 1980; Baer, 1981; Coburn, 1981; Cox, 1981; Lapointe, 1981). These programs were implemented with the aid of physicians, occupational health nurses, community organizations, and volunteers.

Education and follow-up are key components of successful hypertension programs which require time with the hypertensive employee. Occupational nurses and physicians may not be readily available to educate the hypertensive employee. It is imperative for the hypertensive employee to receive adequate education and follow-up to help in lowering or maintaining blood pressure at normal levels. Training

supervisors to help disseminate information to hypertensive employees and to provide support can be valuable to any business or industry.

#### Definitions and Symbols

1. HYPERTENSION: elevated blood pressure of 140/90 mm Hg. or greater. Also referred to as high blood pressure.

2. SUPERVISOR INTERVENTION: educational strategy which attempts to improve compliance. Information is provided to the hypertensive employee on high blood pressure, the consequences of untreated high blood pressure, and various approaches in the treatment of high blood pressure.

3. SOCIAL SUPPORT: Educational input directly provided by a supervisor which cue and reinforce compliant behavior.

4. COMPLIANCE: The extent to which a person's behavior coincides with medical or health advice.

#### Delimitations

The following delimitations applied to this investigation:

1. Only employees of Federal Mogul, a bearing manufacturing plant in Blacksburg, Virginia participated in this study.

2. Participation was limited to those employees who had elevated blood pressure readings on 3 separate occasions.

3. Participation was limited to those hypertensives who voluntarily completed and returned a questionnaire.

4. Only those supervisors of hypertensive employees who completed and returned the questionnaire participated in this study.

#### Limitations

The following limitations applied to this investigation:

1. Different technicians took blood pressure at the screenings.

2. The employee was asked to take the questionnaire home to complete and inso doing an exchange of information may have taken place, contaminating the results of the questionnaire.

3. Some employees returned the questionnaire the same day they received it, while some employees returned the questionnaire as many as three weeks later.

### Basic Assumptions

The following assumptions were made by the investigator:

1. It was assumed that all employees answered the questionnaire with integrity.
2. It was assumed that all supervisors carried out weekly assignments with their assigned hypertensive employee.

### Summary

Since 1972, the campaign to educate the public and health care providers about hypertension has resulted in a declining mortality from hypertension and stroke (AHA, 1987). However, hypertension remains a prevalent health problem, with only 11% having it under control. Left untreated hypertension increases the risk of stroke, heart failure, kidney failure, and heart attack.

Controlling high blood pressure at the workplace can benefit both the employee and the employer (NHPEP, 1984). Investment in hypertension programs allows for savings through reduction of absenteeism, disability, job turnover, hospitalization, and premature death (Castillo-Salgado, 1984).

The workplace can offer support, motivation and education to hypertensive employees in an attempt to help in the area of compliance.

## Chapter II

### LITERATURE REVIEW

This chapter focuses on the literature concerning high blood pressure. More specifically it addresses the epidemiology, mortality, morbidity, and costs associated with high blood pressure. Various nonpharmacological approaches used in the treatment of high blood pressure are reviewed as well as existing programs in the workplace. Social support strategies used in the treatment of hypertension are also reviewed.

#### Blood Pressure

Blood pressure is defined as the force of the blood against the walls of the arteries and veins (AHA, 1987). It is necessary to maintain tissue perfusion through the small arteries and arterioles, supplying oxygen and nutrients throughout the body.

The blood pressure in the vascular system is a result of cardiac rate, blood volume, and total peripheral resistance (Fox, 1984). An increase in any of these variables will result in an increased blood pressure. Arterioles and small muscular arteries provide most of the resistance to blood flow, and play a key role in hypertension, constricting and reducing blood flow to the tissues. Blood pressure is maintained and regulated by the

amount of blood circulating in the arteries and veins (blood volume), the pumping action of the heart (cardiac output) and by the diameter of the blood vessels (peripheral resistance) through which the blood has to flow (Strasser and Ganter, 1987). Blood pressure can also be regulated by the kidneys which control blood volume and the sympathoadrenal system. An increase activity of the adrenal medulla raises blood pressure by stimulating vasoconstriction of the arterioles, raising total peripheral resistance and increasing cardiac output (Fox, 1984).

When the small arteries that regulate blood pressure (arterioles) become narrower it is more difficult for blood to flow and supply the necessary oxygen to the body's organs and tissues. The heart must then pump harder to generate enough pressure to force the blood through the arteries.

Over time, arteries and arterioles become hardened and less elastic. When the heart must pump harder to push the blood, pressure within the vessels increases. When blood pressure increases above 140/90 mm.Hg. and consistently remains elevated, high blood pressure or hypertension exists (AHA, 1987).

High blood pressure is categorized in two ways; essential and secondary. Essential or primary hypertension constitutes the majority of hypertensives and in 90-95% of all cases, the cause remains unknown (AHA, 1987). In primary or essential hypertension, treatment cannot be directed

towards the underlying cause (Strasser and Ganter, 1987). "Secondary" hypertension is the result of a known physical disorder, usually caused by diseases of the kidney, adrenal gland, or the aorta (Fox, 1984).

### Epidemiology

Hypertension is a prevalent chronic condition which affects more than 60 million persons in the United States (AHA, 1987). In the early 1980's the Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure lowered the threshold for hypertension from 160/95 mm.Hg. to 140/90 mm.Hg. This revision was made because statistics show that people with blood pressure readings of 140/90 mm.Hg. and above are at a greater risk of disease or premature death from high blood pressure than those who have normal blood pressure (AHA, 1986). Those individuals who have "mild" hypertension have twice the cardiovascular risk than those individuals with normal blood pressure (JNC,1980).

The Hypertension Detection and Follow-up Program (JAMA, 1979) demonstrated that mortality for those with mild hypertension could be significantly decreased with treatment. The Framingham study (Kannel, 1970), showed those with high blood pressure had 3x as many heart attacks, 6x as much heart failure, and 7x as many strokes as those with normal blood pressure. This study clearly demonstrated

that the lower the blood pressure, the lower the cardiovascular risk even within the borderline or normal range (Kannel, 1981). These studies provided much supportive evidence that early detection and control of hypertension can reduce cardiovascular morbidity and mortality. They also played an instrumental role in the Joint National Committee's (1984) decision to redefine the threshold for hypertension and recommended treatment. Table 1 shows the classification of blood pressure which includes a new category of "high normal" blood pressure and recommends treatment for those with a diastolic pressure of 90 mm.Hg. or more. The American Heart Association as well as the National Heart Lung and Blood institute have all adopted the new classifications and recommendations. Therefore, changing the threshold now includes many more hypertensives, with the majority of them classified in the mild hypertensive range (JNC, 1980).

Left untreated, hypertension is the largest single contributor to stroke, which is the 3rd leading cause of death in the U.S. and the biggest cause of disability (AHA, 1986). In 1985, 152,710 Americans died from stroke alone (Editorial, JAMA, 1987), and many more individuals suffer and die from diseases and disabilities associated with hypertension: kidney failure, and ischemic heart disease. The decline in age-adjusted stroke mortality has accelerated since the National High Blood Pressure Education Program

Table 1. Classification of Blood Pressure

Range, mm Hg	Category*
Diastolic	
<85	Normal BP
85-89	High normal BP
90-104	Mild hypertension
105-114	Moderate hypertension
>115	Severe hypertension
Systolic, when diastolic BP is < 90	
<140	Normal BP
140-159	Borderline isolated systolic hypertension
>160	Isolated systolic hypertension

\* A classification of borderline isolated systolic hypertension (systolic BP, 140 to 159 mm Hg) or isolated systolic hypertension (systolic BP, >160 mm Hg) takes precedence over a classification of high normal BP (diastolic BP, 85 to 89 mm Hg) when both occur in the same person. A classification of high normal BP (diastolic BP, 85 to 89 mm Hg) takes precedence over a classification of normal BP (systolic BP, <140 mm Hg) when both occur in the same person.

began in 1972 (AHA, 1987). It is reported that if 1972 expected mortality rates had prevailed until 1985, 77,500 more Americans would have died from stroke in 1984 than actually did (Editorial, JAMA, 1987).

#### Mortality and Morbidity

From 1960-1962 the National Center for Health Statistics conducted the first Health Exam Survey (JNC, 1985) in which prevalence rates for hypertension were estimated. Since that time several surveys have been done producing a variety of prevalence estimates of hypertension; all based on different criteria and measurement procedures.

In 1984 the Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure revised the prevalence estimate of hypertension, extrapolating data from the results of the 1976-1980 National Health and Nutrition Survey (NHANES II) and the systolic hypertension and elderly program (SHEP). NHANES II data on blood pressure levels were based on direct standardized examinations and medical histories collected at 64 locations throughout the country. The survey was an assessment of a civilian, non-institutionalized population, 6-74 years of age. Blood pressure estimates for persons over 75 were used from the SHEP study where 20,000 persons over the age of 65 were recruited and screened in communities throughout the United States. From these two reliable surveys, the Joint National

Committee (1985) arrived at a consensus on a prevalence estimate for hypertension and the extent to which high blood pressure is detected, treated with medication, and controlled in the United States population. The intent of the Joint National Committee was to present one prevalence estimate and assist health planners, practitioners, and legislators in realizing the scope of high blood pressure. From that report, the National High Blood Pressure Education Program Coordinating Committee recommends use of the following statement in discussing high blood pressure: "Based on 1983 projections from national survey data, 58 million Americans are estimated to be at increased risk of morbidity and premature mortality associated with high blood pressure, warranting some type of therapy or systematic monitoring" (JNC, p.464., 1985).

The prevalence estimates are based on hypertension defined as blood pressure measurements greater than or equal to 140/90 mm. Hg. (JNC, 1985). The data show that black Americans have a higher prevalence of hypertension than whites (38% vs. 29%) with a greater severity, and men having a higher prevalence than women (33% vs. 27%). Prevalence rates show the incidence of hypertension increases with age regardless of race. It occurs most often in people over 35 years old, with men developing high blood pressure between 35-50, while women develop high blood pressure after menopause (AHA, 1987) The American Heart Association reports

(1987) that 2 of every 3 older Americans age 65-74 have high blood pressure.

When the threshold for hypertension was changed from 160/95 to 140/95 (JNC, 1980) the measures of awareness, treatment, and control were lowered (Figure 1). Under the new threshold, 54% of hypertensives are aware of their condition, 33% are taking medication for their hypertension, and only 11% have controlled hypertension.

#### Hypertension Objectives for the Nation

In the fall of 1980, the first Surgeon General's Report of Health and Disease published a document "1990 Objectives for the Nation." This document set out specific and measurable objectives for 15 areas. Five of those areas are related to health promotion. These areas include: smoking cessation, reducing misuse of alcohol and drugs, improved nutrition, exercise and fitness, and stress control (DHHS, 1980).

One health objective linked to all five of the above areas is of top priority because of its relationship to cardiovascular disease, especially stroke. This is the control of hypertension. The 1990 objectives for hypertension control stress the following areas: (1) increasing the public's knowledge of high blood pressure and its related consequences, (2) encouraging the adoption of behaviors which are conducive to blood pressure control, and

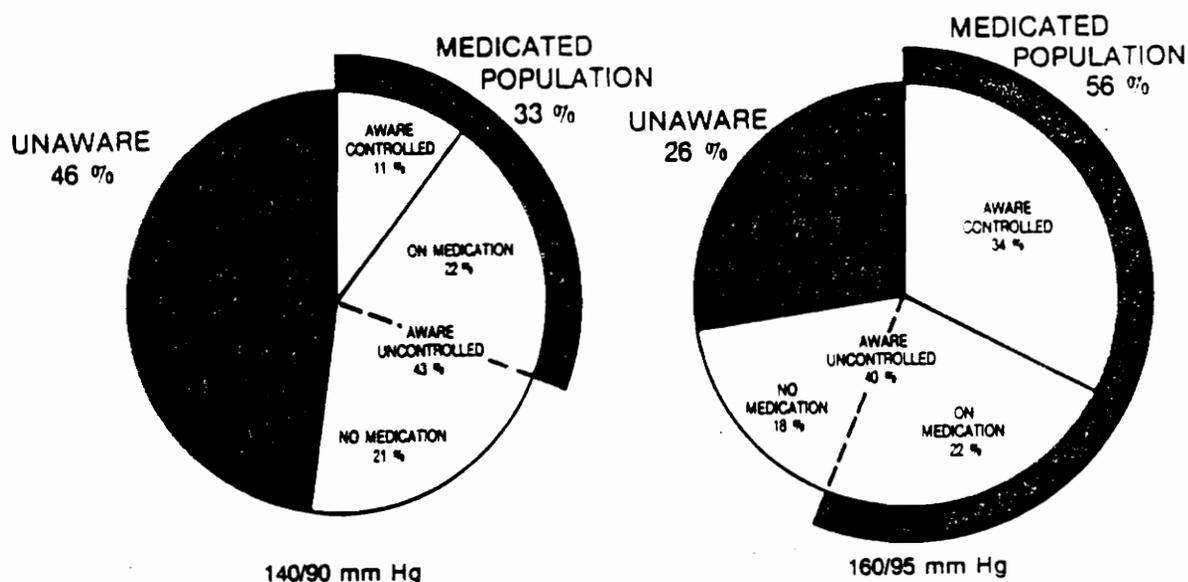


Figure 1. Hypertension awareness, treatment, and control status in the United States. Percentages are based on two different thresholds of hypertension. (Final Report of the Subcommittee on Definition and Prevalence of the 1984 Joint National Committee.

(3) implementing systems that are designed to improve surveillance and evaluation methods (Lenfant, 1987).

Specifically, relevant objectives in hypertension control by 1990 are: 1."at least 60% of the estimated population having definite high blood pressure (160/95) should have attained successful long term blood pressure control, i.e., a blood pressure at or below 140/90 for two or more years.

2."the average daily sodium ingestion for adults should be reduced at least to the 3-6 gram range.

3."the prevalence of significant overweight among the U.S. population should be decreased to 10 percent of men and 17 percent of women, without nutritional impairment.

4."at least 50% of adults should be able to state the principal risk factors for coronary heart disease and stroke, i.e., high blood pressure, cigarette smoking, elevated cholesterol levels, and diabetes.

5."at least 90 percent of adults should be able to state whether their current blood pressure is normal (below 140/90) or elevated, based on a reading taken at the most recent visit to a medical or dental professional or other trained reader" (DHHS, pp.6-7, 1980).

#### Predisposing Factors of Hypertension

Several factors are believed to contribute to the development of hypertension. Age, sex, race, diabetes, and

heredity are factors that cannot be altered. The tendency for high blood pressure runs in families, and close blood relatives who have suffered strokes or heart attacks at an early age increase the likelihood of developing high blood pressure (AHA, 1986). Diabetics also have a greater risk of developing high blood pressure than those where there is no hereditary tendency toward it. Other factors that may be altered and have received considerable attention are weight, sodium intake, alcohol, smoking, stress, and lack of exercise (JNC, 1986). There is no doubt that those who suffer from hypertension are at a greater risk for premature death or disability than those who do not have hypertension. As blood pressure rises the risk for premature death is increased and life expectancy is reduced (Table 2, Society of Actuaries, Nov. 1980).

#### Control of Hypertension

Effective treatment of hypertension can alter its negative impact. The landmark studies by the Veteran's Administration (U.S. Veterans Administration, 1967, 1970, 1972) demonstrated the effectiveness of anti-hypertensive drugs in reducing morbidity and mortality in middle aged hypertensive males, with diastolic pressures in the 90-129 mm.Hg. range. Originally, the study was designed to last longer than 3 years, but because the benefits of treatment were so obvious, the original study was discontinued.

Table 2. Life Expectancy and Elevated Blood Pressure

Male Patients			Female Patients		
Age	Blood Pressure	Loss of Life Expectancy (years)	Age	Blood Pressure	Loss of Life Expectancy (years)
35	Normal	--	45	Normal	--
	130/90	4		130/90	1.5
	140/95	9		140/95	5
	150/100	16.5		150/100	8.5
45	Normal	--	55	Normal	--
	130/90	3		130/90	.5
	140/95	6		140/95	3
	150/100	11.5		150/100	4
55	Normal	--			
	130/90	1			
	140/95	4			
	150/100	6			

Source: Society of Actuaries. Blood Pressure Study 1979 by Society of Actuaries and the Association of Life Insurance Medical Directors of America, November 1980.

The Hypertension Detection and Follow-Up Program (1979) showed that early detection and control of high blood pressure can reduce mortality and morbidity due to cardiovascular events for those with mild hyperension, diastolic levels between 90-104 mm.Hg. This study generalized the findings of the VA study to include both sexes and those of all ages (Kannel, 1984).

While the benefits of reducing blood pressure through the use of drugs is evident, there are also adverse long term effects attributable to drug therapy (Arch. Intern. Med. May, 1984 ). Side effects of antihypertensive drugs include dizziness, headache, fatigue, sexual dysfunction, insomnia, and an increase in serum lipids.

#### Nonpharmacological Approaches

Nonpharmacological therapy has received a great deal of attention in the treatment of hypertension as an alternate to drug therapy. Approaches include weight and sodium reduction, diet modification, reduced alcohol consumption, smoking cessation, stress management, and regular exercise. Each of these approaches will be reviewed briefly.

Weight Loss. The positive relationship between weight and elevated blood pressure is well documented. (Chiang, B.N., Perlman, L.V., Epstein, F.H., 1979, Frohlich, E.D., Messerli, F.H., Reisin, E., Dunn, F.G., 1983).

In the Framingham Study, it was demonstrated that body weight, body weight change over time, and skinfold thickness were related to blood pressure and to the rate of developing high blood pressure (Kannel, W., Brand, N., Skinner, J., Dawber, T., McNamara, P., 1967).

Weight loss by means of caloric reduction lowers blood pressure in most cases. An early study on the effects of an experimental semistarvation diet involving normotensive volunteers demonstrated a fall in diastolic and systolic blood pressure (JNC, 1986). Upon refeeding all values returned to prestarvation levels. While successful treatment of high blood pressure with weight loss has been reported for the past sixty years (Hovell, 1982) a randomized study by Haynes (1984) did not show a reduction in blood pressure with weight reduction. Eliahou (1981) reported that in obese patients blood pressure was reduced to within normal limits when they had lost only half of their excess weight. This suggests that it is not necessary to be at ideal body weight in order to reduce blood pressure. Blood pressure remained down as long as the decreased body weight was maintained.

Weight reduction can reduce cardiovascular morbidity and mortality even if blood pressure does not come down; therefore, weight reduction is recommended by the Joint National Committee (JNC, 1984) and the National High Blood Pressure Education Program (NHBPEP, 1977) to be included in hypertension treatment programs.

Sodium. Sodium restriction is another nonpharmacological approach recommended as a treatment for hypertension. Fries (1976) reported absence of hypertension in many primitive societies where blood pressure does not increase with age. He attributed reduced dietary sodium intake to be the reason for no increase. The JNC (1986) report of significantly lowering of blood pressure with severe sodium restriction as long ago as the 1940's. With the widespread use of antihypertensive drugs, such a severe restriction is no longer advocated.

Sodium trials by Macgregor (1982) and Watt (1983) have demonstrated a diversity of patient responses, where blood pressure may increase, decrease, or stay the same. The Macgregor (1982) study showed a lower blood pressure for those on a low sodium diet, whereas, in the Watt (1983) study there was no difference in blood pressure reported between high intake and low sodium intake groups, but both groups were significantly lower than during their control periods of unrestricted salt intake. Richards (1984) reported a heterogeneity of response to a low sodium intake. These studies have resulted in a category of individuals who are "salt sensitive"; persons whose blood pressure increases with high sodium ingestion and decreases with lower sodium ingestion.

The Dietary Intervention Study in Hypertension (Langford et. al., 1985) reported sodium restriction

doubles the success of withdrawal from drug therapy for those whose blood pressure had been controlled pharmacologically for five years.

Since there appears to be no harm due to moderated sodium restriction, the Joint National Committee (1986) has recommended no more than 2g./day (about 1 teaspoon of salt) as a therapeutic approach to be included in hypertension treatment programs.

Alcohol. A third nonpharmacological approach to treating hypertension which has been recommended by the Joint National Committee (1986) is alcohol restriction. Less than two (2) ozs. of ethanol daily for patients with hypertension is the recommendation supported by the Committee. One (1) ounce of ethanol is contained in 2 oz. of 100 proof whiskey, 8 oz. of wine, or 24 oz. of beer.

Hennekens (1983) reported that alcohol consumption, even in small quantities, has an elevating effect on blood pressure. There is a cause and effect relationship between alcohol consumption and elevated blood pressure; as daily alcohol consumption is increased, so is blood pressure (Cooke, 1983).

More recently, lower morbidity and mortality from coronary heart disease have been reported for those who consume 1-2 oz. of ethanol a day (Marmot, 1984; Gordon, 1984), suggesting alcohol is protective against coronary disease. Men and especially women who drink 10-30 g. of

ethanol per day have been reported to have lower blood pressure than those who do not drink and those who drink more than 10-30 g./day (Klatsky, 1977; Harburg, 1980; ).

Despite the implications of a positive effect of moderate alcohol intake, regular consumption of more than 1-2 ounces per day is the most common cause for reversible hypertension among men (MacMahon, 1984; Friedman, 1982). Saunders (1981) reported over half of 132 patients whose average daily alcohol consumption exceeded 80 g. had hypertension on admission to a hospital. After having stopped drinking and going through withdrawal, both systolic and diastolic pressures fell for those who consumed more than 80 g./day. Within that group, those who returned to heavy drinking had a return of high blood pressure, while those who stayed off of alcohol had normal blood pressure. Alcohol runs a close first, second only to obesity, in predisposing to hypertension (Strasser and Ganten, 1987)

Smoking. Smoking is a major cardiovascular risk factor (ACSM, 1986). Nicotine acutely raises blood pressure but does not elevate blood pressure chronically. The rise in blood pressure that follows the smoking of 2 cigarettes within 10 minutes is dependent on the release of epinephrine and norepinephrine (Cryer, 1976). Ballentyne (1978) reported that chronic smoking is not associated with higher levels of blood pressure or greater frequency of hypertension. However, deaths due to hypertension are more

common among smokers. It has also been reported that nicotine may adversely influence the effects of antihypertensive drugs (JNC, 1984).

Diet. Vegetarians have lower blood pressure and are less likely to become hypertensive than those whose diets include anything (Rouse, 1984). Vegetarians eat less saturated and total fat, cholesterol, and Vitamin B12, more polyunsaturated fat, dietary fiber, and vegetable protein, potassium, and magnesium than those who are not vegetarians. It is difficult to determine which components of the vegetarian diet are most important; therefore, no scientific conclusions have been made with regards to their blood pressure. The literature does indicate that blood cholesterol may be reduced by decreasing dietary fat to help minimize the risk of cardiovascular disease (Puska P., Nissinen, A., Vartianinen, E., 1983).

Stress. Stress is a fact of life which refers to a process in the body, to the body's general plan for adapting to all the influences, changes, demands, and strains to which it might be exposed. Physical, mental, and social strains may activate the plan. When events happen the stress related to the event may exceed an individual's coping ability. Thus it may be a factor in the onset of a variety of illnesses or may increase the severity of an existing problem. Stress is different for everyone, while some may tolerate certain

situations or events well, others are overwhelmed (DHEW, Pub. #79-55071A, 1979).

It has been shown that stressful stimuli from one's environment are a factor in developing or maintaining hypertension (Matarazzo, J.D., Weiss, S.M., Herd, J.A., Miller, N.E., Weiss, S.M., 1984). The effects of stress on elevated blood pressure are of a neural origin (Fox, 1984). The body is alerted by the brain and the pituitary gland releases the hormone ACTH into the bloodstream. Adrenaline and nor-adrenaline are released into the blood and the body is prepared to react. Heart rate increases, blood volume increases; all acutely increasing blood pressure. Blood pressure can return to normal if the body is allowed to express and release the emotion (Strassen and Garten, 1987).

Because stress is so individualistic in how it is perceived and dealt with, its impact on hypertension is difficult to quantify and control (JNC, 1984).

The effects of stress on blood pressure can be modified by biofeedback and relaxation therapy (JNC, 1984). Biofeedback involves providing patients with blood pressure feedback using electronic devices and in turn hypertensives can develop mental techniques to raise or lower blood pressure (JNC, 1984). Relaxation therapy emphasizes muscular relaxation and a relaxed, calm, state of mind; physiological changes that are not produced by stress (JNC, 1984).

Exercise. A well planned program of regular physical exercise has been shown to reduce cardiovascular risk (Paffenberger, 1978). Since 1966 there have been 11 studies on the effects of exercise on hypertension (Ryan, 1987), all showing reductions in blood pressure with 8 showing significant reductions.

The precise mechanism for lowering blood pressure with exercise is not known, it is suggested to occur because of a reduction in catecholamines (Katch & McArdle, 1986). This response results in a decrease peripheral resistance to blood flow producing a lowering of blood pressure. In addition, a regular exercise program is an aid to weight control.

The evidence is supportive that those who exercise and are physically fit, may also follow a healthier lifestyle that includes less fat, sodium, and one's reaction to stress. Paffenberger (1983) in a study of Harvard alumni, reported students who didn't engage in physical activity had a 35% greater risk of later becoming hypertensive. In a 1 to 12 year follow-up of over 6000 men and women, those who had low fitness levels at the initial screening had a greater relative risk of developing high blood pressure than those who had higher levels of fitness (Blair, 1984).

### Social Support

Social support is a concept which has received widespread attention because of the evidence showing it can provide protection against stress, and physical and mental illness.

Social support as defined by Cobb (1976) is "information leading the subject to believe that he is cared for and loved, esteemed, and a member of a network of mutual obligations." Social support begins at birth and continues throughout life; receiving cues and information from mother, family, co-workers, and friends that lead an individual to believe he is cared for.

Throughout the years, the ability of social support to moderate or buffer the negative effects of stress has been examined. Lin (1979,p.109) states "the greater social support that an individual receives, in the form of close relationships with family members, kin, friends, acquaintances, co-workers and the larger community, the less likely that the individual experiences illness."

In a study of 170 pregnant army wives, Nuckolls (1972) found that women who lacked social support were more likely to experience complications. Pregnant women who had the same frequency of life changes with greater social support showed no increase in complications.

A more specific area which has become popular in social support, is job stress and health. Several investigators have reported support plays a major role in modifying the

deleterious health effects of stress and can promote adherence to needed medical regimens (Haynes, Taylor & Sackett, 1979)

Caplan (1972) reported that perceived support from supervisors, subordinates, and co-workers was negatively related to many perceived occupational stresses.

In a study of 100 unemployed men (Gore, 1978), cholesterol levels, depression, and reported illness were less among those with supportive marital relationships and ties to the extended family and peer group than those with low social support.

Studying 1800 white males working in a tire and rubber manufacturing plant, House and Wells (1978) sought to differentiate sources of support. They report, "under maximum levels of social support marked symptoms of self-reported ill health increases only slightly, if at all, as stress increases. However, when social support is minimal, marked symptoms of ill health increase dramatically as stress increases." In looking for specific sources of support which alleviated stress, it was supervisor and wife support that accounted for the buffering effect.

In conclusion, there is substantial evidence that social support can reduce job stress and improve health. Two important variables are needed in regards to social support. A standard way to measure social support, as well as an agreed upon definition of what constitutes social

support. Until a standard model of social support is presented, empirical data will be controversial, conflicting, and confusing.

### Compliance

Although the number of individuals identified as hypertensive has increased dramatically over the last 10 years and with the increasing knowledge in how to control hypertension, there still remains a serious problem. Forty-six percent of hypertensive Americans are still undiagnosed, especially younger adults with mild hypertension. Of the 54% who are diagnosed, more than 13 million are treated yet do not have their hypertension under control (JNC, 1985).

The problem of controlling hypertension lies in adherence or compliance to the prescribed regimen. Many believe the absence of symptoms is an indication that blood pressure is under control (Kirscht & Rosenstock, 1977) so many hypertensives go off of treatment on their own because they no longer experience symptoms they perceive as related to the condition (Baumann & Leventhal, 1985).

According to Leventhal, Meyer, and Gutmann (1980) the Health Belief Model is the model used to study the issue of compliance the most. The Health Belief Model suggests that preventive action is a result of an individual's feelings of susceptibility to a potential health threat, his or her perception of the seriousness or consequences of the

disease; the perceived benefits and costs of specific health behaviours; and a cue to action (Becker, M.H. 1974). To date, the most common methods of measuring compliance in the area of hypertension includes: (1) invasive measurement of drug levels in body fluids; non-invasive measures which include (2) attendance at appointments, (3) pill counts, (4) interviews, (5) self monitoring and medication dispensers, and (6) clinician ratings (DHHS, 1980).

The lack of a consistent definition of compliance contributes to the confounding and contradictory data reported in several investigations. Compliance in this investigation is defined as "the extent to which a person's behavior (in terms of taking medications, following diets, or executing lifestyle changes) coincides with medical or health advice" (Haynes, p.1, 1979).

Social support is an important variable in the study of compliance. Social support in this investigation is defined as "input directly provided by members of the patient's social environment which cue and reinforce compliant behavior (DHHS, pub.#81-2102, 1980, p. 145).

Many studies have investigated the relationship between social support and adherence. Studies involving social support may be grouped into four categories; home visits, significant other training--not at home, group support, and structured reinforcement/contracting. Earp and Ory (1979) investigated the effects of home monitoring of blood

pressure by a significant other with home visits by a public health nurse. A significant drop in blood pressure was reported.

In a study by Green, Levine, Wolle, and Deeds, (1979) patients who were assigned home visits along with a review of their regimen and small group discussions, showed better medication compliance, appointment keeping, and blood pressure control.

Caplan, Harrison, and Wellons (1980) assigned 483 subjects to a control or an experimental condition of social support and a partner or no partner. The nurse was to provide social support by explaining the regimen and how to follow it, providing encouragement to follow the regimen and praising the patient for adherence, encouraging the patient to try partial adherence as a first step, and allowing the patient to express worry, anxiety, and concerns so they could be worked through. Their findings showed no significant changes in blood pressure due to the intervention but that those with partners stayed in treatment longer.

Trends in compliance improvement strategies are divided into four categories. These categories are: (1) practical techniques to make health care services more convenient, focused, and accessible, (2) social support by involvement of significant others, (3) education and counseling approaches to affect the patient's attitudes, knowledge, and

beliefs about hypertension, and (4) techniques to make the patient a more active and responsible participant in his or her own health care (DHHS, 1980).

Control of high blood pressure is the final goal of any hypertension control program. Identifying, then implementing various behavioral, educational, and practical strategies to improve compliance remains to be challenged.

Most social support strategies to improve compliance involve significant others from outside the medical environment. Family or peer group members are encouraged to remind the hypertensive to adhere to his or her recommended regimen. Patient counseling and educational strategies attempt to affect the hypertensive's attitudes, beliefs, and understanding of hypertension and its consequences. Patient involvement strategies try to make patients more active participants in their treatment.

#### Hypertension Programs in the Workplace

Social support strategies for compliance require participation from the provider, the patient, and the family or peers (DHHS, 1980). Johns Hopkins University (1977) aims at instructing one family support person to remind the patient when to take medication. In West Virginia, compliant behaviors are stressed to the patient by a family member or a significant other. The Brookline Health Department in Massachusetts taught high school teachers

methods and techniques in screening, follow-up and support of their faculty colleagues (1979).

The workplace has become an ideal setting for dealing with various health related issues. Utilizing existing facilities at the worksite and implementing various health programs within the workplace has many advantages. These include minimizing time away from the employees' job, cohesiveness and support of the work environment, and low cost treatment (Alderman, 1984).

Hypertension afflicts over 58 million people (AHA, 1986). It is considered a prevalent problem in the work force with an estimated 30 million workers, or 30% of employed Americans having elevated blood pressure (National High Blood Pressure Education Program, 1983). Hypertension is one of the three most important determinants of mortality in the adult population (Salgado, 1984). Because men and women spend nearly 30% of their waking hours at work, and the workplace offers accessibility to large groups of people, it is evident that the workplace would be a valuable site for the detection, education, and follow-up of high blood pressure.

High blood pressure programs in the workplace have become increasingly popular. In 1972, the National Heart, Lung, and Blood Institute launched an intensive, multidisciplinary campaign to reduce excess illness, disability and death from uncontrolled high blood pressure.

The National High Blood Pressure Education Program also begun in 1972, set up by the NHLBI, has had a major impact on educating the public and private sector on the seriousness of hypertension. Thanks to the efforts of such organizations, the evidence is clear that hypertension control programs have a positive impact on health and health-related costs.

Almost 15 years ago, hypertension workplace programs only screened employees for high blood pressure. Screening by itself was found to be inadequate because many employees found to be hypertensive did not seek or maintain medical care (Ward, 1978). Today, many programs vary in their approach to high blood pressure, but all successful programs have certain components in common. These components include screening with strong referral, follow-up, and maintenance which includes education and evaluation (Alderman, 1984).

Many companies and businesses report highly successful programs with control rates up to 80%. These include programs implemented at Campbell Soup Company (1973), Macalloy Corporation (1976), General Motors Corporation, Blue Cross/Blue Shield (1981), Massachusetts Mutual Life Insurance Company, and United Storeworkers (1976), involving New York City department stores.

Successful control rates have been achieved through the efforts of company personnel, the cooperation of employee's own physician, and community organizations. Worksite

programs that have an occupational nurse have reported the nurse to have a close relationship with employees, giving them support and encouragement, and are an important source of reinforcement for the hypertensive employee (Babbitz, 1981; Scarborough, 1981; Tilson, 1981). Using the nurse for follow-up in hypertension programs has also been reported to be cost-effective (Cox, 1981; Foote, 1977; LaPointe, 1981; Logan, 1979, 1982).

Most worksite hypertension programs use health care support strategies or patient education and counseling strategies (DHHS, 1980). Patient tracking is a frequent type of support used in the workplace. It is effective for several reasons: (1) most employees are at work everyday, (2) most workplaces have a medical department with records of employees, (3) the workplace is an ideal location for long term monitoring, (4) the health personnel has good lines of communication with the hypertensive and management (Fries, 1979). The Massachusetts Mutual Life Insurance Co. uses such a program and has met with great success (1979).

Hypertension education and counseling are also useful in the workplace. The focus is on hypertension, risk factors and consequences of untreated hypertension, lifestyle changes, drugs, and attempts to increase motivation and compliance with emotional support.

Two hypertension programs in the workplace which have addressed the issue of social support are the United

Steelworkers Union and Gimbel's Department Store (which is now Bloomingdale's) both in New York City. After identification and referral, the hypertensive was given a wallet sized identification card with information for keeping appointments, how to take medications, clinic telephone numbers, and their current blood pressure readings. The sharing and comparing of this information with other hypertensives they work with develops into a supportive network of peers.

The social support strategy involve the material, intellectual, and emotional resources provided by others. Significant others may offer goods and services helpful in dealing with a challenge, information helpful in meeting a challenge, understanding and encouragement, interpersonal pressure or persuasion in dealing with their regimen (DHHS, 1980). It is reported that outreach subjects visited by a health worker five times in seven months showed a 12 percent improvement in blood pressure control compared to their ordinary care controls (DHHS, 1980). Levine (1979) educated an adult friend of the hypertensive (usually spouse) with a community worker. Hypertensives in this study reported moderate improvement in compliance with medication and better appointment-keeping in comparison to a control group. Blood pressure control improved 37-48 percent as compared to 1 percent improvement in the control group.

The direct and indirect costs of hypertension are staggering. Uncontrolled hypertension costs American companies \$18 billion dollars a year on hypertension and accounts for 29 million lost workdays. In addition, each hypertensive in the work force can consume between \$170 and \$300 in medical care costs and between \$270 and \$460 in lost productivity (Kristen, 1982).

The benefits of hypertension programs in the workplace have been well documented. Possibly the greatest benefit is the reduction of risk for premature death or disability due to stroke or heart attack.

Chapter III  
JOURNAL MANUSCRIPT

Abstract

Forty-six employees of an industrial bearing plant volunteered to participate in a workplace hypertension program. The purpose of this study was to lower hypertensive employees blood pressure by having plant supervisors educate the employee in an eight week hypertension program on his or her high blood pressure. This was done in an effort to aid employees in the management of their blood pressure, as well as to provide a source of emotional support within the plant.

Subjects were randomly assigned to an experimental or control group. Supervisors of each hypertensive subject were given educational instruction on high blood pressure and variables related to hypertension. Supervisors also were given specific weekly assignments to convey to their subjects. Pretest and posttest measurements were made on blood pressure and knowledge concerning blood pressure. At the end of the eight week intervention a significant decrease in systolic blood pressure was seen in the experimental group with a 16 mm.Hg. drop ( $p < .05$ ). There was no significant difference ( $p > .05$ ) between the two groups on diastolic pressures, with both groups dropping to

within the guidelines recommended by the American Heart Association (1987). Subjects in the experimental group scored higher on their knowledge of blood pressure than did subjects in the control group ( $p < .01$ ). The results of this study indicate that a hypertensive educational intervention program may produce positive changes in employee blood pressure responses.

### Introduction

There is no doubt as to the benefits of treating hypertension. Even with the advancements made within the last decade in the detection and treatment of the condition, the problem today lies in adherence to the prescribed regimen.

It is estimated that only 11 percent of the 60 million hypertensive Americans have their condition under control (JNC, 1985). Hypertension may be controlled through pharmacological means or through lifestyle changes such as weight reduction, sodium and alcohol restriction, diet modification, smoking cessation, and emotional stress management (JNC, 1984).

Controlling high blood pressure at the workplace has been of great interest recently. It is an ideal setting for hypertension detection, education, and follow-up. The workplace offers continuous access to a large number of hypertensives, convenience, low-cost, and provides a strong

social support system (NHBPEP, 1984). Many hypertension programs sponsored by unions, companies, hospitals, insurance companies, and the government have been very successful in lowering employee blood pressure with control rates up to 80% (Alderman, 1984; Fielding, 1982). Results from worksite programs consistently show improved control, are cost-effective, and reduce absenteeism among hypertensives (Foote & Erfurt, 1977, 1983).

Most worksite hypertension programs use an onsite occupational health nurse or physician in the management of high blood pressure (Hill, 1985; Cox, 1981; LaPointe & Ormsby, 1981; Coburn, 1981; Woods, 1981; Robb, 1981). Community resources may also provide high blood pressure services, participating in the screening. Because of the large numbers of hypertensives in the workforce, a physician on call or a nurse working certain hours may not have or devote the time to give proper attention to all hypertensive employees (Fries, 1978; DHEW, 1980).

Compliance to hypertension regimens includes a wide variety of interventions (Haynes, 1979). A major problem of multiple interventions in hypertension control studies is that there are no patterns explaining the effectiveness of the interventions. Earp and Ory (1979) found blood pressures dropped and remained under control as long as 24 months in those subjects who participated in home monitoring

by a significant other with routine clinic visits compared to those subjects who only received clinic management.

Caplan et. al.(1980) assigned subjects to a control or one of two experimental groups. The experimental group was divided into those who did and did not bring a partner. Both experimental groups received social support from a nurse. Results of that study indicated no significant differences in mean systolic or diastolic blood pressure due to the intervention. However, subjects who used partners were found to stay in treatment longer. Both of the mentioned investigations had serious methodological problems; Caplan showing a serious attrition rate within the experimental group, and Earp and Ory used a significant other as well as introducing monitoring equipment making it difficult to separate effects.

Numerous techniques have been implemented in an attempt to achieve adherence to prescribed regimens. These strategies include patient instruction materials and classes, group discussions, exit interviews, home visits by nurses or community health workers, special medication packaging, and contracting with the patient (Hill, 1985). Active patient involvement and continued patient education directed toward behavior change yield effective adherence (Haynes, Taylor, & Sackett, 1982; Morrisky, 1982).

This investigation focused on supervisor intervention as a means to transfer knowledge on hypertension to motivate

employees to take responsibility in the management of their blood pressure. The supervisor was an available resource and source of support for the hypertensive employee. This thesis attempted to specify the form of social support as supervisors conveying information on hypertension to an assigned employee in their particular work location. This investigation differs from other hypertension studies because it utilizes management to address high blood pressure control to an assigned hypertensive employee in an educational and practical manner.

#### Methods

Forty-six employees, eight females and thirty-eight males voluntarily participated in this study. All were employees of an industrial bearing manufacturing plant. All had been identified by the investigator as having consistently elevated blood pressure. Medical screening was done in accordance with guidelines set forth by the American Heart Association of Wisconsin Blood Pressure Measurement Education Program (1981) and The Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure (1984).

### Development of Questionnaire

After the screening and identification of those with elevated blood pressure, subjects completed a questionnaire to measure their knowledge of hypertension.

The first part of the questionnaire was an assessment of current lifestyle and pertinent demographics.

The second part consisted of questions addressing current knowledge and beliefs about blood pressure. A 27 item knowledge test was compiled by the investigator. These questions were selected on current facts known and published about high blood pressure from the American Heart Association (1987) and the Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure (1986). The questions dealt with the physiology of high blood pressure, risk factors, a general regimen of treating high blood pressure, and the consequences of treated and untreated high blood pressure.

Questions regarding supervisor support were taken from Job Demands and Worker Health, the work of Caplan, Cobb, French, Harrison, and Pinneau (1980), from the Institute for Social Research.

Employees were randomly assigned to an experimental or control group. The experimental group had 22 participants and the control group had 24 participants.

### Supervisor Selection

Supervisors were selected on the basis of each hypertensive subject's work location. Whatever area of the plant the hypertensive subject worked, the supervisor of that location was selected to be trained to educate the subject.

### Design and Content of Program

The experimental group received supervisor intervention once a week. In addition, each subject was requested to have his or her blood pressure checked by the plant nurse weekly. The control group received no formal education from any supervisor.

Supervisors met with the investigator once a week for 60 minutes to learn about a specific topic related to hypertension and to discuss their weekly assignment to be carried out with the hypertensive subject or subjects for whom they were responsible.

The intervention lasted for eight weeks during which time important areas of hypertension were discussed. These areas included blood pressure, the physiology of high blood pressure, consequences of untreated hypertension, and various pharmacological and nonpharmacological methods of treatment.

### Data Analysis and Results

Pre-post measurements were made on blood pressure and current knowledge of hypertension.

Non parametric (Kruskal-Wallis) statistical analysis was used to measure pretest and posttest differences between the experimental and control groups on blood pressure and knowledge of high blood pressure.

There was no significant difference in blood pressure before the intervention between the two groups. Before the intervention the experimental group had a mean systolic pressure of 153 mm.Hg. while the control group had a mean systolic pressure of 147 mm.Hg. Diastolic pressures were 92 mm.Hg. and 91 mm.Hg., respectively.

After the intervention the mean systolic pressure of both the experimental and control groups was 137 mm.Hg. Figure 3.1 shows the pre-post systolic means for the experimental and control group. There was a significant difference between the experimental and control groups in the amount of change before and after the intervention in systolic blood pressure ( $p < .05$ ). There was a 16 mm.Hg. drop in systolic pressure of the experimental group as compared to a 10 mm.Hg. drop in the control group.

Figure 3.2 compares pretest and posttest diastolic means of both groups. Both the experimental and control groups diastolic blood pressures dropped to within the American Heart Association's recommended guidelines (1987).

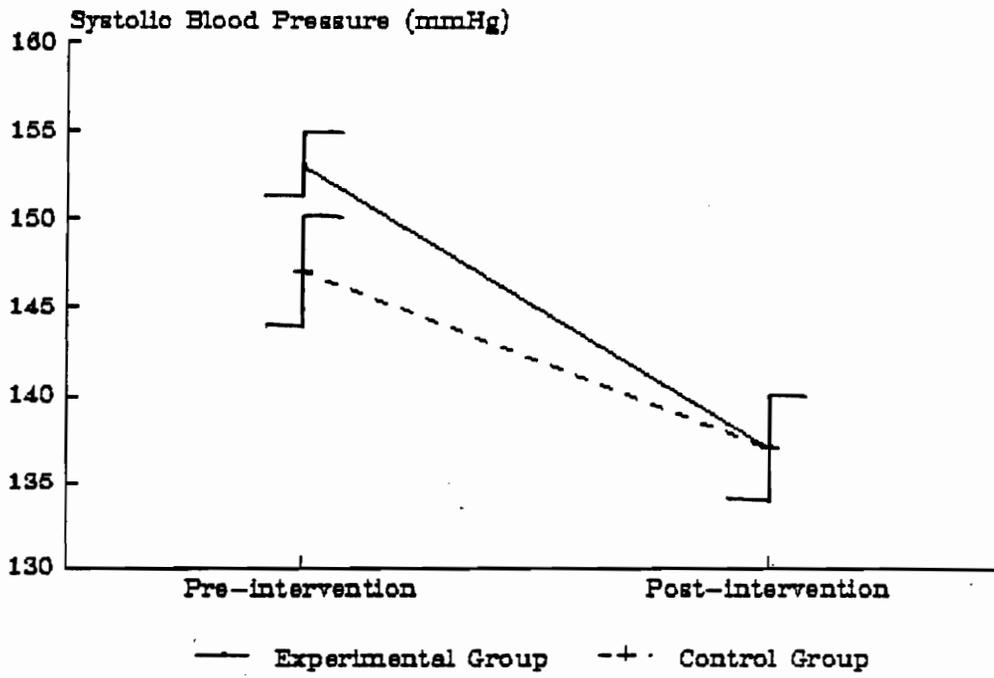


FIGURE 1. Pre and Post Intervention Mean Systolic Blood Pressure

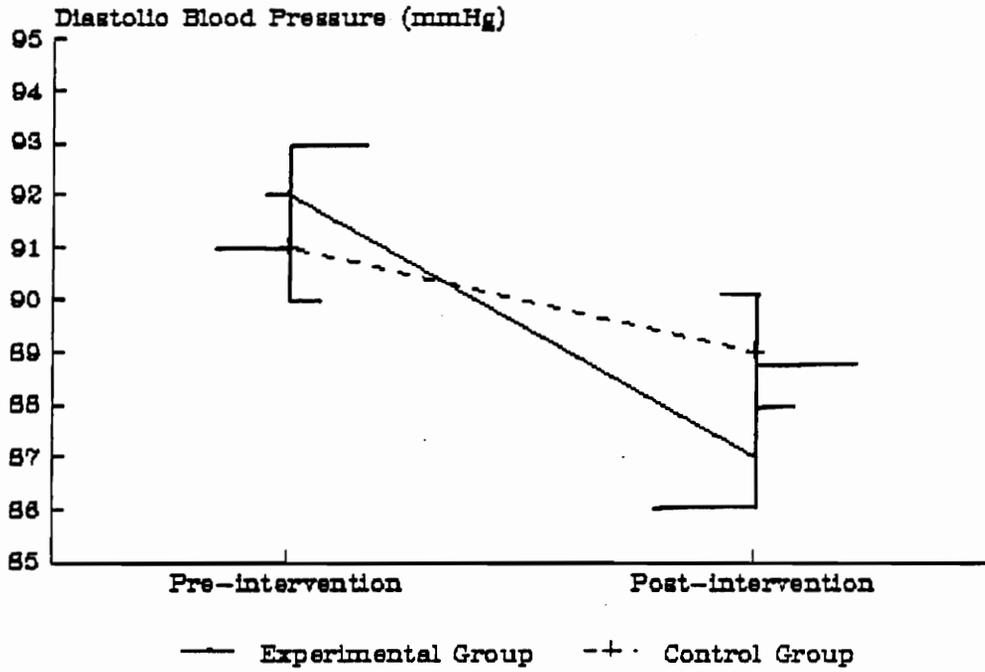


FIGURE 2. Pre and Post Intervention Mean Diastolic Blood Pressure

The diastolic pressures were 87 mm.Hg. for the experimental group and 89 mm. Hg. for the control group.

Blood pressure knowledge was assessed using a 27 item test. The questions were chosen on factual information on high blood pressure and dealt with the physiology of blood pressure, risk factors, consequences of uncontrolled high blood pressure, and a general regimen to treat hypertension. The reliability of the test questions was determined by the Kuder-Richardson Formula 21. The estimate was .67 for the pretest and .75 for the posttest. Each question was given a value of 1 point. The number of correct responses was then added together for an individual score. Means were then analyzed for both groups using an independent nonparametric statistic.

Pre and posttest mean scores for both groups are found in Figure 3.3. Blood pressure knowledge scores between the two groups were not significantly different after the pretest; however, after the intervention, the experimental group scored higher on the blood pressure knowledge test than did the control group, with a significant difference in knowledge ( $p < .01$ ). The control group scores were lower on the posttest than the pretest.

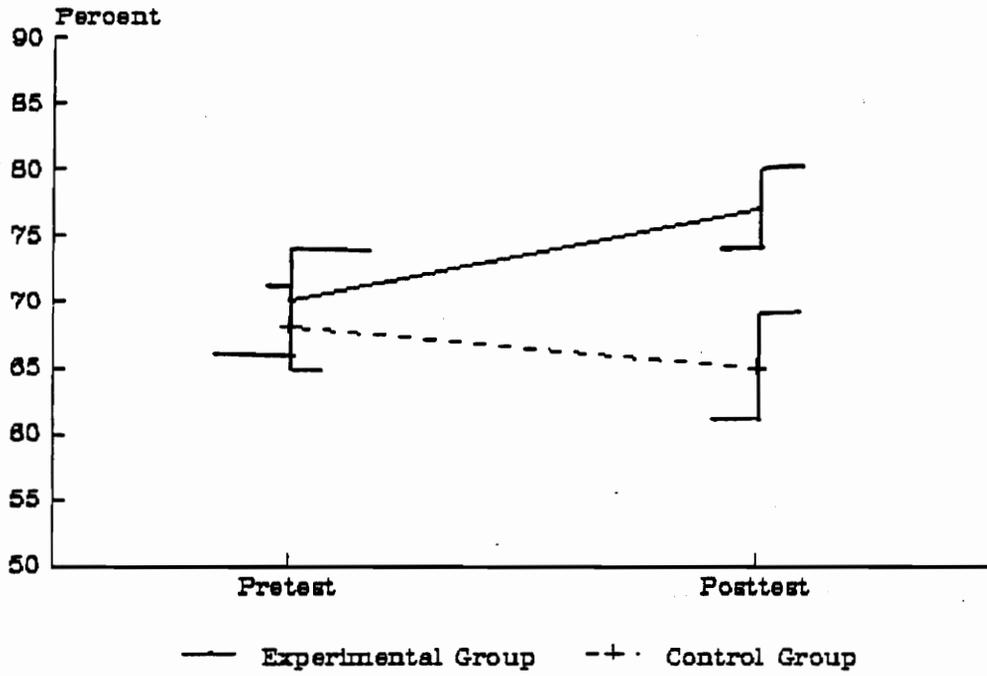


FIGURE 3. Pre and Posttest Mean Blood Pressure Knowledge Scores

### Discussion

Both the experimental and control group showed a decrease in systolic and diastolic blood pressure after the intervention to within the American Heart Association's recommended guidelines (1987). The 16 mm.Hg. drop in systolic pressure by the experimental group was significant, but the diastolic pressure was not. The frequent presence of the investigator and the probable exchange of information among employees may explain the drop in the control group's blood pressure as well.

In addition, the initial screening and detection of high blood pressure among the controls may have increased their awareness and prompted them to take some positive action to control their hypertension.

The experimental groups drop in blood pressure is an indication that knowledge about the consequences of untreated high blood pressure and the costs associated with it may have provided the cue necessary for behavioral change. The components of this investigative program included education; an important variable found in successful hypertension programs (Alderman, 1984).

General knowledge of blood pressure did increase in the experimental group while the control group's knowledge decreased from the pretest measurement. Having the appropriate knowledge about blood pressure may encourage the hypertensive employee to change his or her behavior in a way

to help manage their high blood pressure (Green et. al., 1980).

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Chapter IV  
SUMMARY OF THE STUDY

Summary

The purpose of this investigation was to lower hypertensive employees' blood pressure in an industrial setting. An educational program using plant supervisors was conducted within the plant. The supervisors then provided information about high blood pressure and its management to hourly employees who voluntarily participated in this study.

Forty-six wage employees of an industrial plant who had been identified as having high blood pressure were assigned to either a control or experimental group. Twenty-two employees were in the experimental group and twenty-four were in the control group. The experimental group received educational information from their supervisor in an effort to increase management of their blood pressure. The control group received no supervisor education.

Supervisor selection was determined by the work location of the hourly hypertensive employee. For eight weeks supervisors were given structured education on high blood pressure. After each weekly session the supervisor was to carry out a specific educational component with his assigned employee. The sharing of information on high blood

pressure was to increase the employees' knowledge and awareness of their condition as well as to understand the importance of management.

Pre-post measurements were taken on blood pressure, current knowledge of blood pressure, and perception of supervisor support.

Results indicate highly motivated subjects within each group as both groups blood pressures decreased to within the recommended guidelines. The experimental group showed a significant decrease in systolic pressure ( $p < .05$ ), dropping 16 mm.Hg. Nonparametric analyses of the mean differences are shown in Table 3. Systolic pressure dropped from 153 mm.Hg. to 137 mm.Hg. The control groups' systolic pressure dropped from 147 mm.Hg. to 137 mm.Hg. The goal of any hypertensive management program is the lowest possible reduction of blood pressure below 140/90 mm.Hg. (JNC, 1984).

There was a significant difference in blood pressure knowledge after the intervention between the two groups ( $p < .01$ ). Analyses of knowledge scores are shown in Table 4. The health belief model (Kirscht, 1974) suggests for a behavior change to occur there must be a motivating factor to make an individual take action. An increase in blood pressure knowledge may serve as a "cue to action" in the management of high blood pressure.

Table 3. Comparison of Differences In Mean Drop Of  
Systolic Blood Pressure

	N	Mean Decrease (mm. Hg.)	Standard Error	PR>
Control Group	24	-10.0	2.8	
Experimental Group	22	-15.6	2.2	0.02*

\*p < .05

Table 4. Comparison of Means of Pre and Post Test Blood Pressure Knowledge Scores

	N	Mean (% correct)	Standard Error	PR >
<u>Pretest</u>				
Control Group	24	0.68	0.027	
Experimental Group	22	0.70	0.034	0.679
<u>Posttest</u>				
Control Group	24	0.646	0.039	
Experimental Group	22	0.772	0.025	0.011*

\*p < .01

Actively involving the subject in educational activities which are directed towards behavior change enhances treatment and adherence (Morisky, 1982). Individuals with high blood pressure need information, support, and meaningful involvement to develop self-care skills in the management of hypertension.

There were no significant differences in the supervisor support measure ( $p > .05$ ) between the two groups.

#### Discussion

The drop in systolic and diastolic blood pressures in both groups appears contradictory. The question to be answered is how the intervention resulted in the impact on blood pressure in both groups.

One major explanation for the drop in both groups may be a result of selection bias. Participation in the study was dependent upon the return of the questionnaire. This alone violates the assumption of randomization, as many more employees were identified as having high blood pressure than turned in questionnaires. Using that select group implies all participants were highly motivated individuals and those individuals acted upon something to manage their blood pressure.

The screening process itself may be an explanation of the inability of the intervention to do better. The screening lasted approximately two weeks. Those who were

identified the first day were asked to come back two days later for another screening. If on the second occasion an employees' blood pressure was elevated, he or she was asked to come back two days later for a third measurement. After the third measurement, if they still had elevated readings they were urged to see their physician. They were then given the questionnaire to fill out and return. Pretesting itself is a threat to internal validity and this may have influenced the control group to act.

The inability to stop any interaction within the plant is another explanation for the drop in blood pressure. The investigator was at the plant at least twice a week and for several hours at a time during the educational sessions with the supervisors. The visibility and the connection of the investigator and the screening may have been the cue for all participants to act.

Measurement error during the screening may have attributed to inconsistencies in the data. The large number of volunteers the first day of screening is additional evidence of possible measurement error.

The results of the knowledge measure does indicate the experimental group learned more about hypertension and its consequences than the control group. Because of the conflicting results in blood pressure it is difficult to say blood pressure knowledge is a primary reason for action in the management of blood pressure. It is worth noting that

this investigation lasted eight weeks. Different results may have been obtained had the intervention lasted for a longer period of time. Caplan, Harrison, Wellons, and French (1980), showed similar results with no significant differences in blood pressure in a study involving partner social support. However, their results indicated partner social support kept subjects in treatment longer. A serious problem in their study was a high attrition rate within the experimental group. Studies by Earp and Ory (1979) and Levine, Green, Deeds, Chualow, Russell, and Finlay (1979) all showed a reduction in blood pressure with family education and support within the home. If the present investigation had lasted longer the control group's blood pressure may have gone back up.

#### Recommendations for Future Research

The following recommendations were made for future investigations:

1. A follow-up study to examine effects a year later, specifically the control group and management of their blood pressure.
2. A study using multiple groups to look at different techniques and strategies used to control hypertension.
3. A longitudinal study to determine if this type of intervention is reliable.

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APPENDIX A  
METHODOLOGY

APPENDIX A  
METHODOLOGY

Subject Selection and Measurement Criteria

Over 500 employees from Federal Mogul, an industrial bearing manufacturing plant in Blacksburg, Virginia were screened for hypertension. Screening was done in accordance with the American Heart Association of Wisconsin Blood Pressure Measurement Program (1981), and the Joint National Committee on the detection of high blood pressure (1984). High blood pressure was confirmed when the average of two or more diastolic measurements on at least two subsequent occasions was 90 mm.Hg. or greater, or when the average of two or more systolic measurements on two or more subsequent occasions was 140 mm. Hg. or greater. Screening took place over a two week period at the plant.

On the first day of the screening, blood pressure measurements were taken by the investigator, the plant occupational nurse, and six graduate students who assisted throughout the day. Prior to the screening, all volunteers were instructed on the proper method of taking blood pressure. All volunteers recorded systolic and diastolic measurements within 2 mm.Hg. of the same recording as the investigator. Blood pressures after the first day of screening were recorded by the investigator and three

graduate students. After the second day of screening and on all screenings thereafter, the investigator and two fellow graduate students took all measurements. Posttest measurements were conducted by the investigator and one volunteer graduate student.

After the two week screening period, over 100 employees were found to have elevated blood pressure. These employees signed an informed consent (Appendix B) stating the information given on a questionnaire (Appendix C) may be used to develop a blood pressure program in which they may be selected to participate in.

The questionnaire was designed to assess the employee's general knowledge of blood pressure as well as their perceptions of supervisor support.

Employees were given the questionnaire after their third confirmed measurement of elevated blood pressure. The investigator intended the questionnaire to be returned within one or two days. Some employees returned them the same day and some returned them within a week. In order to have as many participants as possible in the study, employees were given three weeks to return the questionnaire. After the three week deadline those who returned the questionnaire before the deadline were selected to participate in the program. Subjects were randomly assigned to a control group which received no intervention or an experimental group, which

received supervisor intervention. There were 24 employees in the control group and 22 in the experimental group.

Employee demographics are given in Table 5.

Supervisor selection. Eleven supervisors were selected to participate in the intervention as hypertension counselors based upon the hourly employee's work location. Supervisors had either one or two hourly employees to work with. One supervisor had three employees in the work area he supervised.

#### General Methods

Supervisors attended 8 weekly 50 minute educational sessions. During these sessions, supervisors received educational material on high blood pressure, the consequences of untreated high blood pressure, and different approaches in treating high blood pressure. What they learned was to be shared with the one or two hourly employees under his supervision who had consistently elevated blood pressure readings during the week of screening.

Week 1. Supervisors were oriented to the program to be carried out for 8 weeks. Each supervisor was informed of the employee or employees in his work location who had elevated blood pressure. For the next 8 weeks this employee would be educated on his or her high blood pressure, the

Table 5. Employee Demographics

Sex

Males	38
Females	8
Total	46

Age

20-24	2% (1)	40-44	17% (8)
25-29	7% (3)	45-49	15% (7)
30-34	9% (4)	50-54	11% (5)
35-39	24% (11)	55-59	7% (3)
		60 >	9% (4)

Education

< High School	15% (7)
Some high school	24% (11)
Completed high school	33% (15)
Some college	22% (10)
Completed college	7% (3)

Have you ever been told by a physician that you have high blood pressure? 41%

Are you under a Doctor's care now for your blood pressure? 26%

Is medication prescribed? 26%

consequences of untreated high blood pressure, and various approaches to treat their blood pressure.

Areas discussed during this session were blood pressure, what it is, the consequences of untreated high blood pressure, medical costs of high blood pressure, and why the workplace provides an opportunity for high blood pressure education.

Appendix D contains the supervisor's first assignment with his assigned hypertensive. The supervisor was asked to educate the hourly employee and to urge him or her to have his blood pressure checked by the plant nurse.

Week 2. This session contained a review of the physiology of blood pressure, the consequences of untreated high blood pressure, and how drugs are used to treat high blood pressure.

Handouts on high blood pressure from the American Heart Association and a prepared handout on different drugs used to treat high blood pressure were given to the supervisors to give their employee. Supervisors were instructed to ask specific questions of their employee this week. These questions are contained in Appendix E.

The employee was urged by the supervisor to have his or her blood pressure checked by the plant nurse.

Week 3. High blood pressure was reviewed. Nonpharmacological approaches were presented, beginning with sodium. Its role in high blood pressure was discussed as well as how to

identify the sodium content in various foods and on labels. The supervisor assignment for this week was to discuss the role of sodium in high blood pressure with his employee. Various handouts on sodium content in foods and fast foods were given (Appendix F).

Supervisors asked their employee to keep a dietary recall for one day in order to have the sodium content of their diet analyzed.

The employee was urged to have his or here blood pressure checked by the plant nurse.

Week 4. Supervisors were educated on weight control and its relationship to high blood pressure. Diet and exercise were discussed as the two ways to lose weight.

The supervisors were given handouts on the nutritional value of fast foods and other foods. These handouts were reviewed and duplicates provided to their employee. The supervisor asked the employee to fill out an activity sheet (Appendix G) to compute extra calories burned.

The employee was urged to have his or her blood pressure checked by the plant nurse.

Week 5. Smoking, alcohol, stress, and their relationships to high blood pressure were introduced. The physiology of stress was discussed and various ways to live with stress were reviewed. A copy of the Holmes-Rahe stress scale (Appendix H) was given to each supervisor to give to his employee. This was presented so employee's could recognize

what type of events may be stressful in their lives, and possibly alert them to such events.

Smoking was presented as a major cardiovascular risk and excessive alcohol consumption was discussed as causing high blood pressure.

The employee was urged to have his or her blood pressure checked by the plant nurse.

Week 6. A review of blood pressure, what high blood pressure is, consequences of untreated high blood pressure, and different approaches to treat high blood pressure were reviewed. The supervisor handed out a tip sheet (Appendix I) on high blood pressure and discussed any specific concerns of high blood pressure with his employee.

The employee was urged to have his or her blood pressure checked by the plant nurse.

Week 7. No formal educational session was held; however, the supervisor discussed the dietary recall with his hourly employee so each could see just how much sodium is consumed in an average day.

The employee was urged to have his or her blood pressure checked by the plant nurse.

Week 8. No formal educational session was held; however, the supervisor was asked to discuss calories expended through particular activities with his employee. This was done so the employee could see caloric expenditure as an aid to weight reduction.

The employee was urged to have his or her blood pressure checked by the plant nurse.

Week 9. Supervisors were brought together and the 8 week program was discussed. This was the end of their involvement with the study.

Week 10. All employees in the treatment and control groups were re-screened. Employees were asked to fill out the same questionnaire as the pre-test, dealing with general blood pressure knowledge, and questions on their perception of supervisor support.

APPENDIX B  
INFORMED CONSENT

## INFORMED CONSENT

I, the undersigned, agree to participate in the blood pressure screening program sponsored by Federal Mogul. I understand that the program will be conducted with the assistance of Virginia Polytechnic Institute and State University personnel. I acknowledge that *Sam L. E.* has discussed the screening program with me and explained what is expected of me as a participant.

I understand that I will be asked to complete a questionnaire and have my blood pressure measured. Further, I understand that information acquired from me will not be identified with me personally, and that results will not be placed in my personnel file, nor used to make employment decisions concerning me. I authorize the release of any information acquired from me for research purposes only, to the extent that I am not personally identified.

I understand that the research team will inform Federal Mogul of its general findings, but I will not be personally identified. I acknowledge that Federal Mogul has the option, but will not be required to use the information which is acquired from this screening program, to develop an employee instruction program on blood pressure and risk factors associated it.

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Signature

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Date

APPENDIX C  
LIFESTYLE CHECK-UP  
QUESTIONNAIRE

## LIFESTYLE CHECK-UP

Name \_\_\_\_\_ Employee # \_\_\_\_\_

Shift 1 \_\_\_\_\_ Shift 2 \_\_\_\_\_ Shift 3 \_\_\_\_\_

Please check the area where you work.

<input type="checkbox"/> material prep.	<input type="checkbox"/> auto lines
<input type="checkbox"/> press/finish	<input type="checkbox"/> flange
<input type="checkbox"/> plating	<input type="checkbox"/> inspection
<input type="checkbox"/> shipping/receiving	<input type="checkbox"/> tool room
<input type="checkbox"/> tool crib	<input type="checkbox"/> maintenance
<input type="checkbox"/> tool expediter/samples	<input type="checkbox"/> general office
<input type="checkbox"/> quality assurance	<input type="checkbox"/> heavy duty

Please take about 20 minutes to answer the questions below. The first questions deal with your present lifestyle. Check the answer that applies to you.

1. Do you smoke cigarettes?
  - I smoke
  - I used to smoke but have stopped
  - I have never smoked
  
2. Do you ever use smokeless tobacco? (chewing tobacco, snuff)
  - yes
  - no
  
3. Outside of work do you exercise at least 3 times per week, 30 minutes at a time?
  - yes
  - no
  
4. Which of the following sports or physical activities do you regularly do? Check all that apply to you.
 

<input type="checkbox"/> walking for exercise	<input type="checkbox"/> tennis
<input type="checkbox"/> jogging or running	<input type="checkbox"/> racquetball
<input type="checkbox"/> swimming or water exercise	<input type="checkbox"/> calisthenics
<input type="checkbox"/> aerobics or aerobic dance	<input type="checkbox"/> biking
<input type="checkbox"/> yardwork or gardening	<input type="checkbox"/> other
<input type="checkbox"/> none of the above	
  
5. How much physical activity (walking or lifting) would you say your job requires?
  - a lot
  - some
  - none
  
6. Have you had your blood pressure checked within the last year?
  - yes
  - no

7. Have you ever been told by a doctor that you have high blood pressure?  
 yes (go to question 8)  
 no (skip to question 13)
8. Are you under doctor's care for high blood pressure at the present time?  
 yes  
 no
9. Is blood pressure medicine prescribed for your high blood pressure?  
 yes (if yes, then answer question 10)  
 no (if no, then skip to question 12)
10. Do you take your medicine as prescribed by the doctor?  
 yes  
 no
11. If you feel worse after you take your medicine which would you do? (choose 1)  
 I would tell my doctor  
 I would stop taking my medicine  
 I would keep taking my medicine anyway  
 I would keep taking my medicine and tell my doctor
12. Are you doing any of the following to help control your blood pressure? Check all that apply to you.  
 I follow a low salt diet  
 I watch my weight  
 I deal better with stress  
 I cut down smoking  
 I stopped smoking  
 I stopped chewing or dipping  
 I follow an exercise program  
 None of the above
13. As far as you know is your blood pressure:  
 normal  
 under control  
 still high  
 don't know
14. How tall are you? \_\_\_\_\_
15. How much do you weigh? \_\_\_\_\_



Below is a list of sources of stress at work and at home. For each question circle the number that best describes the degree of stress for you in the past month.

Very stressful 4	Somewhat stressful 3	A little stressful 2	Not at all stressful 1
------------------------	----------------------------	----------------------------	------------------------------

For example: If getting to and from work has been very stressful for you, it would receive a score of 4. 4 3 2 1

#### 21. Work Stressors

- |   |   |   |   |  |
|---|---|---|---|--|
| 4 | 3 | 2 | 1 | Too many tasks or responsibilities                     |
| 4 | 3 | 2 | 1 | Not sure of what is expected of me on the job          |
| 4 | 3 | 2 | 1 | Conflict with supervisor or superior                   |
| 4 | 3 | 2 | 1 | Conflict or difficulty with coworkers                  |
| 4 | 3 | 2 | 1 | Dull or boring work tasks                              |
| 4 | 3 | 2 | 1 | No rewards for work well done                          |
| 4 | 3 | 2 | 1 | Competition between coworkers                          |
| 4 | 3 | 2 | 1 | No opportunity for promotion                           |
| 4 | 3 | 2 | 1 | No input into decisions affecting my work              |
| 4 | 3 | 2 | 1 | Getting to and from work                               |
| 4 | 3 | 2 | 1 | Deadline pressures                                     |
| 4 | 3 | 2 | 1 | Many job task changes                                  |
| 4 | 3 | 2 | 1 | Noisy or distracting work locations                    |
| 4 | 3 | 2 | 1 | Loss of interest in my job                             |
| 4 | 3 | 2 | 1 | Inadequate pay for my needs                            |
| 4 | 3 | 2 | 1 | Lack of friendships or communication with<br>coworkers |
| 4 | 3 | 2 | 1 | Tight schedules for lunch and breaks                   |

22. Family and Household Stressors

- 4 3 2 1 Not enough money  
 4 3 2 1 Conflicts with wife or husband  
 4 3 2 1 Conflicts over household tasks  
 4 3 2 1 Problems or conflicts with children  
 4 3 2 1 Conflicts with relatives or inlaws  
 4 3 2 1 House repairs  
 4 3 2 1 Not enough time to spend with family  
 4 3 2 1 Sexual conflict  
 4 3 2 1 Dangerous or stressful neighborhood  
 4 3 2 1 Conflicts with friends  
 4 3 2 1 Personal problem causing strain in family  
 4 3 2 1 Difficulty getting away from home

The questions below are about blood pressure.

23. Which of the following do you believe can help control high blood pressure? Check all that you believe to be true.  
 following a low salt diet  
 watching your weight  
 dealing with stress better  
 cutting down or stopping smoking  
 following an exercise program  
 staying on your prescribed medicine  
 there is nothing one can do to control high blood pressure
24. Check all of the following statements that you believe to be true.  
 if you don't feel bad, you probably don't have high blood pressure  
 if you have high blood pressure, you can lead a normal life  
 controlling high blood pressure lessens the risk of getting a more serious disease  
 what I do (taking medication, exercise, diet, watching my weight, and reducing stress) has a lot to do with keeping my high blood pressure under control  
 it is difficult for me to take the blood pressure medicine my doctor has prescribed
25. How likely do you think it is that someone with untreated high blood pressure would eventually have a heart attack, stroke, or other serious illness?  
 very likely  
 somewhat likely  
 not at all likely

26. How serious would you say is a diagnosis of high blood pressure?
- very serious  
 somewhat serious  
 not at all serious

Just a few more questions about blood pressure.

27. Blood pressure is a measure of: (choose 1)
- how often the heart pumps  
 the force exerted on the walls of the blood vessels  
 how fast the blood flows through the arteries
28. When a blood pressure reading is written 128/76, the 128 represents:
- the pressure in the arteries when the heart is contracting and pumping the blood through the body  
 the number of heart beats per minute  
 pressure in the arteries when the heart is relaxed and filling with blood
29. Blood pressure is considered high when it is:
- 130/80  
 140/90  
 150/96
30. People with high blood pressure usually experience the following symptoms:
- nervousness  
 tiredness  
 headache  
 none of the above
31. Which of the factors below may contribute to the development of high blood pressure?
- a diet high in salt  
 a family history of high blood pressure  
 stress  
 overweight  
 all of the above
32. Check off the complications that may occur when high blood pressure is uncontrolled.
- |  |   |
|--|---|
| <input type="checkbox"/> heart attack  | <input type="checkbox"/> earaches         |
| <input type="checkbox"/> stroke        | <input type="checkbox"/> kidney failure   |
| <input type="checkbox"/> muscle cramps | <input type="checkbox"/> scaly skin       |
| <input type="checkbox"/> eye problems  | <input type="checkbox"/> all of the above |

33. Circle yes or no to the following questions
- People who have high blood pressure usually feel fine
- If you have high blood pressure and feel fine, it is ok to stop taking your blood pressure medicine
- A normal systolic blood pressure reading is your age plus 100
- A person with high blood pressure can always tell when their blood pressure is high
- A person's blood pressure readings will normally vary during the day
- The cause of high blood pressure is unknown in most cases
- Nervous people are more likely to have high blood pressure than calm people
- High blood pressure can be cured with medicine
- Sometimes when individuals take medicine for high blood pressure they feel worse
- High blood pressure is only a disease of middle and old age
- Once people have high blood pressure it usually means that they will have it for the rest of their lives
- Smoking may raise blood pressure
- Cholesterol is most often associated with high blood pressure

Finally, a few questions about yourself.

34. How old are you?
- |   |                                |                                      |
|---|--------------------------------|--------------------------------------|
| <input type="checkbox"/> Under 20 years | <input type="checkbox"/> 35-39 | <input type="checkbox"/> 55-59       |
| <input type="checkbox"/> 20-24          | <input type="checkbox"/> 40-45 | <input type="checkbox"/> 60 or older |
| <input type="checkbox"/> 25-29          | <input type="checkbox"/> 45-49 |                                      |
| <input type="checkbox"/> 30-34          | <input type="checkbox"/> 50-54 |                                      |
35. Are you currently:
- married  divorced  separated  widowed  never married
36. How much schooling have you had?
- Less than high school
- Completed high school
- Some high school and other non-college training (technical or trade school)
- Some college
- Completed college
37. How far do you drive to work each day?
- less than 10 miles
- 10-25 miles
- more than 25 miles

Thank you for taking the time to answer these questions. Please put the questionnaire in the attached envelope, seal it and give it to Jane Lane.

APPENDIX D  
WEEK 1 ASSIGNMENT

The goal for this first week is to make contact with \_\_\_\_\_ about their blood pressure. Casually, during the week, please ask this person the following questions:

1. "Did you have your blood pressure checked during the week that Sara Cole was here"?
2. "Was it recorded on a card"?
3. "What was it"?
4. "What have you done since then"?
5. "Has Jane re-checked it"?

Please make a note of the responses you get to these questions. In your own way, let this person know you are asking as someone who cares.

APPENDIX E  
WEEK 2 ASSIGNMENT

## Review of High Blood Pressure

During the week April 1-8 please contact \_\_\_\_\_ and address the following questions. These questions deal with the consequences of untreated high blood pressure, symptoms, and what a person can do (non-drug) to manage high blood pressure.

1. What are the consequences of having high blood pressure and not doing anything about it?

- heart attack
- congestive heart failure
- stroke
- kidney failure
- eye problems

2. Tell this person that in 90% of the cases of high blood pressure the causes are unknown. In only 10% of all cases is there an identifiable cause, such as kidney disease.

3. Tell this person that there are no symptoms to let them know they may have high blood pressure. The only way to know is to have it checked. This is why it is called "The silent killer".

4. What concerns do you have about high blood pressure?

5. There are certain things a person can do to help control their blood pressure.

- reduce amount of salt in diet
- lose weight
- lower alcohol intake
- stop smoking
- get regular exercise
- manage stress better

6. Ask them to have their pressure checked with Jane and to record it.

Again, please address the question of what they believe to be the consequences of high blood pressure, and what concerns they have about high blood pressure. Make a note of the responses to these questions.

During the week of April 1-8 please contact \_\_\_\_\_ and ask the following questions concerning high blood pressure medication.

1. Has your doctor prescribed medication for your high blood pressure? If so:

-Do you know what kind of medication your doctor prescribed?

-Do you know what the medication does?

-How often are you suppose to take your medicine?

-Do you notice any side effects from this drug?

Please tell this person that blood pressure is lowered only during the time that the drug is working. This is why it is important to take it as prescribed. Not taking your medicine regularly may cause a shock to your system and your blood pressure will go back up.

Tell this individual that if they are experiencing any side effects of the medicine, or if they feel worse than before they were on their medicine to go back to their doctor and tell him how they are feeling. Sometimes it can take up to 6 months or more to get the proper dosage and type of medicine.

## Blood pressure medications

Many medications are available to lower high blood pressure. Your physician should be consulted before using any medication.

### 1. Diuretics

Eliminate large amounts of water and sodium. They decrease blood volume and reduce blood pressure. They stimulate the flow of urine.

#### Side effects

- weakness
- leg cramps (decrease supply of potassium)
- tiredness
- increase in cholesterol
- increase in triglycerides
- increase in blood sugar
- sexual dysfunction

### 2. Vasodilators

Relax the arterial walls and open up the narrowed blood vessels.

#### Side effects

- headache
- swelling around the eyes
- tachycardia (fast heart beat)
- fluid retention (weight gain)
- aches and pains in the joints
- excessive hair growth

### 3. Beta blockers

Block the hearts response to stimulation of epinephrine (which increases heart rate). Protects the heart from overresponding to physical strain and emotional stress by decreasing heart rate and causing blood vessel dilation. Cuts down on the workload of the heart.

#### Side effects

- insomnia
- cold hands, feet
- fatigue
- depression
- slow heartbeat
- increase triglycerides
- decrease HDL cholesterol
- bizarre dreams
- sexual dysfunction
- may bring on symptoms of asthma

Blood pressure is lowered only during the time that the drugs are working. Medication cannot be stopped, even after blood pressure is lowered.

APPENDIX F  
WEEK 3 ASSIGNMENT

### Sodium Restriction

The goal for this week is to inform \_\_\_\_\_  
on the role of sodium restriction in their diet.  
Please talk with your employee about the following items.

1. Too much sodium in the diet may contribute to high blood pressure.
  - increase in sodium causes an increase in water retention which causes an increase in blood pressure
  - Dietary guidelines recommend between 1000-3000 mg. of sodium daily
  
2. Tell them sodium may be listed differently on labels. The five main contributors of sodium in our diets are:
  1. Salt
  2. Monosodium glutamate (MSG)
  3. Baking powder
  4. Baking soda (sodium bicarbonate)
  5. Brine (table salt and water)
  - Ingredients on labels are listed from most to least.
  
3. Most people do not realize the amount of sodium contained in various foods. Even in the amount of food we eat every day. In order to help see just how much sodium we eat every day, please ask your employee to keep a dietary record of **EVERYTHING** they eat for one day. Be as specific as possible in writing it down. For ex: one-half cup of cereal with one cup of milk. Or, one 12 oz. Coke and a small order of fries. Ask them to write down everything they eat.
 

Ask them to do this within the next couple of days. Bring the recall back to you and you will have it analyzed for sodium content. This will give them some idea of how much sodium they consume.
  
4. Give them a handout on the sodium content of selected foods and one on the sodium content of fast foods. Please show them a label and help them identify the sodium content listed.
  
5. Ask them to have their blood pressure checked and recorded with Jane.
  
6. Ask them how they might decrease the amount of sodium in their diet?

## Breakfast Choices

Sodium (mg.)

## Wendy's

## Omelets:

Ham & cheese	405
Ham, cheese & mushroom	570
Ham, cheese, onion and green pepper	480
Mushroom, onion, and green pepper	200
Scrambled eggs	160
French toast	850
Home fries	745
Toast w/ margarine	410
Danish	340

## McDonalds

Egg McMuffin	885
Scrambled egg breakfast	1463
Hot cakes and sausage	1685
English muffin	318
Hash browns	325

## Hardee's

Plain biscuit	650
Biscuit and jelly	653
Ham biscuit	1415
Sausage biscuit	864
Steak biscuit	803
Egg	169
Biscuit with egg	819
Ham biscuit with egg	1584

## Burgers and Such

Burger King Whopper	1083
McDonalds Big Mac	963
Wendy's Old fashioned	708
McDonalds Quarter pounder w/cheese	1209
McDonalds apple pie	414
McDonalds cherry pie	456

Roy Rogers Roast Beef	610
Hardees Roast Beef	765
Arby's Roast Beef	869
Long John Silver's fish	1333
McDonald's Fish Fillet	613
Burger King Whaler	968
Kentucky Fried chicken-original recipe	2285
Kentucky Fried Chicken snack box	728
Wendy's chili	1190
Pizza Hut Supreme(one-half of 10 in.)	1281
Jack in the box taco	926

### French fries

Largest sizes available

McDonalds	82
Burger King	117
Jack-in-the-box	369
Wendy's	151
Long John Silvers	64
Hardee's	590
Arby's	319
Roy Rogers	242
Kentucky Fried Chicken	335

### Dining Out

The following restaurants below will prepare your food without salt upon request.

Bogens	Marriott
Bonanza	Morgans
Country Cookin'	Outpost
Farm House	Sheraton
Huckleberry Inn	Shoney's
Longhorn	Western Sizzlin
Macado's	

When dining out, choose foods without sauces. If you do prefer a sauce, ask for it "on the side" so you can control the amount.

Ask to have your food served without added salt so you can add only as much as you want.

Try to balance, as you do at home. If you have a high-sodium main dish, eat low-sodium side dishes with it; or if you eat a high-sodium dinner, eat a lower sodium breakfast and lunch.

## A Salty Surprise!

The sodium content in common foods

Food	Amount	Sodium (grams)
Low-fat milk or yogurt	1 C.	.125
<b>Cheese:</b>		
American, pasteurized processed	1 slice	.24
American, pasteurized processed cheese spread	1 oz. (2 T.)	.46
cheddar	1 oz.	.20
cottage, uncreamed	½ C.	.21
Parmesan	2 T.	.08
Egg	1 large	.06
Lean meats, cooked	1 oz.	.025
Cured meat (such as ham)	1 oz.	.255-.350
Dried chipped beef	1 oz.	1.29
Cold cuts (bologna, salami)	1 oz.	.39
Frankfurter	1	.55
Poultry, cooked	1 oz.	.02
Fish, fresh, cooked	1 oz.	.03-.06
<b>Shellfish:</b>		
fresh, raw or cooked	1 oz.	.02-.06
canned	1 oz.	.28
Sardines	1 oz.	.235
TV dinner	1	.715-1.32
Frozen pot pie	1	.875-1.025
Lean bacon	2 medium strips	.15
<b>Legumes:</b>		
dried beans and peas, cooked	½ C.	.001-.013
lentils, cooked	½ C.	negligible
<b>Fresh leafy green vegetables:</b>		
collards, kale, beet greens, cooked	½ C.	.025
spinach or dandelion raw	½ C.	.020
cooked	½ C.	.045
Swiss chard, cooked	½ C.	.060
Other fresh vegetables	½ C.	.002-.005
Canned vegetables	½ C.	.25-.30
Pickled vegetables (such as sauerkraut)	½ C.	.88
Tomato juice or V-8	½ C.	.245
Fresh tomato	1 medium	.005
Fruit, unsweetened	½ C.	negligible
Whole cereal grains, cooked	½ C.	negligible
<b>Bread (all types containing salt)</b>		
	1 slice	.13
Cold cereal, unsalted (shredded wheat)	1 oz.	.01

Food	Amount	Sodium (grams)
Cold cereal, containing salt	1 oz.	23-.30
Soup, canned (diluted with an equal volume of water)	1 C.	.72-1.05
Bouillon	1 cube	.78
<b>Snack foods:</b>		
<b>crackers</b>		
saltines or soda	5	.155
oyster crackers	½ C.	.100
<b>olives</b>		
black (Greek)	5 large	.435
green	3 large	.280
<b>peanuts</b>		
salted	1 oz.	.120
unsalted	1 oz.	trace
<b>peanut butter</b>		
salted	1 T.	.10
unsalted	1 T.	trace
pickles, dill	1 medium (2 oz.)	.93
pizza, commercial	½ of 14-inch pie	.455
potato chips	1 oz.	.100
pretzels	5 twisted thins	.505
	1 large rod type	.235
<b>Condiments:</b>		
prepared mustard	1 T.	.195
sweet relish	1 T.	.105
tomato catsup	1 T.	.155
soy sauce	1 T.	1.32
Worcestershire sauce	1 T.	.25
Salted butter or margarine	1 tsp.	.045
Unsalted butter or margarine	1 tsp.	trace
Vegetable oil	1 tsp.	trace
Mayonnaise	1 tsp.	.035
<b>Commercial salad dressing:</b>		
blue cheese	1 T.	.165
French	1 T.	.22
Italian	1 T.	.315
Russian	1 T.	.13
Thousand Island	1 T.	.008
<b>Seasonings:</b>		
salt, seasoned salt, sea salt	1 tsp.	2.13
chili powder	1 tsp.	.025
herbs and other spices	1 tsp.	negligible
Baking powder	1 tsp.	.315
Low-sodium baking powder	1 tsp.	trace
Baking soda	1 tsp.	1.36

Excerpted with permission from *The Family Health Cookbook* by Alice White and the Society for Nutrition Information, David McKay Company, Inc., New York.

APPENDIX G  
WEEK 4 ASSIGNMENT

## Weight and High Blood Pressure

The association of high blood pressure and weight is well established. Blood pressure does not increase with age in populations in which body weight does not increase with age.

Being overweight is related to high blood pressure.

- greater blood volume
- elevated cardiac output
- increase sodium intake

In most cases losing weight will reduce blood pressure and will reduce the risk for cardiovascular disease.

The two ways to lose weight are:

1. Control total caloric intake
2. Exercise

As long as calories eaten equals calories burned, a person will not gain or lose weight. If calories eaten exceeds the calories burned, a person will gain weight. When output exceeds input, weight is lost.

### Diet

1 lb. of fat is equal to 3,500 calories.

- 1 gram of carbohydrate = 4 Kcal
- 1 gram of protein = 4 Kcal
- 1 gram of fat = 9 Kcal

**Carbohydrates** are the most efficient source of energy for the body.

- provide energy for work, cell maintenance, and heat
- complex carbohydrates are found in fruits, vegetables, breads, cereals
- simple carbohydrates are candies, sugars, ice cream, "empty calories"

**Fats** are the most dense source of energy. They are essential to the diet.

- insulator of body heat
- aid in transport of vitamins
- protect vital organs as cushion
- found in dairy products, fats and oils, meats

**Proteins** are the most inefficient source of energy

- needed for growth and repair
- found in beans, lean meat

Dietary guidelines recommend our diets consist of 30% fat, 20% protein, and 50-55% carbohydrates.

DiETING alone is very ineffective in losing weight. Exercise and diet together are more successful in losing fat and increasing lean body mass.

#### **Exercise**

- aerobic: long duration, moderate intensity
- anaerobic: short duration, high intensity

When oxygen is utilized to produce energy in an activity it is aerobic. When oxygen is not used to produce energy it is anaerobic. Energy production is limited in the absence of oxygen.

To lose weight one must engage in aerobic activity--long duration, moderate intensity. Continuous activity because the body uses fat as its fuel source.

1. Have your employee fill out activity sheet so calories may be calculated.
2. Ask them to have Jane check their blood pressure.
3. Give your employee handout of nutritional information on fast foods.
4. Tell them that exercise in addition to cutting back on calories is more effective in taking off weight.

Before starting an exercise program, anyone over the age of 35 who is not already active should consult their physician.

FAST FOOD CHOICES

	<u>Calories</u>	<u>Sodium (mg)</u>	<u>Cholesterol (mg)</u>	<u>% Fat</u>
<u>McDonald's</u>				
Hamburger	255	520	24	35%
Cheeseburger	307	767	37	41%
Big Mac	563	1010	86	53%
Quarter Pounder	424	735	67	45%
Quarter Pounder w/cheese	524	1236	96	53%
Chicken McNuggets (6) (without sauce)	314	525	76	54%
French Fries, regular	220	109	9	49%
Apple Pie	253	398		62%
<u>Hardee's</u>				
Hamburger	305	682		38%
Deluxe Cheeseburger	495	1251		72%
Roast Beef	390	662		40%
Fish Sandwich	470	638		49%
Hot Dog	345	744		59%
Turkey Club				
French Fries, small	240	121		44%
Apple Turnover	282			49%
<u>Burger King</u>				
Hamburger	290	525		40%
Cheeseburger	350	735		44%
Whopper	630	990		51%
Whopper w/cheese	740	1435		55%
Whopper Junior	370	560		49%
Whopper Junior w/cheese	420	785		54%
French Fries, regular	210	230		47%
Apple Pie	260	220		35%
Onion Rings	270	450		53%
<u>Arby's</u>				
Beef and Cheese	450	1220		44%
Club Sandwich	560	1610		48%
Roast Beef Sandwich	350	880		39%
Turkey Sandwich	410	1060		41%
French Fries	155	3		17%
Apple Pie	310	240		61%

	<u>Calories</u>	<u>Sodium (mg)</u>	<u>Cholesterol (mg)</u>	<u>% Fat</u>
<u>Wendy's</u>				
Hamburger on white bun	350	410	65	45%
Hamburger on multi-grain bun	340	290	67	45%
Double on white bun	560	575	125	54%
Chicken Sandwich on multi-grain bun	320	500	59	28%
Chili (8 oz)	260	1070	30	29%
Taco Salad	390	1100	40	40%
<u>Baked Potatoes</u>				
Plain (8 oz)	250	60	Trace	0%
Sour Cream & Chives	460	230	15	48%
Cheese	590	450	22	52%
Chili & Cheese	510	610	22	34%
Bacon & Cheese	570	1180	22	47%
Broccoli & Cheese	500	430	25	45%
Stroganoff & Sour Cream	490	910	43	39%
Chicken a la King	350	820	20	15%
White Bun	160	266	Trace	17%
Multi-grain Bun	135	220	2	20%
French Fries, regular	280	95	15	45%
<u>Kentucky Fried Chicken</u>				
Original Recipe, 2 pc	393	868	164	60%
Original Recipe, 2 pc Dinner	661	1536	172	52%
Extra Crispy, 2 pc	544	861	168	61%
Extra Crispy, 2 pc Dinner	902	1529	176	48%
Cole Slaw	121	225	7	60%
Corn	169	11		16%
Gravy	23	57	1	78%
Mashed Potatoes	64	268		14%
Roll	61	118		15%
<u>Pizza Hut</u>				
Thin 'N' Crispy (2 slices of 16")	370	1000	27	36%
Thick 'N' Chewy (2 slices or 16")	450	900	21	32%
<u>Long John Silvers</u>				
Fish, 2 pc	366			54%
Fish, 3 pc	475			54%
Chicken Planks, 4	460			
Peg Legs, 5	515			
Oysters, Breaded	460			
Clams, Breaded	617			50%
French Fries	275			
Corn on Cob	175			
Cole Slaw	140			
Hush Puppies, 3	155			

**FAST FOOD  
BREAKFAST CHOICES**

	<u>Calories</u>	<u>Sodium (mg)</u>	<u>Cholesterol (mg)</u>	<u>% Fat</u>
<b><u>Wendy's</u></b>				
<b>Omelets:</b>				
Ham & Cheese	250	405	450	62%
Ham, Cheese & Mushroom	290	570	355	66%
Ham, Cheese, Onion, & Green Pepper	280	480	525	63%
Mushroom, Onion & Green Pepper	210	200	460	61%
Scrambled Eggs	190	160	450	56%
French Toast	400	850	115	43%
Home Fries	360	745	20	54%
Toast w/margarine	250	410	0	33%
Danish	360	340		45%
<b><u>McDonalds</u></b>				
Egg McMuffin	327	885	229	41%
Scrambled Egg Breakfast	697	1463	412	56%
Hot Cakes & Sausage	706	1685	90	36%
English Muffin	186	318	13	24%
Hash Browns	125	325	7	50%
<b><u>Hardee's</u></b>				
Plain Biscuit	275	650		43%
Biscuit & Jelly	324	653		36%
Ham Biscuit	350	1415		50%
Sausage Biscuit	413	864		57%
Steak Biscuit	419	803		53%
Egg	108	169		75%
Biscuit with Egg	383	819		52%
Ham Biscuit with Egg	458	1584		51%

## HOW MANY EXTRA CALORIES DID YOU BURN TODAY?

Name: \_\_\_\_\_

Weight: \_\_\_\_\_

Age: \_\_\_\_\_

Physical activity: \_\_\_\_\_

How long did you do this activity: \_\_\_\_\_

Physical activity: \_\_\_\_\_

How long did you do this activity: \_\_\_\_\_

If you do any activity outside of work (ex. walking, running, swimming, biking, golf, basketball) record it here and turn it in to your supervisor. The calories burned for that activity will be calculated and you can see how many more you burn when you participate in an activity.

Remember: THE KEY TO LOSING WEIGHT WITH EXERCISE IS LONG DURATION AND MODERATE INTENSITY!

APPENDIX H  
WEEK 5 ASSIGNMENT

## Stress, Alcohol, and Smoking

The learning objective in this assignment is to learn to recognize and manage stress so it can be brought down to a liveable, productive level.

Stress is a fact of life. It can have positive or negative effects on an individual.

Stressful stimuli from a person's environment has been shown to be a factor in the development and maintenance of high blood pressure.

Physiology of stress; what takes place in the body?

- brain receives message that you are under stress and the brain tells the body to prepare
- the pituitary gland releases a hormone (ACTH) into the bloodstream
- this hormone targets the adrenal glands which then release adrenaline and noradrenaline and cortisone; you are now prepared to deal with what is causing you stress
- heart speeds up and more blood is being pumped into your body, more oxygen is being delivered to your muscles
- breathing increases and sweating begins

### Physical symptoms of stress

- changes in eating habits
- digestive problems
- assorted aches and pains
- crying
- sexual problems
- excess nervous energy

### Emotional signs of stress

- personality changes
  - drinking more
  - driving too fast
  - smoking more
  - taking "recreational" drugs
  - unable to get to work or keep appointments
  - change in personal hygiene habits
- mood changes
- general changes
  - sleeping problems
  - life is boring or dull
  - free floating anxiety
  - depressed
  - dreading free time, vacation
  - attention wandering
  - new fears

**How to live with stress**

- work it off;EXERCISE
- talk to someone you really trust
- LEARN TO ACCEPT WHAT YOU CANNOT CHANGE
- avoid self medication
- get enough sleep and rest
- take time to play
- take one thing at a time
- agree with someone
- manage your time better
- plan ahead
- develop a hobby
- eat well
- don't be afraid to say no
- know when you are tired
- learn how to delegate responsibility
- be realistic about perfection

**Stress reduction techniques**

- meditation
- biofeedback
- breathing exercises

**Alcohol**

Alcohol raises blood pressure.

- increase is independent of smoking, weight, exercise and sodium intake
- increase in blood pressure is reversible when drinking stops

How alcohol raises blood pressure.

- affects every system in body
- increase cardiac output
- increase in epinephrine and norepinephrine
- affects smooth muscles in arteries causing them to lose their ability to get smaller or larger
- alcohol is high in calories causing weight gain

**Recommended alcoholic intake**

- less than 2 oz. of ethanol a day
  - 1 oz. of ethanol = 2 oz. of 100 proof whiskey
  - 1 oz. of ethanol = 8 oz. of wine
  - 1 oz. of ethanol = 24 oz. of beer

## Smoking

Smoking is a major cardiovascular risk and if you smoke you should STOP.

Nicotine consumption raises blood pressure. The cardiovascular effects are dependent on the inhaled nicotine.

How smoking increases blood pressure.

- vasoconstrictor
- release of epinephrine and norepinephrine
- also influences the antihypertensive drug and may require larger doses to lower blood pressure

Chemicals found in cigarette smoke.

- more than 3,000 separate substances
- 10% are tar and nicotine
- tar contains most of cancer causing agents
- nicotine affects major body organs
- 90% consists of a dozen gases
  - carbon monoxide; reduces oxygen carrying capacity of blood
  - nitrogen oxide; pollutant linked to lung disease
  - hydrogen cyanide; damages lining of the airways

Effects of sidestream smoke

- nicotine and carbon monoxide are found in higher concentration in sidestream smoke than in smoke that is directly inhaled

The assignment for this week is to contact \_\_\_\_\_ and ask them the following questions about stress.

1. What things do you find stressful in your life?
2. How do you know when you are under stress?
3. How do you deal with stress in your life?

Share with them some of the physical and emotional signs of stress and have them tell you how they reduce stress in their life.

Explain to them how alcohol and smoking may be stress related and how they affect blood pressure.

Give them a copy of the Life Event-Stress scale and tell them how to use the life chart.

Ask them to have Jane check their blood pressure and record it.

## SELF-ASSESSMENT EXERCISE 1\*

Below are listed events which occur in the process of living. † Place a check in the left-hand column for each of those events that have happened to you during the last 12 months.

<i>Life Event</i>	<i>Point Values</i>
<input type="checkbox"/> Death of spouse	100
<input type="checkbox"/> Divorce	73
<input type="checkbox"/> Marital separation	65
<input type="checkbox"/> Jail term	63
<input type="checkbox"/> Death of close family member	63
<input type="checkbox"/> Personal injury or illness	53
<input type="checkbox"/> Marriage	50
<input type="checkbox"/> Fired from work	47
<input type="checkbox"/> Marital reconciliation	45
<input type="checkbox"/> Retirement	45
<input type="checkbox"/> Change in family member's health	44
<input type="checkbox"/> Pregnancy	40
<input type="checkbox"/> Sex difficulties	39
<input type="checkbox"/> Addition to family	39
<input type="checkbox"/> Business readjustment	39
<input type="checkbox"/> Change in financial status	38
<input type="checkbox"/> Death of a close friend	37
<input type="checkbox"/> Change to different line of work	36
<input type="checkbox"/> Change in number of marital arguments	35
<input type="checkbox"/> Mortgage or loan over \$10,000	31
<input type="checkbox"/> Foreclosure of mortgage or loan	30
<input type="checkbox"/> Change in work responsibilities	29
<input type="checkbox"/> Son or daughter leaving home	29
<input type="checkbox"/> Trouble with in-laws	29
<input type="checkbox"/> Outstanding personal achievement	28
<input type="checkbox"/> Spouse begins or stops work	26
<input type="checkbox"/> Starting or finishing school	26
<input type="checkbox"/> Change in living conditions	25
<input type="checkbox"/> Revision of personal habits	24
<input type="checkbox"/> Trouble with boss	23

## SELF-ASSESSMENT EXERCISE 1 (cont.)

<i>Life Event</i>	<i>Point Values</i>
_____ Change in work hours, conditions	20
_____ Change in residence	20
_____ Change in schools	20
_____ Change in recreational habits	19
_____ Change in church activities	19
_____ Change in social activities	18
_____ Mortgage or loan under \$10,000	17
_____ Change in sleeping habits	16
_____ Change in number of family gatherings	15
_____ Change in eating habits	15
_____ Vacation	13
_____ Christmas season	12
_____ Minor violations of the law	11

Score: \_\_\_\_\_

After checking the preceding items, add up the point values for all of the items checked. \*Holmes and Rahe, 1967.

APPENDIX I  
WEEK 6 ASSIGNMENT

## Pressure Tips

- I. **What is blood pressure?**
  - blood pressure involves your heart and blood vessels
  - blood pressure is the force that the blood exerts on walls of the blood vessels
  - systolic pressure (upper number) is the pressure of the blood as the heart beats
  - diastolic pressure (bottom number) is the pressure of the blood as the heart is at rest between beats
  - the more difficult it is for the blood to flow through the arteries, the higher the numbers
  
- II. **What is high blood pressure?**
  - high blood pressure has no symptoms
  - high blood pressure and hypertension are the same
  - arterioles regulate blood pressure by expanding or getting narrower
  - when they become narrower, heart must pump harder and blood cannot pass easily through them
  - this increases the blood pressure in the arteries and when it increases and stays there, the result is high blood pressure
  - abnormal blood pressure is consistent readings of 140/90 or greater
  
- III. **How can it damage your body if not controlled?**
  - congestive heart failure
  - arteriosclerosis
  - heart attack
  - kidney failure
  - stroke
  - eye problems
  
- IV. **What can be done for high blood pressure?**
  - high blood pressure cannot be cured but can be controlled
  - weight is highly related to high blood pressure; **losing weight will reduce blood pressure**
  - reducing the amount of sodium in your diet may help reduce blood pressure
  - a program of regular exercise will help reduce weight and keep blood pressure under control
  - watching the amount of alcohol you drink will reduce your blood pressure
  - stopping smoking will save your life
  - learning to manage stress by relaxation may help reduce your blood pressure
  - certain drugs can control high blood pressure

V. High blood pressure is not a disease, it is a condition that can be controlled. It is not something to fear if it is detected and treated. You can live a normal life with your blood pressure under control.

## VITA

Sarajane Cole was born on October 1, 1951 in El Campo, Texas. She was one of four children raised on a farm located fifty miles southwest of Houston, Texas. She spent her childhood riding horses and being outdoors participating in many athletic events.

After graduating from high school she attended Texas Tech University in Lubbock, Texas and received her bachelors degree in Psychology. It was during this period she became very interested in golf and decided to move to Virginia and pursue a career as a golf professional.

She joined the L.P.G.A. as a teaching professional and worked at Hunting Hills Country Club in Roanoke Virginia as an assistant professional. In 1979 she worked at Countryside Golf Club in Roanoke as the club professional until December of 1983.

She has always had an active interest in athletics and fitness. When Countryside was sold she made a career change by going back to graduate school at Virginia Polytechnic and State University for a Master's degree.

She hopes to develop health and exercise programs in the workplace.

*Sar Cole*