Knowledge and implementation of the JNC VII guidelines for treatment of hypertension in the elderly by health care practitioners in northwest Ohio

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Knowledge and Implementation of the JNC VII Guidelines for Treatment of Hypertension in the Elderly by Health Care Practitioners in Northwest Ohio

Submitted by
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In partial fulfillment of the requirements for the degree of
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Ericka Elizabeth Eugeni
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2005
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Introduction

According to the seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC VII), hypertension is defined as a systolic pressure of 140 mm Hg or higher or a diastolic pressure of 90 mm Hg or higher in adults (Chobanian, Bakris, Black, Cushman, Green, Izzo, et al., 2003). More than 50% of those over the age of 60 are affected by hypertension and almost 30% are unaware that they have high blood pressure (Chobanian, et al.). “In addition, suboptimal blood pressure is the number one attributable risk for death throughout the world,” (Chobanian, et al., p 1206). Hypertension is also one of the primary reasons for visits to health care providers in the United States (Hyman & Pavlik, 2001). Uncontrolled high blood pressure increases the risk for heart attack, heart failure, stroke, and kidney disease with a cost of over $55 billion to Americans last year (American Heart Association [AHA], 2004). The new hypertension guidelines released by the JNC VII are aimed at simplifying the classification of hypertension and clarifying the appropriate treatment for each level. Despite these efforts, it is estimated that only 34% of patients diagnosed with hypertension have blood pressures below 140/90 mm Hg (Chobanian, et al.). Possible barriers to meeting these blood pressure levels may include cultural norms, insufficient patient education, time constraints for health care professionals, or patient non-compliance to treatment (Chobanian, et al.; Fretheim, Oxman, & Flottorp, 2004).

The lifetime risk of elderly persons developing hypertension is greater than 70%, even for those persons with only mildly elevated blood pressure, according to the Framingham Study (Kannel, 2003). Therefore, it is essential that blood pressure be monitored at regular intervals and preventative measures initiated for those at highest risk. Hypertension in the elderly is of special concern due to the high number of comorbidities usually present in elderly patients. This
makes treatment more difficult and the need for prevention even greater. More than 25% of cardiovascular events occur in patients receiving treatment for hypertension (Kannel). The National Health and Nutrition Examination Survey (NHANES) concluded that in patients over the age of 65, 45% were unaware that they had hypertension, 32% were aware of their high blood pressure but were not being treated, and 57% of those being treated had blood pressure readings above the goal of 140/90 mm Hg as set forth by the JNC VII (Hyman & Pavlik, 2001). It is important to understand why treatment is not effective and to identify areas where health care providers can improve in providing care to elderly patients with hypertension.

The purpose of this study was to assess the knowledge and implementation of the guidelines set forth by the seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure among health care providers as it relates to patients over age 65. This study examined the knowledge and use of JNC VII guidelines among physicians, physician assistants, and nurse practitioners. This study also examined why a large percentage of elderly patients have blood pressure levels that remain classified as uncontrolled. Based on these findings, the results were used to make recommendations to health care providers on how to improve adherence to the JNC VII guidelines.

Four main research questions were tested using the survey to determine whether there were differences among health care practitioners.

H$_1$: There will be no difference in knowledge of the JNC VII guidelines among physicians, nurse practitioners, and physician assistants.

H$_2$: There will be no difference in adherence to the JNC VII guidelines among physicians, nurse practitioners, and physician assistants.
H₃: There will be no difference in patient compliance to hypertension treatment among patients treated by physicians, nurse practitioners, and physician assistants.

H₄: There will be no difference in the number of patients with controlled hypertension among patients treated by physicians, nurse practitioners, and physician assistants.

The information obtained in this study was used to help health care workers identify misconceptions about hypertension in the elderly and to help improve hypertension treatment in the elderly. It also identified differences between the groups of health care practitioners in their treatment of hypertensive patients. Ideally, this has lead to an increased number of older patients reaching their blood pressure goal with treatment.
Literature Review

Early on in the development of the medical profession, little was known about the relationship between the heart and blood vessels. It was not until 1733 that the British scientist Steven Hales first attempted to measure the pressure of blood flowing through arteries. Scipione Riva-Rocci developed the first instrument to measure blood pressure without cutting the skin, which we call a sphygmomanometer today. The Russian physician Korotkoff discovered in 1905 that the pulse waves could no longer be heard when the artery is completely occluded, reappear when blood flow is returned to the artery, and disappear again at the point that the artery is no longer compressed. Shortly thereafter, blood pressure measurement became clinically accepted as a way to identify patients with abnormal cardiovascular functioning (Dehn & Asprey, 2002).

Hypertension is defined as a systolic pressure of 140 mm Hg or higher or a diastolic pressure of 90 mm Hg or higher in adults (Chobanian, et al. 2003). It is an independent and modifiable promoter of cardiovascular disease (Kannel, 2003). Essential hypertension has no known cause, while secondary hypertension is caused by a known medical condition. The lifetime risk of developing hypertension is greater than 70%, even for those persons with normal blood pressure levels (Kannel). Therefore, it is essential that blood pressure be monitored at regular intervals and preventative measures initiated for those at highest risk. The most common risk factors for developing hypertension are family history of hypertension, African-American race, increasing age, obesity, lack of physical activity, high dietary salt intake, low dietary potassium intake, cigarette smoking, and alcohol use (Mayo Clinic, 2004; AHA, 2004).

Hypertension in the elderly is of special concern due to the high number of comorbidities usually present in elderly patients. This makes treatment more difficult and the need for prevention even greater. Hyman and Pavlik (2001) found that in patients over age 65, 45% were
unaware that they had hypertension, 32% were not being treated for their hypertension, and 57% had blood pressure readings that were considered uncontrolled. More than 25% of cardiovascular events occur in patients already receiving treatment for hypertension (Kannel, 2003). Uncontrolled high blood pressure increases the risk for heart attack, heart failure, stroke, and kidney disease (Chobanian, et al. 2003).

It is important to correctly measure blood pressure to avoid falsely elevated or lowered readings. The most common mistake in taking blood pressure readings is choosing the wrong size cuff for the patient. Choosing a cuff size that is too small for the patient results in a blood pressure reading increased by an average of 8.5 mm Hg systolic and 4.6 mm Hg diastolic (Dehn & Asprey, 2002). For adults, the bladder should encircle 80% of the patient’s upper arm and the width should cover 40-50% of the upper arm. Blood pressure can vary greatly in the elderly, especially if there is evidence of atherosclerosis. Therefore, it is important to take multiple measurements from each side before making a diagnosis (Dehn & Asprey).

Before obtaining a patient’s blood pressure measurement, it is necessary to ensure that the patient is calm and relaxed. “Blood pressure readings may be affected by emotions, physical activity, nicotine from cigarette smoking, and ingesting caffeine” (Dehn & Asprey, 2002; Wilkening, 1999). The patient should be sitting with their feet flat on the floor and the blood pressure cuff should be placed over the brachial artery at approximately the horizontal level of the heart or one inch above the antecubital crease. The brachial pulse should be palpated while inflating the blood pressure cuff to establish the level at which the pulse disappears. This will ensure correct measurement and avoid underestimation of blood pressure in patients with an auscultatory gap. After deflating the cuff and waiting several seconds, the clinician may continue with their measurement of the patient’s blood pressure. The earpieces of the stethoscope should
be inserted into the clinician’s ear canal facing forward with the bell of the stethoscope over the 
brachial artery just above the antecubital crease. The blood pressure cuff should be inflated 
rapidly to a pressure 20-30 mm Hg above the level at which the pulse disappeared during 
previous palpation. The valve is partially opened and the bladder is deflated at a rate of about 
two mm Hg per second until Korotkoff sounds are heard. These sounds indicate the level of the 
patient’s systolic blood pressure. Deflation of the bladder should continue slowly until the 
sounds disappear, indicating the patient’s diastolic blood pressure. The values should be 
recorded in the patient’s chart along with date and time, the arm in which the measurement was 
taken, cuff size, and the position of the patient during measurement (Dehn & Asprey).

Ambulatory blood pressure monitoring may be of value in patients with hypertension that 
is not responsive to treatment, patients with borderline blood pressure measurements, and in 
patients with suspected “white coat hypertension”. Currently, ambulatory blood pressure 
monitoring is only approved for reimbursement in patients with suspected white coat 
hypertension. White coat hypertension is the result of the apprehension or fear that some patients 
feel when in the presence of a clinician resulting in higher blood pressure readings and a possible 
misdiagnosis of hypertension. It is estimated that nearly a quarter of people who are diagnosed 
with hypertension actually have white coat hypertension (O’Brien, 2003). The clinician should 
suspect white coat hypertension in cases where the patient’s blood pressure measurement varies 
significantly from self-reported values, in elderly patients, in patients with recent onset 
hypertension, or in patients with a low cardiovascular risk profile. Incorrect diagnosis of 
hypertension and inappropriate use of medication can cause serious adverse effects (O’Brien).

Treatment of patients with systolic hypertension and high pulse pressure may be of more 
importance than treating patients with increased overall blood pressure levels according to
Chaudhry, Krumholz, and Foody (2004). Until recently, high systolic blood pressure was thought to be a normal part of aging and more importance was placed on the diastolic blood pressure level (Lloyd-Jones, Evans, Larson, O’Donnell, Roccella, & Levy, 2000). Research indicates that systolic blood pressure continues to rise with age while diastolic blood pressure remains constant after the fifth or sixth decades of life (Chobanian, et al., 2003). It has also been shown that women’s blood pressure begins at a lower level than men’s until age 60 when it frequently surpasses the men’s readings. Explanations for this pattern in the elderly focus on the “thinning, fragmentation, and eventual fracturing of elastin and increased collagen and calcium deposition in the large arteries” which leads to increased stiffness (Franklin, et al., 1997). The difference between the systolic and diastolic pressures is defined as the pulse pressure and is also related to increased risk for development of cardiovascular disease. Elevated systolic blood pressure (>140 mm Hg) is associated with a high risk of developing other cardiovascular problems such as myocardial infarction, left ventricular hypertrophy, and stroke, even if diastolic blood pressure remains within normal limits (<90 mm Hg). Despite these findings, there remains a belief among some clinicians that it is acceptable for systolic blood pressure to equal 100 plus the patient’s age (Izzo, Levy, & Black, 2003). Participants in the Systolic Hypertension in the Elderly Program (SHEP) had a 30% decrease in cardiovascular events when systolic hypertension was diagnosed and treated (Chaudhry, et al.). Despite these results, there remains poor control of systolic hypertension in the elderly.

The National Heart, Lung, and Blood Institute (NHLBI) has coordinated a committee to issue guidelines and advisories to increase awareness, prevention, treatment, and control of hypertension for over three decades (Chobanian, et al., 2003). This coalition of professional, public, and federal agencies meet approximately every seven years to review current guidelines
and research as well as make recommendations for changes to the guidelines. The JNC VII was published based on new studies and clinical trials completed since the JNC VI in 1997, the need for more concise guidelines and classification of hypertension, and the need to increase the benefit to patients. Awareness, treatment, and control of hypertension are at their highest levels since the first JNC report was published, but much improvement is still needed.

Under the JNC VII guidelines, classification of blood pressure in adults over the age of 18 has been condensed into four categories. Normal blood pressure is considered <120 mm Hg systolic blood pressure (SBP) and <80 mm Hg diastolic blood pressure (DBP), while prehypertension is now classified as 120-129 mm Hg SBP or 80-89 mm Hg DBP. Prehypertension is a category used to identify individuals at high risk of developing hypertension. Stage 1 hypertension is now considered 140-159 mm Hg SBP or 90-99 mm Hg DBP, and stage 2 hypertension is considered >160 mm Hg SBP or >100 mm Hg DBP. These levels are lower than the levels set out by the JNC VI as more studies confirm the importance of maintaining optimal blood pressure in order to decrease the risk of cardiovascular disease. Classification of blood pressure should be based on an average of two or more properly measured, seated readings on two or more occasions (Chobanian, et al., 2003).

Treatment of patients diagnosed with hypertension is based on their blood pressure category. Prehypertensive patients should be encouraged to make lifestyle modifications such as a low salt diet, increasing physical activity, weight loss, stopping smoking, and decreasing alcohol intake. These patients are not candidates for drug therapy, but intervention may prevent the development of later cardiovascular disease (Chobanian, et al., 2003). Most patients in stage 1 should be started on a thiazide diuretic to control blood pressure, while patients in stage 2 usually need a combination of at least two different classes of drugs to control blood pressure,
including ACE inhibitors, angiotensin receptor blockers, beta blockers, and calcium channel blockers. Clinical trials have indicated that the use of diuretics was well tolerated in patients and provided the best reduction in cardiovascular disease (Chobanian, et al.). Beta-blockers were found to have the most side effects while calcium channel blockers and diuretics were the most effective at lowering SBP in the elderly (Morgan, Anderson, & MacInnis, 2001). If the patient’s blood pressure is still not controlled after the addition of a second drug, increased dosages or addition of another class of drug should be attempted. Patients should be followed at least once a month until risk of end organ damage is reduced. At that point, the patient should be monitored approximately every two to three months to verify treatment efficacy and patient compliance (Chobanian, et al.).

Even with the newest JNC guidelines, the control rate for hypertension remains near 34% (Chobanian, et al., 2003). Many studies have tried to examine the reasons for this low control rate. Several gaps between recommendations and treatment practices have emerged including office time constraints, medication side effects, medication costs, complex drug treatment regimens, patient non-compliance to drug therapy, limited access to care, and both patient and physician underestimation of the seriousness of high blood pressure (Fretheim, et al., 2004; Spranger, Ries, Berge, Radford, & Victor, 2004; Oliveria, et al., 2002). Oliveria, et al. showed that physicians placed more importance on diastolic blood pressure levels than systolic levels, waiting to initiate therapy until systolic readings were above 160 mm Hg and diastolic readings were above 90 m Hg. In a study by Spranger, et al. (2004), physicians were frequently found to rely on monotherapy for hypertension treatment and to omit lifestyle modification recommendations during their patient encounters. It is the goal of the JNC VII to increase clinician education and simplify treatment guidelines.
Another major problem is patient non-compliance to treatment. Many patients stop taking their medications due to cost constraints, difficulty remembering to take the medication, or unwanted side effects (Oliveria, et al. 2002). Combination drugs have emerged to try and reduce the cost and complexity of hypertension treatment, however, frequent changes to insurance coverage of medications often forces clinicians to choose the cheaper, less effective drugs. Patients also do not usually have symptoms that accompany high blood pressure and are reluctant to take medication when there is no immediate result. The ongoing education of patients is an important part of each follow-up visit. One study by Aminoff and Kjellgren (2001) found that patient encounters with physicians focused mainly on medication effects, while patient encounters with nurses focused more on patient education about lifestyle factors and adherence to treatment regimens resulting in better compliance to care. Taking even a few minutes at each office visit to review patient risks and treatment goals can increase patient compliance.

The JNC VII report suggests that these barriers to hypertension control can be overcome with both patient and physician efforts. Lowering medication cost can be achieved by prescribing generic medications whenever possible and by enrolling qualifying patients in patient assistance programs. Many pharmaceutical companies also provide clinician offices with samples to give to their patients. Choosing medications that can be taken once or twice a day can also alleviate the confusion over medications, especially for the elderly. The elderly often take many medications, and may have difficulty taking medications several times a day. Simply writing down medication instructions can also eliminate much confusion. Informing the patient of possible side effects can help increase compliance and can alleviate patient fears. Frequent follow-ups with patients are important to monitor drug therapy and to encourage the continuance of lifestyle changes such as
stopping smoking or exercising. Family support is also an important aspect of increasing patient compliance to lifestyle changes and should not be forgotten. The goal of the JNC VII guidelines is to increase the control rate for hypertension to 50% by the year 2010 (Chobanian, et al., 2003).
Methodology

Upon approval of my proposal by my advisor in early February 2005, I submitted the necessary forms to the MCO IRB committee for approval. The committee approved my project on April 8, 2005. My project was a survey-based study to assess practitioner knowledge and application of the Seventh Joint National Committee Guidelines on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC VII). The questions were formed from current classification of high blood pressure as set forth by the JNC VII report as well as the current treatment guidelines for those classifications. Areas of focus included diagnosis, classification, treatment choices, and number of patients with controlled hypertension. These questions were designed to determine the health care practitioner’s response to a hypertensive patient with no other comorbidities in order to more fully test the understanding of JNC VII basic guidelines.

Questions for the survey focused on making the diagnosis of hypertension, risk factors for developing hypertension, treatment of hypertension, and patient compliance to treatment for hypertension. The survey included questions about demographic information such as gender, age, years of practice, and medical training. Participants were also asked about their familiarity with the JNC VII guidelines and their adherence to the guidelines. The remaining questions focused on specific aspects of the JNC VII guidelines such as proper diagnosis of hypertension, proper treatment of patients classified as hypertensive, and interventions taken to improve patient success at lowering high blood pressure. The survey was tested for validity by selecting a sample of Allied Health faculty to review the questions.

A total of 1004 names and addresses of health care practitioners were provided by the Hugo-Dunhill Corp. Of the 1004 surveys mailed, 685 were mailed to MDs, 190 were mailed to
DOs, 37 were mailed to NPs, and 92 were mailed to PAs. These names were chosen from MDs, DOs, NPs, and PAs who were registered with national organizations such as the American Medical Association and the American Association of Physician Assistants. Participants were chosen from a total of ten northwest Ohio counties including Williams, Fulton, Lucas, Wood, Sandusky, Seneca, Hancock, Henry, Putnam, and Defiance counties. A copy of the survey and cover letter were included along with a pre-addressed and stamped envelope for the participant to use to return the survey. The surveys were mailed out during the first week of May 2005 and participants were given until June 30, 2005 to return their completed surveys. A copy of the survey and a cover letter was distributed to MD’s, DO’s, PA’s, and NP’s in northwest Ohio who treat patients aged 65 or older (see Appendix 1). The completion and return of the survey indicated their informed consent to participate in the study. A reminder postcard was mailed to all mailing list recipients after 30 days in order to increase the number of respondents. Once surveys were completed, there was no further contact with the participants. All information remained anonymous and no personal identifiers were included in this study.

The number of correct answers to these questions was calculated and compared among the different groups of health care providers using statistical analysis. Data was analyzed using SPSS version 13.0. Crosstabs and Pearson Chi square tests were used to compare and contrast the number of correct responses between MDs, DOs, NPs, and PAs. Post-hoc tests, including Lambda and Kruskall tau were used as well. The significance level was set at <0.05 to identify significant differences in responses. Bar graphs were also made to determine trends in responses. Knowledge scores were calculated by hand using the percentage of correct answers given by each group of practitioners.


*Definitions*

**Elderly** – patients aged 65 or older.


**Hypertension** – elevated blood pressure > 140/90 mm Hg.

**Systolic Blood Pressure** – the top number in the blood pressure reading that indicates the pressure of blood against the artery walls when the heart has just finished contracting.

**Diastolic Blood Pressure** – the bottom number in the blood pressure reading that indicates the pressure of blood against the artery walls when the heart is relaxed and filling with blood.

**Uncontrolled Hypertension** – patients with blood pressures readings > 140/90 mm Hg after treatment.

**Controlled Hypertension** – patients with blood pressure readings < 140/90 mm Hg after treatment.

**Lifestyle Changes** – any non-pharmaceutical treatments, such as diet or exercise, to try and decrease blood pressure.
Results

A total of 163 completed surveys were returned during this timeframe, a 16.2% return rate. However, an additional 158 surveys were returned for incorrect addresses as provided by Hugo-Dunhill Corp. This accounts for 15.7% of the surveys mailed. There were not an equal number of returned surveys from members in each of the four categories of practitioners. A total of 121 surveys or 74.2% of those who responded were MDs, with 17 surveys or 10.4% of returned surveys from DOs, and 13 surveys or 8% and 12 surveys or 7.4% of the surveys being completed by NPs and PAs respectively (Table 1). Also, the highest number of surveys, 45.4%, was returned by practitioners who have been in practice for over 20 years. Practitioners with 15-19 years of experience and 5-9 years of experience comprised 16.6% of the returned surveys each, while practitioners with 10-14 years of experience made up 12.9% of the returned surveys. Only 8.6% of the surveys were from practitioners with less than five years of experience. A similar result was seen with practitioner ages with 36.8% of surveys being returned by practitioners between the ages of 50-59. Practitioners age 40-49 comprised 28.8% of the responses, while practitioners age 30-39 and 60+ comprised 16.6% each. Only 1.2% of the returned surveys were from practitioners in the 20-29 age bracket. More males returned the survey, making up 68.1% of the respondents with only 31.9% of the surveys from females. Most respondents work in a private office or hospital setting with the majority specializing in family medicine or internal medicine. This unequal disbursement of responses made it difficult to determine whether there were significant differences between groups of health care practitioners.

The percentage of the number of elderly patients with hypertension showed that 33.3% of respondents estimated that 21-40% of their elderly patients were hypertensive, followed closely by 41-60% of elderly patients and 61-80% of elderly patients with hypertension at 28.9% and
23.3% estimated by practitioners respectively. Fewer practitioners estimated that only 1-20% of their elderly patients had hypertension with less reporting that 81-100% of their elderly patients were hypertensive. The national average for hypertension rates among the elderly is closer to 50%.

Of the 163 respondents, 22.7% indicated that they were in fields such as surgery and neurology that do not primarily diagnose or treat hypertension. These participants indicated that they normally refer their hypertensive patients to the family medicine practitioner to follow-up on high blood pressure. Therefore, these surveys were incomplete and contribute to the majority of respondents who stated that they were not familiar with the JNC VII guidelines and who “never” followed the JNC VII guidelines when treating hypertension as asked in questions #8 and #9 of the survey. 81.6% of those who returned surveys were familiar with the JNC VII guidelines, with only 18.4% answering in the negative. However, when asked how closely they follow the JNC VII guidelines, only 9.2% stated that they always follow the guidelines. The majority, 58.3%, responded that they follow the JNC VII guidelines “most of the time” while 11% followed the guidelines “sometimes”. Only 2.5% “rarely” follow the guidelines with 13.5% “never” following the guidelines and 5.5% of returned surveys having no answer on this question. Graph 1 shows that the “rarely” answer was not chosen until the group of practitioners with ten or more years in practice.

The majority of practitioners knew how to correctly diagnose hypertension. The JNC VII guidelines recommend that hypertension be diagnosed in the elderly after at least two high blood pressure readings taken while sitting in a chair on two separate office visits. Most chose the correct answer followed by the less correct answer of two measurements sitting on an exam table
at 66.3% and 12.3% respectively. 4.9% would diagnose hypertension after two measurements taken at home and 1.2% would diagnose after only one high blood pressure measurement.

A full 14.1% of practitioners incorrectly answered that both systolic and diastolic blood pressure measurements must be above 140/90 to be classified as hypertensive. Either a systolic blood pressure measurement above 140 mm Hg or a diastolic blood pressure reading above 90 mm Hg would be classified as hypertensive under the JNC VII guidelines. The majority of respondents correctly answered this question at 74.8%. However, when the knowledge scores were calculated between the four groups of practitioners, nurse practitioners responded correctly only 53.8% of the time with DOs performing at a 64.7% correct response rate (Table 2). This is supported by Graph 2 which shows that NP’s have the highest incorrect response rate among the practitioners. Calculating knowledge scores based on number of years in practice showed that practitioners with more than twenty years of experience responded correctly only 60.8% of the time (Table 3).

Treatment choices for a patient classified as prehypertensive showed that 73.6% of those who answered chose the correct treatment of lifestyle changes alone. Graph 3 supports this and shows that the majority of respondents in each group chose the correct answer. This was followed by 9.8% choosing to treat with thiazide diuretics, 1.8% choosing no treatment, and 1.2% choosing an ACE inhibitor for prehypertension. Other combinations were also chosen at a lower rate. Knowledge scores showed that DOs responded correctly only 58.8% of the time with PAs choosing correctly only 58.3% of the time (Table 2). Knowledge scores calculated using years in practice showed that practitioners with 15-19 years of experience answered correctly only 77.8% of the time while those with more than twenty years in practice answered correctly only 64.9% of the time (Table 3). MDs responded approximately equally between all of the choices,
while DOs would choose ACE inhibitors or nothing more often than lifestyle changes. It is interesting that the “nothing” answer was chosen by only the MDs and DOs. NPs were split between lifestyle changes and thiazide diuretics as treatment choices. PAs also had a bipolar response, either treating very aggressively with a combination of thiazide diuretic, ACE inhibitor, and lifestyle changes or with lifestyle changes and nothing.

Question #13 was used to determine whether health care practitioners regarded high systolic blood pressure as dangerous when diastolic blood pressure was normal. About two-thirds of the respondents in each practice group correctly chose to treat high SBP with either a thiazide diuretic or lifestyle modifications. Only 47.1% of the DOs surveyed answered correctly based on knowledge scores (Table 2). There was a wide variation in knowledge scores when years in practice was considered, with only 47.6% of the practitioners with 10-14 years of experience answering correctly (Table 3). The majority of those responding would choose a thiazide diuretic and nothing or a thiazide diuretic alone, at 26.4% and 25.8% respectively. The rest of the respondents were equally split between the remaining choices. MDs chose diuretic with lifestyle changes or diuretic alone most often. DOs were split equally between diuretics and lifestyle changes, while NPs chose diuretics most often. PAs chose diuretics and lifestyle changes together the most. Increased systolic blood pressure has traditionally not been viewed as a risk factor for future cardiovascular risks. Graph 4 shows treatment choices for high SBP broken down by age.

The majority of respondents also knew that the JNC VII guidelines indicate that an elderly patient often needs more than one class of medication to control their hypertension. A full 87.1% chose correctly with only 0.6% choosing the incorrect answer. However, these results are based on only one incorrect response (Graph 8). Once again, the DO practitioners had a 76.5%
knowledge score which was lower than the other three groups (Table 2). When years in practice is considered, practitioners with more than twenty years of experience only answered correctly 70.3% of the time (Table 3).

Question #14 was used to determine the treatment course for an elderly patient who shows no improvement on only a thiazide diuretic medication. Addition of a calcium channel blocker is suggested by the JNC VII as it has fewer side effects than a beta blocker. 63.8% of the responses chose this answer followed by 20.2% choosing to try the maximum dose of the thiazide diuretic. This is also an acceptable response according to JNC VII guidelines. Graph 5 shows that these two choices were the most common choices in all four groups of participants. Knowledge scores indicate that DOs had the lowest correct response rate at 76.5% with rates for the other groups ranging from 83.3% to 86% (Table 2). Knowledge scores by years in practice indicate a sharp decline in correct responses in the group with twenty or more years of experience at 75.7% (Table 3).

The JNC VII guidelines suggest that a hypertensive elderly patient at risk for end organ damage be followed in the office every month until the blood pressure is controlled. The responses to question #16 were widely varied in their choice of how often to follow a patient at risk for end organ damage (Graph 9). The majority, 47.9%, would follow-up every three months, while 19.6% would follow-up once a month. 7.4% would follow-up every two months, with very few choosing to follow-up in six months or a year. The number of correct responses to this question was low in all groups of practitioners with NPs scoring the highest with 46.2% correct responses (Table 2). Looking at years in practice, the knowledge scores were again low in all categories with only 14.8% and 13.5% correct responses in the 15-19 year category and 20+ category respectively (Table 3).
The respondents were also asked to estimate the percentage of their patients who are compliant with their hypertension treatment. An equal amount of practitioners chose 41-60% and 61-80% patient compliance at 37% of respondents each. This was followed by 13% choosing 21-40% of patients being compliant. An equal amount also chose the highest percentage and lowest percentage of patient compliance at 6.5% and 5.8% respectively. Graph 6 shows the most frequently chosen responses for each group of practitioners.

The respondents were then asked to estimate the percentage of elderly hypertensive patients who were controlled as specified by the JNC VII guidelines. Graph 7 illustrates the estimates by all four groups of practitioners. The majority, 44.2% stated that 61-80% of their patients’ hypertension was controlled, while 30.4% chose the 41-60% control level. 11.6% of practitioners thought that 81-100% of their patients’ hypertension was controlled and 9.4% believed that 21-40% of patients had controlled blood pressure. Only 4.3% thought that 1-20% of their patients were controlled according to the JNC VII guidelines. It is interesting that nearly three-quarters of those responding estimated that at least 40% of their patients with hypertension were controlled. The JNC VII guidelines indicate that the national average for blood pressure control is only 34%.

Finally, I asked the practitioners what reasons their elderly patients gave for not remaining compliant to blood pressure treatment. There were many combinations of answers possible for this question, but the most common answer by far at 75.7% was that the medications cost too much. Most elderly patients are on multiple medications for their blood pressure and other health problems while living on a fixed income. Health care insurance plans also have restrictions on which medications are covered. The next most common complaint at 53.8% was side effects of the medication. Patients would stop taking the medication if they could not live
with the side effects. Almost a third of those responding stated that their patients did not believe that hypertension was a serious health problem, followed by 28% who misunderstood the directions for taking their medication. Only 16.4% of patients were reported to not know why the medication was prescribed. Other common reasons included that patients forgot to take their medicine, were already taking too many medications and did not want to add any more, patients were not experiencing symptoms of their high blood pressure, or there was confusion based on insurance coverage changes.

I also asked practitioners if they had tried any methods to increase patient compliance. The most common methods were to prescribe generic medication and to emphasize the possible complications that can occur if blood pressure is not controlled. These answers were each chosen about 76% of the time. Following closely behind at 66% each were the choices of scheduling frequent follow-ups to monitor patient blood pressure, writing down treatment instructions and verbally stating instructions. Fewer practitioners would get family members involved to help remind the patient, counting for 45% of the responses. Other common methods included giving elderly patients samples of their medications, enrolling elderly patients in patient assistant programs to help pay for medication, and asking patients to keep a record of blood pressure readings outside of the office.
Discussion and Conclusions

The results of the survey are difficult to analyze due to the overwhelming majority of responses from physicians with an MD degree. Part of this is due to the number of MDs included in the mailing list as compared to the smaller number of names for DOs and even smaller number of names for NPs and PAs. Also, there were an unequal number of surveys returned by male practitioners as compared to female practitioners. A large majority of respondents have been practicing medicine for over twenty years, which also skews the results. Similar responses were found when practitioner age was taken into account, with most respondents falling into the 40 year old and above age range. The unequal distribution of survey responses was a result of a skewed mailing list. A more updated list would have included more recent graduates who have been in practice for a shorter time period as well as more NP and PA addresses. Because there were so few responses from these two categories, it is impossible to draw any meaningful conclusions about knowledge and treatment practices across Northwest Ohio. A more equal pool of participants will make analysis of results more accurate and more applicable to health care practitioners in Northwest Ohio.

There was a wide range of estimates of elderly patients with hypertension. Practitioners in Northwest Ohio estimate that anywhere between 21-80% of their elderly patients have high blood pressure. The national estimate of the percentage of elderly with hypertension has been calculated and is reported as 50% by the JNC VII. This wide range of estimates by practitioners in Northwest Ohio may represent simple inaccuracy or may be the result of how aggressively health care practitioners diagnose and treat high blood pressure in the elderly. Clinicians who follow the JNC VII guidelines more closely may have higher estimates of elderly patients with hypertension than those who do not. There were no differences between the four groups of
practitioners, but higher estimates were given by practitioners in cardiology and internal medicine. This indicates that more elderly patients with hypertension are being treated by cardiologists and internal medicine specialists than by family medicine practitioners. The medical field is becoming more specialized and patients are seeing specialists more often for the treatment and management of high blood pressure.

Nearly 23% of the respondents claimed not to be familiar with the JNC VII guidelines or to treat hypertensive patients due to their work in specialty fields such as surgery. These practitioners claim to refer patients to their family clinician for treatment. However, even specialists need to know how to classify hypertension and can be a source of information and education for the patient about cardiovascular complications from high blood pressure. In today’s world of multidisciplinary medicine, a specialist may be the first to recognize and diagnose hypertension in a patient. Early diagnosis and treatment of hypertension may help to decrease or even prevent the damage done to the patient’s heart or organs. These figures closely resemble the national trend of a 70% rate of awareness of what is considered high blood pressure. While the majority of the respondents were familiar with the JNC VII guidelines, most admitted to following the JNC VII guidelines “most of the time”. Also, when responses were examined using years in practice as a comparison, those practitioners with more than twenty years of experience followed the guidelines less closely than practitioners with fewer years in practice. This may be the result of the many changes that have developed in the treatment of hypertensive elderly patients over the years. Practitioners with more years in practice may have developed their own strategies for treating elderly hypertension patients that resemble the strategies of the JNC VII guidelines. Another possibility is that practitioners with more years in practice may be resistant to the changes recommended by the JNC VII because the guidelines
differ so greatly from what older clinicians were taught during their training. A more in depth look at the reasons for adherence to the JNC VII guidelines is needed to determine why this difference exists.

The majority of respondents were also aware of the correct method for measuring blood pressure and making the diagnosis of hypertension. The JNC VII recommends that the diagnosis be made after an average of two or more seated blood pressure readings are taken on two or more office visits. Incorrect measurement of blood pressure can lead to inaccurate diagnosis and treatment of high blood pressure, therefore, it is important to correctly measure blood pressure. A blood pressure cuff that is too small can elevate blood pressure measurements, along with recent ingestion of substances like caffeine or nicotine. Also, while keeping track of blood pressure readings on a home machine is recommended, diagnosis based solely on those readings is discouraged due to variation in machines. Only one person responded that they would make the diagnosis of hypertension based on only one measurement. The JNC VII recommends more than one measurement be taken to ensure that the reading is not due to increased stress or white coat hypertension as well as technician error. Proper measurement leads to more effective treatment.

There did seem to be some disagreement about the classification of high blood pressure. The JNC VII guidelines state that either the systolic measurement needs to be above 140 mm Hg or the diastolic measurement needs to be above 90 mm Hg in order to be classified as hypertensive. Some of the respondents incorrectly indicated that both systolic and diastolic numbers had to be higher than the limit in order to be classified as hypertensive. This may result in the delay of diagnosis and treatment for those patients with an elevated reading in only one of the levels. This is especially true for elderly patients whose systolic blood pressure has been shown to continually rise throughout their life, while their diastolic blood pressure remains the
same. The incorrect answers were shown to be present in the NP and DO respondents more often than MD and PA responses. It is unclear from the survey whether the difference exists due to a difference in training or merely personal preferences.

The next question looks at treatment choices for a patient with blood pressure classified as prehypertensive. The JNC VII states that these patients do not qualify for pharmacological treatment and should be advised only to make certain lifestyle changes in order to help lower their blood pressure. This includes weight loss, quitting smoking, less alcohol consumption, and a low sodium diet. Most of those who returned surveys correctly chose lifestyle changes alone. However, a small percentage would also treat with thiazide diuretics, no treatment at all, or an ACE inhibitor. Other combinations were also chosen a small amount of the time. A trend in the responses was apparent in the bar graphs. While MDs were fairly equally split between the choices, DOs more frequently chose ACE inhibitors. Also the “nothing” answer was chosen most often by the MDs and DOs. NPs would choose either lifestyle changes or diuretics, while PAs would treat most aggressively with a combination of diuretic, ACE inhibitor, and lifestyle changes. It is once again unclear from the survey whether these differences are due to differences in training or differences in personal preferences. Surprisingly, there were no differences in treatment when the age of the health care practitioners were compared.

Treatment choices for a patient with only elevated systolic blood pressure was again meant to test the knowledge that only one of the two levels needs to be high in order to qualify as hypertensive and to be eligible for treatment. The JNC VII suggests that patients falling into this category be treated first with a thiazide diuretic, adding medications as needed based on the patient’s response. There was no real agreement among survey respondents on treatment of a patient with only elevated systolic blood pressure. The highest number of those responding chose
either a thiazide diuretic alone or a thiazide diuretic and nothing, however this only accounts for half of the responses. This indicates that high systolic blood pressure is still considered to be less of a problem among health care practitioners. There was no difference in responses when compared by practitioner training. However, when compared by practitioner age, clinicians over fifty years of age had a higher response rate of the “nothing” choice. Older clinicians were taught that a systolic blood pressure equal to 100 plus the patient’s age was considered normal and it is apparent that this belief persists if only in a small number of practitioners.

All except one respondent correctly answered that elderly patients often need more than one class of medication in order to control their hypertension. Choice of medications was not examined in this survey, as each patient is unique and has different comorbidities. There were no differences in responses among the practitioners when training or years in practice were compared. The incorrect answer was given by an MD with over twenty years in practice. It is not possible to make a conclusion based solely on this one incorrect response.

For patients who show no improvement after a trial of one medication to treat their hypertension, the JNC VII guidelines suggest that the maximum dose of the medication be tried or a second medication added. A diuretic is the first line treatment medication due to the low number of side effects and the efficacy. Following a diuretic, a calcium channel blocker is the next suggested medication because it has fewer side effects than a beta blocker or ACE inhibitor. The question was meant to determine how aggressively practitioners treat hypertension. A majority of the respondents chose to add a calcium channel blocker while the second choice was to use the maximum dose of the diuretic. This closely follows the JNC VII guidelines.

Determining how often to follow-up with hypertensive patients is also discussed in the JNC VII guidelines. For an uncontrolled hypertensive elderly patient at risk for end organ
damage, the guidelines suggest that the health care practitioner follow-up once a month until the blood pressure is controlled. However, almost half of the respondents chose to follow-up in three months. Only one-fifth of those polled would follow-up in one month. It is not clear as to why there is such a large deviation from the guidelines on this question. One problem could be that practitioners did not understand what end organ damage meant. Also, even though the blood pressure given of >140/90 mm Hg was clearly higher than the level considered controlled, respondents may have overlooked that detail and assumed that the patient had blood pressure in the controlled category. There did not seem to be a difference when practitioner training was compared.

Estimates of the number of hypertensive patients who are compliant with their treatment was aimed at identifying whether compliance with treatment was a problem. A large percentage of the respondents chose both 41-60% and 61-80% of their patients were compliant with treatment. This indicates that compliance with treatment does not seem to be a problem for health care practitioners in Northwest Ohio. Previous research had suggested that elderly patients were less compliant with hypertension treatment due to taking a large number of medications, side effects of medications, and not remaining compliant due to experiencing no symptoms. There was no difference in responses when the groups were compared by training.

Estimations of the number of elderly patients with controlled hypertension, <140/90 mm Hg, also showed that health care practitioners in Northwest Ohio believe that most of their patients are controlled. Nearly half of those surveyed answered that 61-80% of their patients had blood pressure that was controlled, while a third stated that 41-60% of their patients had controlled hypertension. Less than ten percent of those responding chose 21-40% as the control rate for their patients. The national average for blood pressure control is close to 34%, much
lower than the estimates given by those responding to the survey. There was no difference when results were compared by training. Yet when compared by years in practice, practitioners with more than twenty years in practice had the highest estimates of patients with controlled blood pressure. It is not clear why the rate of blood pressure control is so much higher in Northwest Ohio and needs to be further investigated. This could simply be an overestimation on the part of the practitioners or a true improvement in treatment.

Reasons given for patient noncompliance were not surprising. The most frequent reason was cost of medication, as expected. Most elderly patients take multiple medications and are on a fixed income. Health care practitioners try to give out medication samples and prescribe generic medications whenever possible. They also try to help enroll their elderly patients in patient assistant programs to help pay for medications. Side effects of the medication also were a popular reason to stop taking the medicine. Clinicians reported that they try different classes of medications in order to find one that will successfully lower blood pressure while decreasing the number of side effects experienced by the patient. Almost a third of the patients were estimated to believe that high blood pressure is not a serious problem because they had no symptoms while many did not understand how to take their medication. It is encouraging that only a small percentage of clinicians believe that their patients do not know why medications were prescribed. Practitioners are trying to be better at educating their patients as to the dangers of hypertension by providing them with pamphlets and written material on the subject as well as verbally emphasizing the risk of having high blood pressure. Scheduling frequent follow-ups with patients and writing down instructions for hypertension treatment may help as well. Enlisting the help of close family or friends for compliance to treatment is another less frequently used method to increase compliance.
This study has all of the drawbacks of any self-reported survey. Participants relied on their own estimations about their adherence to the JNC VII guidelines, their treatment of elderly hypertensive patients, and their elderly patient hypertension control levels. These estimations could either be exaggerated or reported below the actual level and future studies could improve the results by doing a side by side survey and chart analysis to determine the actual treatment and results. Interviewing patients may help to uncover more reasons for low hypertension control rates and may illustrate more problems with treatment regimens. Also, a more equal distribution of survey participants from each of the four groups of practitioners and those with fewer years in practice would make the results more accurate. Extending the survey to a wider geographical area may also help make the results more applicable.

From the mailing list provided by the Hugo-Dunhill Corp., a total of 163 completed surveys were returned with an additional 158 returned to sender due to incorrect address. The company promised a 95% delivery rate. Almost 16% of their addresses were not up to date and the customer service has been minimal. Unfortunately, this company was suggested by one of the mailing list providers on the AAPA web site as being more cost effective with no minimum purchase quantity. However, I strongly caution anyone considering using the Hugo-Dunhill Corp. for future mailing list purchases. Both the AAPA and the company that suggested Hugo-Dunhill will be notified about the problems encountered during this study. I contacted the company for a refund and sent them the returned envelopes as proof, however, I am still awaiting a partial refund of my purchase price. This researcher does not recommend the use of this company for the purchase of updated mailing lists in the future.
References


Table 1. Percent Return Rate of Surveys by Training

<table>
<thead>
<tr>
<th>Practitioner Group</th>
<th>Number Returned</th>
<th>Percent Returned</th>
<th>Return Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDs</td>
<td>121</td>
<td>74.2</td>
<td>17.7</td>
</tr>
<tr>
<td>DOs</td>
<td>17</td>
<td>10.4</td>
<td>8.9</td>
</tr>
<tr>
<td>NPs</td>
<td>13</td>
<td>8.0</td>
<td>35.1</td>
</tr>
<tr>
<td>PAs</td>
<td>12</td>
<td>7.4</td>
<td>13.0</td>
</tr>
</tbody>
</table>
### Table 2. Knowledge Scores by Training

<table>
<thead>
<tr>
<th></th>
<th>MD</th>
<th>DO</th>
<th>NP</th>
<th>PA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classification of HTN</td>
<td>77.7%</td>
<td>64.7%</td>
<td>53.8%</td>
<td>83.3%</td>
</tr>
<tr>
<td>Prehypertension Treatment</td>
<td>76.6%</td>
<td>58.8%</td>
<td>76.9%</td>
<td>58.3%</td>
</tr>
<tr>
<td>Normal DBP</td>
<td>61.2%</td>
<td>47.1%</td>
<td>69.2%</td>
<td>66.7%</td>
</tr>
<tr>
<td>Resistant HTN</td>
<td>86.0%</td>
<td>76.5%</td>
<td>84.6%</td>
<td>83.3%</td>
</tr>
<tr>
<td>Medications</td>
<td>89.3%</td>
<td>76.5%</td>
<td>84.6%</td>
<td>83.3%</td>
</tr>
<tr>
<td>Follow-up</td>
<td>17.4%</td>
<td>17.6%</td>
<td>46.2%</td>
<td>16.6%</td>
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</table>
Table 3. Knowledge Scores by Years in Practice

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<thead>
<tr>
<th></th>
<th>0-4</th>
<th>5-9</th>
<th>10-14</th>
<th>15-19</th>
<th>20+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classification of HTN</td>
<td>85.7%</td>
<td>85.2%</td>
<td>85.7%</td>
<td>88.8%</td>
<td>60.8%</td>
</tr>
<tr>
<td>Prehypertension Treatment</td>
<td>85.7%</td>
<td>81.5%</td>
<td>81.0%</td>
<td>77.8%</td>
<td>64.9%</td>
</tr>
<tr>
<td>Normal DBP</td>
<td>78.6%</td>
<td>59.3%</td>
<td>47.6%</td>
<td>74.1%</td>
<td>56.8%</td>
</tr>
<tr>
<td>Resistant HTN</td>
<td>92.9%</td>
<td>96.3%</td>
<td>95.2%</td>
<td>96.3%</td>
<td>70.3%</td>
</tr>
<tr>
<td>Medications</td>
<td>100%</td>
<td>96.3%</td>
<td>95.2%</td>
<td>96.3%</td>
<td>75.7%</td>
</tr>
<tr>
<td>Follow-up</td>
<td>28.6%</td>
<td>33.3%</td>
<td>23.8%</td>
<td>14.8%</td>
<td>13.5%</td>
</tr>
</tbody>
</table>
Percentage of Health Care Providers by Years in Practice and Frequency of Guideline Adherence

Follow Guidelines
- No Answer
- always
- most of time
- sometimes
- rarely
- never

Percent of Health Care Providers

Years in Practice
- 0-4
- 5-9
- 10-14
- 15-19
- 20+

Figure 1.
Figure 2.

Percent of Health Care Providers who Understand Hypertension Measurement Classification

Hypertension Classification
- No Answer
- correct
- incorrect

<table>
<thead>
<tr>
<th>Classification</th>
<th>MD</th>
<th>DO</th>
<th>NP</th>
<th>PA</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Answer</td>
<td>66.7%</td>
<td>16.7%</td>
<td>11.1%</td>
<td>5.6%</td>
</tr>
<tr>
<td>correct</td>
<td>77.0%</td>
<td>13.0%</td>
<td>17.4%</td>
<td>8.2%</td>
</tr>
<tr>
<td>incorrect</td>
<td>65.2%</td>
<td>13.0%</td>
<td>5.7%</td>
<td>8.3%</td>
</tr>
</tbody>
</table>
Figure 3.

Number of Health Care Providers by Training and their Treatment Choices for Prehypertensive Patients

- No Answer
- Thiazide diuretics
- Diuretic, ACEI, & lifestyle changes
- Diuretic & lifestyle changes
- ACE inhibitor
- Lifestyle changes
- Lifestyle changes & nothing
- Nothing
Figure 4.

Treatment Choices for High SBP by Health Care Provider Age
Figure 5.

Treatment Choices by Training for No Improvement in BP After One Month on Thiazide Diuretic

- No Answer
- return one month
- maximum dose
- maximum dose & Ca blocker
- add Ca blocker

Number of Health Care Providers
Figure 6.

Percent Compliance of Patients of Health Care Providers by Training

![Graph showing percent compliance of patients by type of health care provider and training level.](image-url)
Figure 7.

Percentage of Elderly Patients with Controlled HTN by Health Care Provider Training

Number of Health Care Providers

Percent Controlled
- 1-20
- 21-40
- 41-60
- 61-80
- 81-100

Percentage of Elderly Patients with Controlled HTN by Health Care Provider Training
Figure 8.

**Number of Health Care Providers by Training who Know that Elderly Patients Often Require More than One Class of Medication**

- **MD**: 108 correct, 13 incorrect, 10 no answer
- **DO**: 11 correct, 10 no answer
- **NP**: 11 correct, 10 no answer
- **PA**: 10 no answer

# of Medications
- No Answer
- correct
- incorrect
Figure 9.

Frequency of Follow-up Care by Health Care Provider Training for Patients at Risk for End Organ Damage

Followup Frequency
- No Answer
- once a month
- every two months
- every three months
- every two or three months
- every six months
- once a year

Number of Health Care Providers

MD: 64
DO: 5
NP: 6
PA: 6
Appendix 1: Cover letter

Dear Health Care Provider,

My name is Ericka Eugeni and I am a physician assistant graduate student at the Medical College of Ohio in Toledo. I am working on a scholarly project (thesis) to assess the knowledge and adherence among clinicians to the guidelines set forth by the Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC VII) as they relate to elderly patients over the age of 65. The purpose of this study is to determine why such a large percentage of elderly patients have uncontrolled hypertension. This study will examine how clinicians in Northwest Ohio treat elderly patients with hypertension and whether hypertension in the elderly is sufficiently controlled by following the JNC VII guidelines.

You are being asked to complete this survey because you are a clinician working in Northwest Ohio who treats patients over the age of 65. Your participation in this academic research would be greatly appreciated and the results will assist your fellow clinicians in finding better treatment for elderly patients with hypertension. This survey is completely voluntary and your answers will remain anonymous. No personal information will be collected that could connect you to your answers. Please do not write your name on the survey or the return envelope.

You may choose to omit questions if you wish. You will not be compensated for your participation and there is no cost to you. Please take a few minutes to answer the following questions by filling in the circle next to the one best answer for each question unless otherwise specified. When you are finished, please return the survey in the enclosed pre-addressed, stamped envelope by June 30, 2005.

Thank you for taking the time to complete this survey. Please return it in the provided pre-addressed, stamped envelope to:

Ericka Eugeni
Medical College of Ohio
Dept. of Physician Assistant Studies
3015 Arlington Ave.
Toledo, OH 43614-5803

Sincerely,
Ericka Eugeni
Appendix 2: Questionnaire

1. What is your gender?
   O Male
   O Female

2. What is your age?
   O 20-29
   O 30-39
   O 40-49
   O 50-59
   O 60+

3. For how many years have you been practicing?
   O 0-4
   O 5-9
   O 10-14
   O 15-19
   O 20+

4. What is your medical training?
   O MD
   O DO
   O NP
   O PA

5. What is your medical specialty?
   O Family Practice
   O Cardiology
   O Geriatrics
   O Other ______________________

6. What is the setting in which you practice?
   O Office
   O Hospital
   O Community Clinic
   O Other ______________________

7. Please estimate the percentage of your elderly patients that have high blood pressure (>140/90 mm Hg).
   O 1-20%
   O 21-40%
   O 41-60%
   O 61-80%
   O 81-100%

8. Are you familiar with the JNC VII guidelines?
   O Yes
   O No

9. In your opinion, how often do you follow the JNC VII guidelines when treating elderly patients?
   O Always
   O Most of the Time
   O Sometimes
   O Rarely
   O Never

10. Diagnosis of hypertension should be made after:
    O one blood pressure measurement >140/90 mm Hg is taken in the office with the patient sitting in a chair
    O two blood pressure measurements >140/90 mm Hg are taken in the office with the patient sitting in a chair
    O two blood pressure measurements >140/90 mm Hg are taken in the office with the patient sitting on the exam table
    O the patient reports two blood pressure measurements >140/90 mm Hg taken on their machine at home

11. According to the JNC VII, both systolic and diastolic measurements must be above 140/90 mm Hg in order to be classified as hypertensive.
    O True
    O False

12. Elderly patients classified as prehypertensive should be treated with:
    O thiazide diuretics
    O ACE inhibitors
    O Beta Blockers
    O lifestyle modifications
    O nothing
13. A 5’6” 140 lb. 68 year-old woman in good health and with a blood pressure measurement of 160/70 mm Hg should be treated with: (Please mark all that apply.)
O thiazide diuretics
O ACE inhibitors
O Beta Blockers
O lifestyle modifications
O nothing

14. A hypertensive male, age 72, returns for his follow-up appointment. His blood pressure is 170/110 mm Hg, the same as his last reading, even though he states that he has been taking his thiazide diuretic. How should he be treated?
O tell him to continue taking the diuretic and return in another month
O place him on the maximum dose of the diuretic and follow-up in a month
O add a calcium blocker to the diuretic and follow-up in a month
O attribute the elevated blood pressure reading to white coat hypertension and follow-up in two months

15. Only one class of medication should be used in elderly patients to treat hypertension.
O True
O False

16. How often do you schedule follow-up appointments with your hypertensive elderly patients at risk for end organ damage (>140/90 mm Hg)?
O once a month
O once every two months
O once every three months
O once every six months
O once a year

17. Please estimate the percentage of your hypertensive elderly patients (>140/90 mm Hg) who you believe are compliant with their hypertension treatment.
O 1-20%
O 21-40%
O 41-60%
O 61-80%
O 81-100%

18. What is the reason that your elderly patients give for not remaining compliant with their hypertension treatment. (Please mark all that apply.)
O unpleasant medication side effects
O lack of understanding about instructions from the clinician
O could not afford treatment/medication
O unaware of why medication was prescribed
O misconception that high blood pressure is not a serious health problem
O other _________________________

19. Have you implemented any of the following interventions to improve patient compliance? (Please mark all that apply.)
O providing thorough verbal and written instructions for the patient
O emphasizing the medical importance of treatment and the possible complications associated with high blood pressure
O prescribing generic forms of medication when available
O scheduling frequent follow-ups to assess patient progress and response to treatment
O encouraging support from the patient’s family and friends
O other _________________________

20. Please estimate the percentage of your elderly hypertension patients who are controlled (<140/90 mm Hg) with treatment.
O 1-20%
O 21-40%
O 41-60%
O 61-80%
O 81-100%
Abstract

**Objective.** The JNC VII guidelines were developed to decrease mortality rates among hypertensive patients. High blood pressure control in the elderly is still far from optimal near 34%. This study was designed to determine whether health care providers in Northwest Ohio adhere to the guidelines and how well hypertension is controlled in elderly patients. **Methods.** A multiple choice survey was sent out to MDs, DOs, NPs, and PAs in ten Northwest Ohio counties and responses were compared among the groups. The 163 returned surveys were evaluated using SPSS software. **Results.** Health care practitioners with more years in practice follow the JNC VII guidelines less closely than clinicians with less experience, yet these practitioners estimate that they have more elderly patients with controlled hypertension. **Conclusion.** All four groups follow the JNC VII guidelines equally and have similar rates of control. A more equal distribution of respondents will increase the accuracy of the results.