

Sue G. Edwards. AN ASSESSMENT OF LEVEL OF KNOWLEDGE ABOUT INDIVIDUAL BLOOD PRESSURE VALUES AND THE DISEASE OF HYPERTENSION AMONG RESIDENTS OF EASTERN NORTH CAROLINA. (Under the direction of Mary A. Rose) Department of Nursing, June, 1985.

This study examined the level of knowledge about hypertension and individual blood pressure among residents of rural eastern North Carolina. Its purpose was to evaluate the knowledge of high blood pressure in a selected group of rural residents, to explore whether these adults could correctly state the value of their own blood pressure, and to examine whether a relationship existed between previous treatment of hypertension and level of knowledge about the disease.

Two hundred-eleven volunteers, solicited from the patrons of a local supermarket chain store and an independent grocery, completed a two-part instrument which gathered demographic data as well as a profile of each participant's knowledge about their own blood pressure. A six-item true-false quiz was administered to test knowledge about the symptoms, sequelae, and treatment of hypertension. A single blood pressure measurement was then conducted for each participant by the investigator for comparison to their predicted blood pressure values.

A majority of respondents incorrectly answered questions which addressed the causes and symptoms of hypertension. The highest area of knowledge tested was recognition of high blood pressure as the leading cause of stroke, heart disease, and

kidney disease.

Fifty-five percent of participants correctly categorized their perception of their individual blood pressures as either normal or too high. Only 12% could correctly state the value of their own blood pressure.

No significant difference was found in comparison of total knowledge scores of previously treated hypertensives with those of previously untreated persons. When knowledge questions were analyzed individually, the previously treated group were significantly less knowledgeable than their counterparts about the absence of physical indicators of high blood pressure. ($p=.001$, $df\ 1$)

AN ASSESSMENT OF LEVEL OF KNOWLEDGE ABOUT
INDIVIDUAL BLOOD PRESSURE VALUES AND THE DISEASE
OF HYPERTENSION AMONG RESIDENTS OF EASTERN NORTH CAROLINA

A Thesis
Presented to
the Faculty of the Department of Nursing
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In Partial Fulfillment
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Master of Science in Nursing

by
Sue G. Edwards

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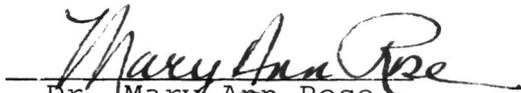
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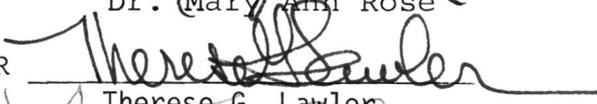
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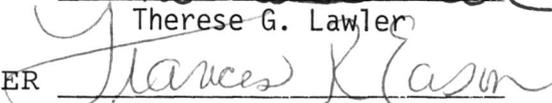
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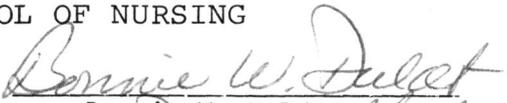
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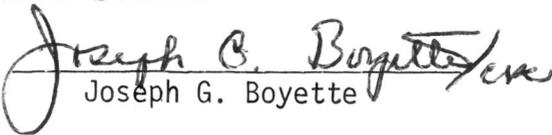
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CHAPTER I - PROBLEM AND REVIEW OF LITERATURE

Hypertension, or high blood pressure, is one of the most common health problems affecting Americans today. Defined as a systolic blood pressure in excess of 140 mm. of mercury or a diastolic blood pressure exceeding 90 mm. of mercury, it affects nearly 60 million persons in the United States. (U. S. Department of Health and Human Services, 1984)

Hypertension is a significant contributor to mortality and morbidity in the United States. One in every seven American adults is hypertensive. (U. S. Department of Health and Human Services, 1984) This chronic illness is cited as the primary cause of death for more than 20,000 Americans annually and is a contributing factor to other causes of mortality, such as hypertensive heart disease. (Tanner and Noury, 1981)

Untreated hypertension is the single greatest risk factor for stroke, and it is a major risk factor for heart disease and kidney failure. (U. S. Department of Health and Human Services, 1983) Both the Framingham Study (1976) and the Western Electric Study (1981), longitudinal studies which examined the risk factors for coronary heart disease, identify hypertension as "the most potent antecedent to the cardiovascular diseases," and indicate that high blood pressure is the single most useful factor for detecting persons at risk for cardiovascular disease. (Kannel, 1976)

The precise cause of hypertension is unclear; research

indicates that it has both genetic and environmental determinants, with heredity being the most significant. Race is a major genetic factor, while obesity and excessive salt consumption appear to be the most significant environmental factors related to hypertension. (Borhani, 1982) Reduced dietary intake of calcium has recently been implicated in the development of high blood pressure. (McCarron et al, 1984)

Hypertension has been described as a "silent killer" because it is often asymptomatic until irreversible body damage has occurred. Usually, high blood pressure has no commonly expected symptoms such as headache or dizziness: there is no way to tell whether a person's blood pressure is elevated by the way he feels. Target organs most commonly damaged are the heart and kidneys: detection of hypertension may not occur until the physical manifestations of heart disease or kidney failure appear. Early detection is, therefore, fundamental to control of the problem.

Once detected, control of hypertension is a lifelong process that requires active participation by the affected individual. It can be treated, but not cured, by one or a combination of several therapies, including weight reduction, increased exercise, salt restriction, or antihypertensive drugs, ranging from diuretics to potent vasodilators. Daily compliance with a prescribed medical regimen is essential for reducing blood pressure to goal levels and maintaining it

there.

Despite the role that detection and control play, the U.S. population has a disturbingly low level of knowledge about hypertension. In 1972, two-fifths of Americans with high blood pressure were unaware of their problem, and two-fifths of those persons who did know they were hypertensive were not adhering to any treatment regimen. (Podell and Gary, 1976) A 1973 Harris survey indicated that less than 30% of the American public believed they could accurately define a normal blood pressure. (The Hypertension Detection and Follow-Up Program Cooperative Group, 1977)

Some progress has been made since 1972 by the National Institutes of Health and its affiliates. By 1978, public awareness of high blood pressure had increased by 28% and the number of hypertensives under treatment had increased by 25%. (Apostolides, 1980) In 1972, the National Heart, Lung, and Blood Institute projected that control of hypertension would lead to significant reductions in mortality and morbidity from cardiovascular disease, particularly myocardial infarction and stroke. Although 1978 data reveals that mortality from hypertension has declined by 80% since 1948, the steepest decline occurred between 1973 and 1978. Mortality from stroke has fallen by 36% since 1948, again most significantly since 1973. (Levy, 1979)

Despite this progress, Vital Statistics of the United

States (1984) cites cardiovascular disease as the leading cause of death in this country. Prevention appears to be the most realistic and cost-effective approach to reversing this trend. Primary prevention involves not only education of the public about the risk factors and treatment of high blood pressure and other contributors to heart disease, but an individual assumption of health maintenance behaviors by all Americans. Because knowledge is essential for detection and control of hypertension, and ultimately, to reduced mortality, it is important for each American to know the status of his/her blood pressure.

Towards this end, the National High Blood Pressure Education Program has developed a specific goal that by 1990 at least 50% of American adults should be able to identify hypertension as a primary risk factor for coronary heart disease and stroke. Additionally, at least 90 % of American adults should be able to state whether their current blood pressure is normal or elevated. (U.S. Department of Health and Human Services, 1973)

Achievement of this goal may be possible on a national level; however, special efforts may be required for its success in specific segments of the population which are at increased risk for the development of hypertension and cardiovascular disease. One particular group at which concern is presently directed is the rural population of the southeastern United

States. North Carolina, for example, has an age-adjusted rate for heart disease which is 7.8% higher than the national average. (N. C. Vital Statistics, 1981)

Eastern North Carolina is a good example of an area where the rural population is at increased risk for hypertension. A majority of the 15 counties in the state with the highest levels of hypertension are located in the eastern section of the state. This may be due to a unique interaction between the genetic and environmental determinants already reviewed. A high proportion of the population is black (some counties have 34% blacks compared to a national average of 11.7%). (N. C. Vital Statistics, 1981) The black race is particularly susceptible to hypertension; the overall prevalence of high blood pressure is 37% among blacks and 18% among whites. There is no appreciable difference in incidence between sexes of the same race. An inverse relationship exists between hypertension and level of education; however, even at higher education levels, the incidence for blacks remains at nearly twice that of whites. (Borhani, 1981)

Other regional differences exist. Education level is below national average; while 66.5% of Americans complete 12 years of school, only 55% of North Carolinians do so. The state's per capita income is \$8656, compared to a national figure of \$10,495. (U. S. Bureau of Census, 1983) More than 37% of deaths in North Carolina residents in 1981 resulted

from heart disease; 9% were directly attributable to hypertension. The eastern region of the state has a significantly higher age-sex-race adjusted rate of hypertension than the rest of the state, causing speculation that some regional factors have not been isolated. (N. C. Vital Statistics, 1981)

Since the residents of eastern North Carolina are prime candidates for hypertension, assessment of both their knowledge of hypertension as a risk factor for coronary heart disease and stroke, as well as knowledge of their own blood pressure status, is important and useful. Identification of hypertensive individuals is fundamental to the implementation of antihypertensive therapy, which is effective in reducing mortality from cardiovascular disease, (AHA Committee Report, 1980) and informed individuals are essential for effective control.

Nurses can play a significant role in assessing the level of individuals' knowledge about hypertension. They can identify persons with elevated blood pressures and refer them for medical treatment. Nurses can also educate clients about the consequences of hypertension and perhaps influence control of this disease.

Purpose

The purpose of this study was to determine progress in a rural Southern population toward one aspect of the National

High Blood Pressure Education Program's 1990 goal. In particular, it investigated the level of knowledge of a select group of rural people about hypertension and their perceptions about the normalcy of their own blood pressure values. It also explored whether previous identification of an individual's hypertension affected his knowledge about the disease.

Research Questions

This study addressed the following research questions:

1. What is the level of knowledge concerning hypertension in adults living in eastern North Carolina?
2. Can adults living in eastern North Carolina correctly state their own blood pressure?
3. Is there a relationship between previous identification and treatment of hypertension and the level of an individual's knowledge concerning high blood pressure?

Review of Literature

A review of research in this area reveals ample data about the incidence of hypertension and also establishes that treatment of high blood pressure is effective, as evidenced by many studies. The National Heart, Lung, and Blood Institute reported results of a five-year longitudinal study of 158,906 individuals in 14 U. S. communities, designed to test the effectiveness of vigorous treatment for hypertension in

reducing mortality and morbidity from cardiovascular disease and stroke. Participants were randomly assigned to a 'customary care' or an 'optimal care' group; 'customary care' involved treatment of hypertension by the existing sources of medical care in the community, while 'optimal care' was a therapy program designed to treat high blood pressure aggressively until a pre-established goal was reached and maintained for five years. Twenty-three percent of those persons surveyed were found to be hypertensive; this value is consistent with data from a 1971 National Health and Nutrition survey which revealed a 26% incidence of hypertension in the United States in persons aged 18 or older. (The Hypertension Detection and Follow-Up Program Cooperative Group, 1977) The study also indicated that hypertension was positively associated with being overweight and inversely related to educational and socioeconomic status. College graduates had a 40% lower rate of high blood pressure than persons completing only 10 years of schooling. There was twice the incidence of hypertension among blacks than whites, even at higher educational levels. The five-year data revealed a 17% higher mortality rate in persons who received 'customary care', indicating that vigorous management of hypertension has the potential to significantly reduce mortality from cardiovascular disease and stroke, even in persons with 'mild' hypertension. (The Hypertension Detection and Follow-Up Program Cooperative Group, 1979)

Several communities and regions investigated effects of hypertension surveillance programs. The Minnesota Heart Survey was a random comparison of hypertension detection and control between the periods of 1973-74 and 1980-81. In the 3475 adults surveyed in 1973-74 and the 1656 adults in 1980-81, the age-adjusted 1980-81 blood pressures were three mm. of mercury less for men and two mm. less for women. The incidence of hypertension was unchanged. Control of hypertension had improved significantly: in the first survey, 40% of hypertensives had controlled blood pressures, while 76% of the latter group were controlled. The author noted that coronary heart disease in the St. Paul-Minneapolis area decreased by three percent annually during that same period. (Folsom, 1983)

Connecticut evaluated the effectiveness of its high blood pressure education efforts between January, 1974 and December, 1976. Of particular interest to the investigators were characteristics of sites which attracted the largest number of blood pressure screenees. During the study's two-year period, 189,006 adults, who were representative of the state's ethnic population, were screened. The best sites were found to be schools and industries: more than 50% of the participation occurred at these areas. An undesirable consequence of utilizing these sites was that black participation was less than in other areas. Of the persons screened, 36% were found to be hypertensive, and 28% were unaware of their

hypertension. Fewer blacks, women, and older persons were unaware of their elevated blood pressure, perhaps suggesting that men and younger women should receive priority for screening. (D'Atri et al, 1980)

A statewide survey of blood pressure control in California, begun in 1979, measured the incidence of high blood pressure among California adults, with specific analysis of prevalence in four major subgroups. Overall prevalence of high blood pressure in the state was 24%, with slightly more incidence in males than females. Groups with less education and income had higher rates of hypertension than other groups, with the highest rate in the black population. (Blacks had a 40% higher rate than whites.) Blacks, however, had the highest rate of awareness and control. This study also shows males to be less aware of their hypertensive status than females. (Leonard et al, 1981)

An evaluation of hypertension control in rural Edgecombe County, North Carolina, was conducted in 1983. Hypertension was found in nearly 50% of persons over age 60 and in Blacks aged 40-59. Awareness, treatment, and control was highest in females, especially white females older than 60. Less than 10% of Black males with hypertension who were younger than 60 years were controlled. This study also revealed that two-thirds of the unaware hypertensives, most of whom were working males, had not had their blood pressure checked within six months prior

to the study, perhaps indicating a need for continued screening efforts. (Wagner et al, 1984) Later reports from this same study revealed that blacks reported more problems with access to medical care than whites, and that Black males had lower confidence in the efficacy of antihypertensive drugs than any other subgroup. (James et al, 1984)

Only two related studies are reported in the nursing literature. Ailinger recently studied the knowledge of a Southern Hispanic community about the risk factors, treatment, prognosis, and sequelae of hypertension. Three hundred thirty Hispanic households in Arlington County, Virginia, were interviewed in 1981: 64% were found to have an adequate knowledge of hypertension, 86% knew high blood pressure is often asymptomatic, and 28% could correctly define hypertension. (Ailinger, 1982)

Hinds compared knowledge of persons never identified as hypertensive with those persons previously diagnosed with high blood pressure. She found that a majority of both groups expected some physical indications of high blood pressure. Only 18% of those being treated for hypertension indicated an awareness that it required life-long therapy. (Hinds, 1983)

Findings emanating from these studies may be of substantive interest to nurses. Since nurses have contact with clients and their families in a variety of settings, they can help detect, refer, and follow-up persons with high blood

pressure. Nurses can assess individuals' knowledge of their own blood pressure status and provide instruction about areas of deficit: nurses' role as health educators is particularly cogent in an area where the per capita availability of health care professionals is scarce.

CHAPTER II - Theoretical Perspective

The Health Belief Model (HBM), formulated by Hochbaum, Kegeles, Leventhal, and Rosenstock, uses socio-psychological variables to explain preventive health behaviors. The model is based on Vroom's expectancy theory, which was modified by Kurt Lewin, a social psychologist. Lewin postulated that an individual's behavior is the consequence of the interaction of two variables: the valence (value) of a specific outcome of behavior to an individual, and the person's estimation of the likelihood that the specific behavior will result in that outcome. (Rosenstock, 1974) Also in Lewinian tradition was the focus on current influences which affected an individual's behavior, rather than past historical experiences.

Beliefs of the model are that man exists in a life space which contains positively, negatively, and neutrally-valued regions: life's activities are a result of the interaction between these forces. Illness and disease belong to the negative region. In order for man to take action to avoid disease, he must believe that he is susceptible to it, that occurrence of the disease would significantly impact his life, and taking action to avoid the disease would be beneficial because it would reduce his susceptibility to the disease or its consequences. The individual must also believe he could have the disease even without symptoms. (Rosenstock, 1974)

Perceived susceptibility refers to the individual's per-

ceived risk of actually developing an illness or disease. This, obviously, varies from person to person, as does one's perception of the seriousness of a disease. Perceived severity of a disease is likely to be influenced by the consequences of the disease, not only upon the individual, but his family, job, and social relations. The factors of perceived susceptibility and severity are both at least partially dependent upon the individual's level of knowledge about the illness or disease. (Becker, 1974)

In summary, the Health Belief Model assumes that a person's recent subjective perceptions determine behaviors and proposes that "the likelihood that a person will take action relative to a health condition is determined both by the individual's psychological state of readiness to take that action and by the perceived benefit of the action weighed against the perceived cost or barriers involved in the proposed action." (Mikhail, 1981) Health action, then, will not occur unless the person perceives himself susceptible to a serious illness: the health action must also be considered effective against the health threat. If the perceived benefits of taking action do not outweigh the disadvantages (or vice-versa) the individual may psychologically remove himself by taking action which does not really reduce the threat. Another consequence of such conflict is the likelihood of increased individual fear or anxiety. (Rosenstock, 1974)

The Health Belief Model applies to hypertension in a manner similar to any disease, or negative life force. In order for persons to take preventive health action, such as having regular blood pressure checks, reducing dietary intake of salt, or controlling body weight, they must feel susceptibility to the disease, understand how it may affect their lives (such as reducing life expectancy or requiring life-long treatment) and have enough knowledge about the disease to realize they could be hypertensive without having physical symptoms. They must believe that control of hypertension is essential to minimize further illness or even death, and that treatment is effective in reducing mortality from the development of related diseases, such as heart or kidney disease or stroke.

CHAPTER III - METHODOLOGY

Design

This project was a descriptive study exploring the level of knowledge about hypertension of a selected group of eastern North Carolina adults and its relationship to selected variables. The interview method was utilized to gather data about participants' prior history of hypertension and knowledge of their own blood pressure. A standardized cognitive tool was administered to evaluate participants' knowledge of hypertension and its sequelae. Participants' actual blood pressures were then measured and recorded by the investigator. The design permitted participants to sit and rest for 10-15 minutes prior to their blood pressure measurements, in concordance with recommended screening techniques. (Schwartz, 1976)

Population and Sample

Adults living in eastern North Carolina were the target population for this study. The study sample consisted of 211 adult volunteers from Ayden, North Carolina, a small town in Pitt County. Participants were limited to persons aged 20 or older to facilitate comparison to existing census data. A nonprobability convenience sampling technique was utilized: volunteers were canvassed from the patrons of two local supermarkets. A table, with signs publicizing the intent of the study, was located outside the stores' entrance and manned by

the investigator on varying weekdays. The purpose and mechanics of the survey process were briefly explained to those who were interested in having their blood pressure checked. All participants were assured of anonymity and advised that the data would be coded by numbers only.

Instruments

The written data collection instrument, measuring knowledge and participants' estimate of their blood pressure, consisted of two parts. Part A, developed by the investigator, sought demographic data about each participant. It also asked respondents to categorize themselves as either previously treated or untreated for high blood pressure. Two questions addressed individuals' estimates of their own blood pressure: participants were asked whether they thought their blood pressure was normal or abnormal, and they were asked to state the value of their blood pressure. The tool inquired about respondents' usual source of health care, to be used in the event that a referral for hypertension evaluation was needed. Part A also permitted the recording of each participant's blood pressure, as measured by the investigator.

Part A of the tool was pretested on a group of five people, (whose ages ranged from 23-66 years) from Grifton, North Carolina, a neighboring town of Ayden.

Part B consisted of a six-item true-false quiz which tested knowledge about hypertension, its symptoms, and treat-

ment. This quiz was developed by the National Heart, Lung, and Blood Institute for use in the National High Blood Pressure Education Program. Validity and reliability data were not available. Permission to use the quiz was granted by the High Blood Pressure Information Center at the National Institute of Health.

The third instrument used in the study was an electronic blood pressure device. Its digital display eliminated investigator bias and interference from traffic and other environmental noises in the measurement of each participant's blood pressure. Calibration of the device was verified prior to each recording.

Data Collection

Data was collected on four occasions from the customers of two local supermarkets. Both a supermarket chain store and an independent grocery market were canvassed to minimize the likelihood of sample bias due to socioeconomic status. The supermarket was part of a regional enterprise and was surveyed on a consecutive Friday and Saturday. The grocery, which permitted customers to charge their purchases on both a weekly or monthly basis, was visited on a Monday and Saturday of the same week.

Participants were limited to interested persons who stated they were residents of Ayden and at least 20 years of age. After the intent of the study was briefly explained,

each participant was seated and given a clipboard containing a "Blood Pressure Survey" and "High Blood Pressure Quiz". Respondents were asked to mark their answers to each item directly on the forms. Writing instruments were provided. Whenever participants indicated that they could not read or needed assistance, the investigator read the items to them. After participants completed and returned the survey instruments, the investigator briefly scanned the forms for thoroughness.

Participants were then asked to sit at the display table for blood pressure measurement by the investigator. Blood pressure was measured in each volunteer's right arm (unless contraindicated by deformity, amputation, radical mastectomy, paralysis, or obvious disease of the extremity), using an electronic blood pressure device and a cuff which covered approximately two-thirds of the individual's upper arm. A single blood pressure measurement was conducted for each participant, and the systolic and diastolic values were recorded on the survey form.

Persons whose blood pressure exceeded 140/90 mm. mercury were advised that as of that sitting, their blood pressure exceeded normal limits. They were encouraged to seek reevaluation of their blood pressure from their usual source of health care (already identified on the "Blood Pressure Survey"). In the event that a participant denied having a

usual source of health care, he or she was provided with the telephone number of the Pitt County Medical Society, where a secretary could advise them of physicians would accept new clients.

Upon completion of these activities, each participant was given a copy of answers to the "High Blood Pressure Quiz". A section of that paper was designed to be a wallet-card, onto which was copied their measured blood pressure value.

Data Analysis

Knowledge concerning hypertension in adults living in eastern North Carolina was reflected by reporting the frequency distribution of responses to the knowledge quiz. The ability of eastern North Carolinian adults to correctly state their own blood pressure was analyzed by defining a "correct response" as a value plus or minus 10% of both the measured systolic and diastolic values. This range was then used to compare participants' predicted blood pressure values to their measured blood pressure values. Finally, the relationship between previous treatment of hypertension and level of knowledge was identified by using a Chi-Square statistical test of significance to compare Knowledge Quiz responses of persons who identified themselves as previously treated for hypertension with those persons who denied prior treatment of high blood pressure. Significance level was set at $p=.05$.

CHAPTER IV - FINDINGS

This study examined the hypertension knowledge level of a selected group of rural eastern North Carolina adults. It investigated whether they could correctly state the actual value of their individual blood pressures, and searched for a relationship between level of knowledge and previous identification and treatment for high blood pressure. A demographic survey and six-item quiz, addressing the causes, signs and symptoms, and treatment of hypertension, were administered to participants; their projected and measured blood pressure values were then recorded.

Of the 211 volunteers for this study, 89 (42%) were male and 122 (58%) were female. The subjects were almost evenly divided between the black and white races: 115 (54%) were black and 96 (46%) were white. The mean age of the sample was 51 years. Sixty-five (31%) of the participants completed high school, with the average education achievement level being completion of 10.6 grades.

Ninety-one (43%) of the sample had been previously treated for high blood pressure. Fifty-one (24%) respondents reported they were currently taking medication for high blood pressure. Nine people (6% of the sample) stated they were supposed to be taking antihypertensive medications; six cited 'expense' as their reason for stopping, two reported that they

no longer perceived a need to continue their medicines, and one person stated his medication supply had expired.

The study sample was representative of its target population, residents of Ayden, N. C., with age being the major exception. The sample, limited to persons of age 20 and older, had a mean age of 51.3 years, while the mean age of Ayden's population is 31.7 years. (Thirty-two percent of Ayden residents are aged 0-19 years.) Racial composition of both groups was similar: 46% of the study sample were white and 55% were black, while 55% of Ayden residents are white, with 44% black. Males in the study numbered 89 (42%), which is similar to the 49% male population of Ayden. (U. S. Department of Commerce, 1982)

Tables I and II are comparisons of the sample's demographic characteristics with 1980 census data for Ayden residents. Distribution by age and sex is shown for the white race in Table I and for the black race in Table II.

Table I
 Comparison of Sample and Target Population
 by Age and Sex for White Race

Age	Sample	Ayden
20-39 years		
males	11 (5%)	324 (7%)
females	11 (5%)	382 (9%)
40-59 years		
males	13 (6%)	271 (6%)
females	16 (8%)	287 (7%)
60+ years		
males	19 (9%)	175 (4%)
females	24 (11%)	323 (7%)

Table II
 Comparison of Sample and Target Population
 by Age and Sex for Black Race

Age	Sample	Ayden
20-39 years		
males	18 (9%)	207 (5%)
females	26 (12%)	288 (7%)
40-59 years		
males	15 (7%)	142 (3%)
females	21 (10%)	207 (1%)
60+ years		
males	12 (6%)	122 (3%)
females	25 (12%)	222 (5%)

The sample differed somewhat from the profile of Pitt County. Mean age for the county is 26.1 years, less than that of either Ayden or the study group. (This is secondary to the location of a major university in the county's largest town.) Fifty-seven percent of Pitt County residents completed high school, while only 31% of the sample did so. Pitt County also has a higher proportion of white residents (65%) than does Ayden (55%) or the sample (46%).

Findings by Research Question

Question #1: What is the level of knowledge concerning hypertension in adults living in eastern North Carolina? --The High Blood Pressure Quiz contained six true-false questions about the causes, physical signs and symptoms, and treatment of high blood pressure. Two of the questions were true: "High blood pressure is the leading contributor to strokes, heart disease, and kidney disease" and "Once I have high blood pressure, it usually means I will have to take medicine to control it for the rest of my life." The following four questions were false: "If I stay calm and relaxed I won't have high blood pressure," "I can tell when my blood pressure is high," "Headaches and dizziness are symptoms of high blood pressure," and "There's nothing I can do about high blood pressure except watch my diet."

Only three of the 211 participants answered all questions correctly. Table III shows a distribution of responses to the

Quiz. It reveals that a majority of participants incorrectly answered those questions addressing the causes and symptoms of high blood pressure. The table reflects moderate knowledge about the treatment and prevention of hypertension and identifies the highest area of knowledge as recognition of high blood pressure as the leading cause of stroke, heart disease, and kidney disease.

Table III
Responses to Knowledge Quiz

Questions	# Responding "True"	# Responding "False"
1. If I stay calm and relaxed I won't have high blood pressure. (Correct answer=FALSE)	108 (51%)	103 (49%)
2. High blood pressure is the leading cause of strokes, heart disease, and kidney disease. (Correct answer=TRUE)	204 (97%)	7 (3%)
3. I can tell when my blood pressure is high. (Correct answer=FALSE)	119 (56%)	92 (44%)
4. Once I have high blood pressure, it usually means I will have to take medicine to control it for the rest of my life. (Correct answer=TRUE)	123 (58%)	88 (42%)
5. Headaches and dizziness are symptoms of high blood pressure. (Correct answer=FALSE)	173 (82%)	38 (18%)
6. There's nothing I can do about high blood pressure except watch my diet. (Correct answer=FALSE)	85 (40%)	126 (60%)

Question #2: Can adults living in eastern North Carolina correctly state their own blood pressure? --One hundred-fifty-one (74%) of the participants stated that their individual blood pressures were normal: 82 (54% of this group of 151) were correct on the basis of a single blood pressure measurement. Of the 52 (26%) who believed their blood pressure to be abnormal, 44 (88%) felt it was too high. Thirty-four (77%) of these 44 were correct on the basis of a single measurement of high blood pressure.

One hundred-eleven (53%) of the total group were found to be hypertensive on the basis of a single blood pressure measurement. Measured systolic blood pressures ranged from 102-192 mm. of mercury, while diastolic values ranged from 40-122 mm. of mercury.

One hundred-eight of the 111 hypertensive participants were referred to their usual source of health care (identified in Part A of the survey tool) for further evaluation of their blood pressure status. Sources of health care cited by respondents ranged from local family practice clinics and physician specialties such as internal medicine and obstetrics/gynecology to Public Health Department clinics. Three persons, who denied a usual source of health care, were given the telephone number of the Pitt County Medical Society and urged to seek medical evaluation of their blood pressure.

Only 66, slightly less than a third of the sample,

thought they knew the actual value of their blood pressure, with the majority (39= 56%) obtaining their perceptions from their last physician visit. Twenty-six (39% of the 66) were correct in predicting both a systolic and diastolic value within 10% of their measured blood pressure. Therefore, 12% of the total sample were able to correctly state the value of their own blood pressure.

The mean value of all 66 predicted blood pressures was 132/78 mm. mercury. The mean measured blood pressure of this same group was 133/84 mm. mercury, which does not differ markedly from the 140/87 mm. mercury mean value of all 211 participants.

Question #3: Is there a relationship between previous identification and treatment of hypertension and the level of an individual's knowledge concerning high blood pressure? --The participants were divided into two groups for specific analysis, with the 91 persons who identified themselves as previously treated for hypertension constituting Group A, and the remaining 120 people who denied prior treatment for hypertension being Group B. Table IV is a demographic comparison of these two groups. Racial and sexual composition of both groups was essentially the same, as was educational level. Mean age was highest in the group previously treated for hypertension.

Table IV
 Comparison of Groups
 With and Without Previously Treated Hypertension
 by Race, Sex, Age, and Education

	Previously Treated (Group A)	Untreated (Group B)
Race		
White	41 (45%)	55 (46%)
Black	50 (55%)	65 (54%)
Sex		
Male	36 (40%)	53 (44%)
Female	55 (60%)	67 (56%)
Age (mean)	56 years	48 years
Education (mean)	10.2 grades	10.9 grades

Knowledge Quiz responses of persons previously treated for hypertension (Group A) are compared with those of untreated respondents (Group B) in Table V. Both groups scored highly on associating high blood pressure as a major risk factor for cardiovascular disease; both groups were primarily incorrect in anticipating physical signs and symptoms of high blood pressure. The largest variance in the groups' responses was in perceived ability to tell if individual blood pressure was high: this difference was highly significant.

Table V
 Comparison of Correct Responses to Knowledge Quiz
 between Previously Treated and Untreated Groups

Questions	Previously Treated (Group A) Correct Responses	Untreated (Group B) Correct Responses
1. If I stay calm and relaxed I won't have high blood pressure. (FALSE)	47 (52%)	56 (47%)
2. High blood pressure is the leading cause of strokes, heart & kidney disease. (TRUE)	86 (94%)	118 (98%)
3. I can tell when my blood pressure is high. (FALSE)	29 (32%)	63 (52%) *
4. Once I have high blood pressure, it usually means I will have to take medicine for the rest of my life. (TRUE)	59 (65%)	64 (53%)
5. Headaches and dizziness are symptoms of high blood pressure. (FALSE)	17 (19%)	21 (18%)
6. There's nothing I can do about high blood pressure except watch my diet. (FALSE)	49 (54%)	77 (64%)

* (p=.001, df 1)

Chi-square analysis revealed no significant difference in total knowledge scores of Group A and Group B. When questions were analyzed individually, the only significant difference between the two groups was in perceived ability to "tell if (their) blood pressure is too high." Twenty-nine (32%) of those persons previously treated for hypertension answered correctly, while 56 (47%) of the previously untreated group responded correctly. ($p=.001$, $df=1$)

CHAPTER V - DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

This study suggests that the level of knowledge regarding hypertension among the residents of a rural eastern North Carolina is low. A majority of those interviewed incorrectly associated the development of high blood pressure with nervous tension and expected physical indicators of the presence of the disease. These findings are consistent with Hinds' Canadian study (1983), where 75% of the participants associated symptoms with hypertension. The misperceptions are higher in the rural North Carolina group, where 51% (compared to 36% in Hinds' study) thought staying calm would prevent high blood pressure. Eighty-two percent of the Ayden sample and 64% of the Canadian sample expected headaches and dizziness to be symptoms of hypertension.

The absence of a significant difference in knowledge between persons previously treated for high blood pressure and those without prior treatment for it suggests that if education was provided to hypertensives in this sample, it was not effective. The only important difference in the two groups' responses related to subjects' perception of their ability to tell if their blood pressure were elevated; the previously treated group answered incorrectly more than those without prior knowledge of their hypertension. Hinds also reported a nonsignificant greater frequency of incorrect responses in the previously treated Canadian group.

Ninety-seven percent of the sample correctly identified high blood pressure as a major risk factor for strokes, heart disease, and kidney disease. This concept and the necessity of treating high blood pressure 'for life' are the frequent subjects of mass media educational campaigns: it is difficult to explain why knowledge of the former is so high, while nearly 30% fewer knew the latter. Hinds reported a similar trend, with 85% of the Canadian sample linking hypertension with cardiovascular diseases, and only 18% indicating that high blood pressure requires lifelong treatment.

This study revealed that a greater proportion (84%) of those without prior treatment for hypertension (Group B) thought their blood pressure was normal: 61% of Group A, who identified themselves as previously treated for hypertension, responded in this fashion. On the basis of a single blood pressure measurement, 41% of Group B and 68% of Group A were found to be hypertensive. These findings support the usual absence of physical manifestations of high blood pressure.

When compared to the National High Blood Pressure Education Program's educational targets, the results of this study indicate both progress and deficits in knowledge about hypertension and normalcy of individual blood pressure: over 90% of this rural sample were able to identify hypertension as a major risk factor for stroke, heart disease, and kidney disease. Twenty-one percent of those who thought their blood

pressure was normal, however, were incorrect.

Only 31% of respondents felt they knew the value of their individual blood pressures. The proportion of the total sample who were able to correctly state their blood pressure was quite small, 12%. This appears to indicate that this group was poorly informed about a vital statistic. No comparative data regarding knowledge of blood pressure value is available.

The amount and quality of blood pressure education provided to this rural group is seriously questionable. The absence of significant differences in knowledge levels (in the presence of mediocre Quiz scores) between those previously treated for hypertension and those untreated for the disease seems to indicate a diffuse teaching or learning deficit.

Limitations

Several factors should be considered before attempting to generalize the results of this study to the target population. First, use of a non-probability sampling method makes it impossible to estimate the magnitude of error when inferences are drawn to the population. While volunteers for the study were solicited from grocery-shoppers, based on the premise that most adults buy groceries, they were not necessarily representative of the target group. Participants who are older than 60 years may, for example, be less likely to do their own grocery-shopping because of health constraints.

Another limitation of this study was the use of a single blood pressure measurement to determine the presence of individuals' hypertension. While results would be more valid if serial or both sitting and lying blood pressure measurements were recorded, the location and logistics of data collection precluded this possibility.

Finally, reliance upon each participant's perception of whether they had been previously been treated for high blood pressure was a limitation of this study. It is possible that some respondents may have confused the concept of 'high blood pressure' with other disorders, such as a 'high blood count' of red blood cells.

Theoretical Implications

The Health Belief Model describes behavior as an interaction between the value of a specific behavioral outcome and the estimation that a behavior will result in the outcome. (Rosenstock, 1974) It further states that individuals must perceive that a threat to their health exists before they will engage in definitive health actions. Perceived susceptibility is a key concept in the model; Becker (1974) postulated that this is at least partially dependent upon knowledge of illness or disease.

When results of this study about knowledge of hypertension and normalcy of individual blood pressure are considered within the framework of the Health Belief Model, the lack of

knowledge may be due to the sample's poor perception of susceptibility to the disease of hypertension. Since 74% of the sample thought their blood pressure was normal, while 53% were found to be hypertensive, a gap in perceived susceptibility exists. This factor, combined with the false impression (by a majority of the sample) that physical manifestations of high blood pressure exist, may eliminate individual motivation to have blood pressure evaluations.

In this situation, it would appear that knowledge of the disease of hypertension and perceived susceptibility to its consequences are mutually dependent. Man may not perceive himself susceptible to the disease of hypertension until he becomes knowledgeable about the disease; he may not become knowledgeable about the disease until he perceives himself susceptible to the irreversible damage which is its consequence.

Implications For Nursing Practice

This study reveals that persons previously treated for high blood pressure had no greater knowledge of the causes, treatment, and sequelae of hypertension than those not previously diagnosed, as measured by responses to the Knowledge Quiz. There is apparently room for much improvement in the education of both groups; however, the adequacy of patient education for the previously treated group is of major concern. Regardless of the instruction that may have been

provided to the hypertensives during the course of their treatment, they do not appear to have learned any more than their counterparts.

Nurses, as the largest group of health-care providers in the United States (Stanton, 1985) are in a good position to teach preventive health behaviors. As neighbors, relatives, friends, or direct health-care providers, nurses have a great deal of opportunity to be health educators. Professional nurses are prepared to assess knowledge deficits and provide information, with reinforcement, to those who are ready to learn. They can encourage individuals to learn the range for normal blood pressure and foster self-care behaviors, such as encouraging high-risk clients to monitor their own blood pressures on a regular basis.

Why nurses were unable to influence the learning of these previously treated hypertensive clients is a mystery; possibilities range from the chance that clients had no interaction with nurses to the outlook that nurses may have been poor educators. The learning readiness of the clients is another factor which might have influenced the educational process.

Recommendations For Further Study

Replication of this study in both rural and urban settings would provide more descriptive data for nurses to utilize in intensifying their preventive health efforts. If studies were conducted in both rural and urban settings, they

might isolate knowledge needs secondary to lifestyle, race, or sex.

It would also seem beneficial to assess the efficacy of high blood pressure education provided by a variety of sources. Since there was no appreciable difference in knowledge between those who identified themselves as previously hypertensive and those without prior knowledge of high blood pressure, it would be interesting to discover the content of health education provided to the hypertensives, as well as the various sources who provided the teaching. It would be useful to compare knowledge levels of persons who received their health education from nurses with those who were taught by other health-care providers to evaluate the efficacy of nurses' health teaching activities.

Finally, further study is indicated to determine whether persons with knowledge of their blood pressure value are also more informed of the causes, symptoms, and treatment of high blood pressure. Such findings might support the concept that knowledge of disease and perceived susceptibility to its consequences are mutually dependent.

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APPENDIX A: INSTRUMENTS

E. Do you think your blood pressure is normal? Yes No

If No, do you think it is too high or too low?

too high too low

F. Do you think you know the value of your blood pressure?

Yes No

If Yes, please answer the following two questions:

1. What is your blood pressure? _____ / _____

2. What is your source of knowledge of your blood pressure?
(Check one)

- my last visit to the doctor
 I have a kit at home which I use
 I use a publicly available blood pressure service at the drug store, hospital, health department, etc.
 other (specify) _____

When you finish answering these questions, please answer the short quiz on the next page. Then take both papers to the nurse so she can check your blood pressure.

Thank you for your cooperation in this study!

The nurse will complete this section:

W - B - H - I - A - O

If hypertensive, was it pregnancy-induced? Yes No

Measured BP value:

R/L arm

High Blood Pressure Quiz

One in every seven adults you meet today has high blood pressure. Some don't even know they have it. Many who do know they have high blood pressure aren't doing enough to control this disease, partly because they don't understand enough about it. Do you? Test your knowledge of high blood pressure by taking this quiz. Answer true or false to each of the following:

- | | | |
|---|---|--|
| T | F | 1. If I stay calm and relaxed I won't have high blood pressure. |
| T | F | 2. High blood pressure is the leading contributor to strokes, heart disease, and kidney disease. |
| T | F | 3. I can tell when my blood pressure is high. |
| T | F | 4. Once I have high blood pressure, it usually means I will have to take medicine to control it for the rest of my life. |
| T | F | 5. Headaches and dizziness are symptoms of high blood pressure. |
| T | F | 6. There's nothing I can do about high blood pressure except watch my diet. |

ANSWERS

- 1 **False**—High blood pressure, or hypertension as it is also called, is *not* nervous tension. Even a relaxed, easygoing person may have high blood pressure.
- 2 **True**—High blood pressure is a physical condition in which the heart and blood vessels are under a constant strain. If undetected and untreated, it may eventually lead to a stroke, heart disease, or kidney disease.
- 3 **False, False, False**—High blood pressure usually has no symptoms. The only way to know if your blood pressure is high is to get it checked by a doctor or other trained health professional. It's quick and painless. But, no matter how you feel, if your doctor has prescribed pills for high blood pressure, it's important to take them every day.

- 4 **True**—For the vast majority of people with high blood pressure the condition will be with them for life. But that's not as bad as it seems. Although science has not yet found a cure for the most common form of high blood pressure, there are many ways to lower high blood pressure and to keep it low.
- 5 **False**—For *most* people with high blood pressure, there are *no symptoms*, especially in the early stages. In *severe* cases, usually in persons who have had high blood pressure for many years but who weren't treating it, there will sometimes be dizziness and headaches. If you are told that you have high blood pressure and don't treat it, the first *symptom* may be a heart attack or stroke.
- 6 **False**—Although there is no cure for high blood pressure that will keep it normal, you can *control* it with proper treatment. Your doctor may suggest some diet restrictions (less salt, less fatty food) as well as prescribe medication. If your doctor does give you pills, it's important to take them regularly.

Cut along dotted line for wallet card.

On _____, 1985, I checked
_____'s blood
pressure and measured it to be

_____.

Sue Edwards

Sue G. Edwards, RN