Community Worker Guided Home-based Monitoring Program for Hypertension Control

Sandra Schlup Woods, DNP, CCRN

Cindy Costanzo, PhD, RN, CNL
Creighton University
Abstract

Purpose:

The purpose of this project was to impact hypertension control of the population utilizing services at a non-profit agency. A Doctor of Nursing Practice Clinical Nurse Specialist completed development and implementation of this project.

Background: To validate the incidence of hypertension individuals utilizing services of a non-profit agency, a pilot study was conducted to determine incidence of HTN and explore impact of Home Blood Pressure Monitoring on hypertension control in this population.

Description: Using American Heart Association guidelines, blood pressure measurements were conducted and recorded using Omron 760 for both home and clinic visits. Individuals were recruited to participate in study for home blood pressure monitoring and scheduled B/P checks for a six-week period. Community Layworkers were recruited to conduct B/P screenings, make home visits with HTN educational teaching.

Outcome: Twenty-four individuals had blood pressure screened, six individuals proceeded to the BP comparison portion of the study: three in usual care and three in home visit group. There was significant difference in systolic (p=0.0002), pm/am (0.0015) and systolic BP with bi-monthly blood pressure checks (0.0086).

Implications: Community Layworkers did enhance participation and compliance with participants in meeting their cultural needs. Individuals that could benefit from more frequent BP monitoring were able to demonstrate compliance with home BP monitoring.

Conclusion: Home-blood pressure monitoring program following developed protocols for hypertension control was assisted through relationship building with a non-profit agency staff, volunteers and Doctor of Nursing Practice Clinical Nurse Specialist graduate student.
Hypertension (HTN) control continues to be an unmet health maintenance challenge across America. It is a major risk factor for cardiovascular and kidney disease, which affects approximately 75 million Americans.\(^1\) Hypertension is defined as untreated Blood Pressure (BP) with systolic pressures equal to or greater than 140 and diastolic pressures equal to or greater than 90. One in three adults in the United States (US) have HTN while 25% have pre-HTN (BP 120 – 139/80-89).\(^1,2\) The prevalence of HTN increases in men under the age of 45, in females who use contraceptives and those individuals over the age of 65. The risk of developing HTN is 90% for those individuals who are normotensive at age 55.\(^3\) The AA (AA) population has the highest rates of HTN in the world; increasing in the last decade from 35.8% to 44%, with the highest prevalence in AA females. Awareness and treatment for HTN have increased overall for males and females, non-Hispanic blacks and Mexican Americans (MA) over the last decade.\(^2\) Addressing health disparities for uncontrolled HTN within vulnerable populations involves understanding risk factors that include poor health status, decreased health access, increased age, low socioeconomic status and no insurance.\(^4\) In addition to health concerns, the financial costs of HTN to the United States (US) are substantial. The predicted total estimated direct and indirect cost of cardiovascular disease for 2010 was over 500 billion dollars.\(^1,3\) Approximately 77 billion dollars related to lost workdays, medication and healthcare services was utilized in 2010.

The purpose of this project was to impact hypertension control of the population utilizing services at a non-profit agency. A Doctor of Nursing Practice Clinical Nurse Specialist (DNP-CNS) completed development and implementation of this project.
Background

The absence of signs and symptoms is a serious challenge in diagnosing HTN. Among vulnerable populations with an increased prevalence and incidence of HTN, the challenge of diagnosing and treating HTN requires a multi-faceted approach. The Seventh Joint National Committee on the Prevention, Detection, Evaluation, and Treatment of High BP (JNC7)\(^5\) guidelines propose multifaceted approaches including Therapeutic Lifestyle Changes (TLC) and community-based outreach programs. Therapeutic lifestyle changes include diet modification, physical activity, weight management, limiting alcohol consumption and the absence of tobacco use.\(^6\) Achieving these lifestyle changes involves increasing self-awareness and self-management strategies for HTN control.\(^7\) Diet modification with increased fruits and fiber (Dietary Approaches to Stop HTN [DASH])\(^8\) can result in weight reduction with an 8-20 mmHg drop in BP; reduction of sodium intake to 2400 mg/day can decrease BP 2-8 mmHg; and limiting alcohol consumption can reduce BP 2-4 mmHg. In addition to dietary changes, establishing a regular physical exercise routine of 30 minutes per day has shown a decrease of 4-9 mmHg pressure.\(^6\)

Community-academic partnerships provide an opportunity to build strong alliances that involve community members, establish open communication, build trust and develop commitment. Key to successful partnerships is keeping the community at the forefront in planning as well as implementation strategies. Strategies that utilize education efforts, resource utilization, and evidence-based practices can enhance the health status of vulnerable populations.\(^9\)

Hypertension is classified in accordance with patho-physiological changes and has been associated with insulin resistance, glucose intolerance, renin/angiotensin abnormalities, and
increased lipid levels associated with increased smooth muscle tone.\textsuperscript{10,11} \textit{Primary hypertension} is the result of the interaction between genetics and the environment. This interaction leads to changes in blood volume in addition to the increased vascular tone, which leads to sustained high BP.\textsuperscript{11} \textit{Secondary HTN} is the result of a malfunction of another system; common secondary factors are renal, endocrine, vascular, reproductive and neurologic disorders.\textsuperscript{11}

\textbf{Hypertension BP Diagnosis Classifications}

The JNC7 guidelines\textsuperscript{5} proposed a new classification system, which had four classifications of BP. The goal for most individuals is a BP less than 140/90. Individuals that have diabetes or renal disease should have a BP goal of 130/80. Individuals who are identified as pre-hypertensive, (SBP 120 – 139 or DBP 80-89), should participate in lifestyle changes to decrease the incidence of cardiovascular disease.\textsuperscript{12} (Table 1).

\textbf{Therapeutic Lifestyle Changes}

In the last decade, initiatives to improve healthy lifestyle characteristics (HLC) were introduced as TLCs. Therapeutic Lifestyle Changes have been identified as assisting individuals with HTN to achieve better BP control involving diet modification, physical activity, weight management, limiting alcohol consumption, and no tobacco use.\textsuperscript{6} The International Society of HTN in Blacks (ISHIB)\textsuperscript{13} and JNC7\textsuperscript{5} have recommended TLC to achieve acceptable BP control and reduce cardiovascular risk.

\textbf{Barriers to healthy lifestyle change.} Individual, provider, environmental and therapy related barriers to TLC and strategies have been identified.\textsuperscript{4,6} Individual factor barriers include income level, cultural practices and lack of trust in the health care system. Provider factors are variable provider coverage and lack of awareness of current HTN control practice. Environmental factors include access to care due to lack of insurance and/or transportation; and
therapy related factors include complex medical plans that are difficult to follow. Multifaceted strategies are instrumental in addressing barriers to HTN control. Strategies that empower individuals, enhance cultural competence of providers, provide a team approach and encourage small, incremental changes have been successful. \(^6\)

**Lifestyle modification programs.** Rigsby\(^{14}\) developed a lifestyle modification program for AA church members with the objectives of increasing awareness of HTN, improving BP control, increasing consumption of fruits and vegetables, decreasing body weight and increasing physical activity.\(^{16}\) The goals for participants of the program were to increase awareness of elevated BP, improve BP control, and reduce body weight. After completion of the 12-week program, participants met all of the goals. The participants requested continued support of this program to continue improvement in their health status. This project confirmed that healthy lifestyle changes were imperative in improving HTN control in this population.

**Hypertension Management**

Over the past three decades, healthcare professionals have been addressing HTN control through the implementation of management strategies utilizing ambulatory (usual care provided by provider in office setting) and home-based monitoring of BP. The most common methods of BP monitoring are usual care, self-management and Community Lay Worker (CLW) assisted BP monitoring.\(^{15, 16, 18-24}\)

**Usual Care.** Bosworth et al\(^ {15}\) studied BP control comparing four different groups: 1) usual care by primary physician, 2) home BP monitoring only, 3) behavior self-management intervention only, and 4) home BP monitoring with behavioral self-management interventions in older individuals (\(X\) age = 62). The group with both home BP monitoring and education intervention had a significant increase in BP control.
**Home BP measurement.** Verbeck et al.\(^{16}\) conducted a systematic review to determine the efficacy of Home BP Measurement (HBPM). Home BP measurement was found to be an effective and reliable method to counteract the white coat effect (term to explain elevation in BP related to anxiety of going to provider\(^{16}\)) and to obtain regular daily BP measurements. Stahl et al.\(^{17}\) found home BP measurement significantly increased long-term control of BP up to 18 months and when family and significant others were involved, the drop-out rate decreased among low income African-American clients.

**Community Lay Workers (CLW).** Community Lay Workers are respected members of community who promote positive health behaviors and have been successful in assisting at risk and diverse populations in achieving HTN control. Community Lay Worker programs have shown positive results in appointment keeping and continuity of care for individuals with HTN.\(^{16}\) Levine et al.\(^{18}\) conducted a 4-year project with urban African-Americans (AA) who utilized a Community/Academic health approach with CLWs for community based HTN care. Community Lay Workers trained to take BPs and participants were randomly assigned to two groups and provided the education component of both the less intensive and more intensive arms of intervention. The intensive intervention arm of the project also included home visits, which assessed adherence to BP monitoring and healthcare provider follow-up and nutrition education. A finding was that while the more intensive intervention group had a lowered BP at 27 months, the BP was on the rise by month 40. The authors concluded that this method was effective in establishing a community-based hypertensive program for vulnerable populations.

Brownstein et al.\(^{19}\) reviewed randomized studies utilizing CLWs in controlling BP to prevent heart disease and stroke. In a population of AA males participating within a CLW model, outcome variables involving BP control and entry into care were improved.\(^{16}\) Connell et al.\(^{20}\)
conducted a review of the literature to determine the presence of cultural sensitivity in the interventions utilized for HTN control in AA adults. Achievement of cultural sensitivity was demonstrated through collaboration with African-American communities, using local or minority staff, and conducting preliminary research with target groups to identify perceptions and intervention design ideas.

**Theoretical Framework**

The Chronic Care Model (CCM)\(^{21}\) has been utilized as the framework in which to build chronic disease management practices in the community setting. In 2003, the model was expanded to include more population specific prevention and health promotion of chronic disease management. This change emphasized the need for healthcare organizations and community to collaborate in a more formal manner. The concepts of this model include community resources, the health system, self-management support, delivery system design, decisions support and central information systems.\(^{22}\) A major component of this model is to promote effective relationships between individuals and providers that allow individuals to meet the challenges of a chronic disease.\(^{2,3}\) Positive outcomes have been achieved when providers utilize self-management techniques and provide optimal therapy and consistent chronic disease management follow-up. Three of the original components, self-management, decision support, and delivery system design are essential threads that need to be equally developed and integrated to provide populations a health promotion focus. Therefore, the goals of the healthcare delivery for chronic illness expanded to provide more opportunity for personal health and wellness developments. Initiatives that are examples of the expanded chronic care model are smoking cessation programs, walking programs, increased access to public transportation, and community
support in requesting safe and affordable housing for individuals with chronic diseases.23 (Figure 1)

Community-Academic Partnerships

Community-academic partnerships have utilized the fundamental concepts of the CCM in community outreach and academic partnerships.9, 18, 24, 25 Similarities between CCM and prevention strategies include regular screening, defined population with complex health needs, care managed with proactive follow-up, and cost control. Glasgow et al 24 propose that the CCM can be used as a template for prevention of chronic disease. Ward et al 25 utilized a community approach, Community Hypertension Intervention Project (CHIP) to develop a HTN center for the underserved. The aims of the project were to improve BP over 4 years comparing three different interventions; individualized session, home visits and computerized system and their BP control was increased at the end of study. Meade & Calvo 9 utilized a community-academic partnership to work with rural and migrant Hispanic women in breast cancer prevention. The goal of the partnership to enhance minority community health through utilization of interdisciplinary practice and research initiatives, was achieved.

Model Application to Pilot Project

The CCM provided a strong conceptual foundation for the development and implantation of this study. This non-profit agency formed a partnership with a local university to provide an interdisciplinary approach to deliver care to vulnerable populations. An urgent care clinic, which provides services on a weekly basis, had been established. One of the gaps in service identified during interdisciplinary interactions was uncontrolled HTN. This project utilized community and academic resources to establish a program that demonstrates the use of self-management support,
delivery system design and decision support in the utilization of Community Lay Workers (CLW) to assist individuals with achieving BP control in their home environment.

**Method**

**Research Design**

The design of this pilot project was a mixed methods quasi-experimental design. The purpose of this pilot project was to impact hypertension control of the population utilizing services at a non-profit agency. The specific aims were:

**Aim I:** Determine incidence of hypertension in individuals during blood pressure screening.

**Aim II:** Conduct a comparison of BP control with usual care versus Community Lay Worker (CLW) guided Home-Based BP monitoring (HBPM) program to achieve consistent and sustained HTN control of men and women.

**Aim III:** Determine the feasibility of establishing and sustaining a CLW guided HBPM program to achieve consistent and sustained HTN control in adult men and women.

**Population**

This pilot project included a convenience sample of 24 adult men and women who utilized services at a non-profit agency in a large urban Midwestern city. The inclusion criteria for both Aim I and Aim II were adult men and women 19 years and older who participated in the BP screening. Additional inclusion criteria for Aim II were individuals with an elevated BP greater than 140/90 or 130/80 in individuals with diabetes mellitus or chronic kidney disease or current treatment with meds for hypertension; b) have a permanent residence, and c) English speaking. For Aim II the adult men and women who agreed to participate were assigned to: a) usual care or b) CLW guided-home group for this feasibility study. For Aim III inclusion criteria
were all CLWs and adult men and women who participated in the feasibility study. Inclusion criteria for the CLW were age over 19 year and older, permanent residence, English speaking and transportation availability. The setting for this project for Aim I was a non-profit agency in an urban Midwestern city. The settings for Aim II were both the non-profit agency and homes of the feasibility study participants.

**Ethical considerations**

The Institutional Review Board at a Midwestern university approved the study. Participation in the pilot project was voluntary and all participants signed a consent form and HIPPA authorization. The information collected was stored in a confidential manner according to the University IRB committee. Compensation for CLWs was mileage and transportation assistance and electronic BP device. Project participants kept the electronic BP device for BP measurements at home.

**Measurement Methods**

**Demographic collection.** Demographic, medical history, and health risk behavior data was collected. Demographic data included gender, age, ethnicity, income, marital status, highest education level. (Table 2) Medical history included history of diabetes, cardiovascular disease, renal dysfunction, neurovascular stroke, as well as current antihypertensive therapy. Health risk behaviors included smoking history, alcohol consumption, dietary practices regarding fast food and salty food intake and exercise practices. (Table 2)

**Blood pressure procedure.** BP measurement followed the JNC7 guidelines. Participants were asked to refrain from strenuous exercise, caffeine intake and cigarette and/or cigar smoking for at least 30 minutes prior to BP measurement and to sit quietly in a chair with their feet on the floor and arm supported at heart level for five minutes prior to BP being taken.
BPs was taken in the right arm by use of an electronic BP device. Two BPs were taken 1 minute apart and the average recorded. The principal investigator (PI) was responsible for regular inspection of equipment.

**Data Collection Procedures**

Data collection for the recruitment, timeline, BP and education procedures for Aim I and Aim II was as follows:

**Recruitment.** Flyers advertising the BP screenings and the CLW program were displayed at the non-profit agency. For Aim I, all individuals who were at the agency on Fridays were invited to participate in the BP screening. For Aim II, individuals who participated in the BP screenings who met the inclusion criteria were invited to participate in usual care or HBPM groups. Recruitment and selection of the CLWs was in collaboration with the Executive Director and the Assistant Director of the nonprofit agency.

**Timeline.** For Aim I, the BP screenings were initiated after IRB approval and continued throughout the data collection of the feasibility study. For Aim II, the participants in the usual care or HBPM groups received education and BP monitoring over a 6-week period.

**BP Screening.** Individuals visiting the non-profit agency on Fridays, food pantry day, were invited to participate in the BP screening. All individuals were invited to participate in the BP monitoring project. Participants who were invited to participate in the BP monitoring project were consented. Using American Heart Association (AHA)¹ and JNC7 guidelines, blood pressure measurements were conducted and recorded. All individuals who did not qualify or chose not to participate in the pilot project were given recommendations based on JNC7⁵ findings. Individuals were recruited to participate in study for HBPM and scheduled BP checks for a six-week period. Participants were assigned to one of two groups: usual care and CLW
home groups. All participants, were given Omron 760 electronic blood pressure machines to take BP three times a week, twice a day, and a BP record in which to record blood pressures. In addition, the home group was given education on HTN, diet and physical exercise; usual care group did not receive additional education.

The CLWs completed three one-hour educational information sessions on HTN, taking BP, healthy eating, physical activity and BP medications. Community Layworkers were recruited to conduct BP screenings and make home visits.

**Evaluation Procedure.** Evaluation of the feasibility study involved reviewing BP readings, demographic data, and health history, and conducting focus group sessions with the CLWs, usual care participants and HBPM measurement participants. Successful evaluation outcomes for future sustainability of the pilot project will be: a) sixty percent of adult men and women in the HBPM group have lowered their BP within acceptable parameters; b) sixty percent of the adult men and women who have been assigned to the HBPM group will agree to continue the program voluntarily; and. c) ninety percent of the participants will express satisfaction with the project.

**Results**

ANOVA analysis by Statistical Analysis System (SAS) program was conducted on blood pressure readings for the screening and HBPM study. Twenty-four individuals consented to participate in the blood pressure screening held weekly over a three-month period (See Table 3). Six of the individuals met inclusion criteria and completed the six-week home-blood pressure and bi-monthly blood pressure monitoring. The six individuals were assigned to be in one of the two BP groups: three in the usual care and three in the CLW home visit BP group. No differences were found in baseline BP readings between groups signifying homogeneity. The
group effect for the HBPM groups was significant for systolic (p=0.002) and PM Systolic pressures were lower than AM systolic pressure (p=0.0015). Systolic blood pressure readings differences were significant for bi-monthly BP checks (p=0.0086). (Figure 2) One individual was selected, educated and utilized as a CLW; another individual was unable to continue CLW training for personal reasons. The CLW did not have transportation, so the PI served as the transportation provider. The CLW was responsible for interacting with participants during the BP screening and home visits for blood pressure monitoring. This was to allow the CLW to be viewed as the provider of services, which is congruent with literature support. Blood pressure checks for both usual care (at clinic) and home visits were scheduled with participants every two weeks. Participants received reminder phone call notice the day before or day of visits.

Focus groups were conducted with four of six HBPM participants and the CLW present. Feedback was obtained regarding recruitment, consent, HBPM process and what went well or needed improvement. Several participants learned of the study via the flyer and others were informed by the agency staff. All participants thought the quick response to needs of blood pressure record was very effective and important to the success of the program. All of the participants present were interested in continuing the program and could identify at least one family member or friend that could benefit from the program. The participants requested additional blood pressure records to continue recording blood pressures. Several participants stated that they had been encouraged by their physician to record BP at home, which they did not do. They were highly motivated to take blood pressures because they knew the CLW team would be reviewing the BP records and blood pressure machines for readings every two weeks.
Discussion

Participants in the study were committed individuals and receptive to strategies to promote health. Participants were open to the PI and CLW in establishing an effective working relationship and welcoming the CLW team into their homes. The director, staff advisor, and volunteers from the non-profit agency were supportive in recruiting individuals for initial and continued support for the blood pressure screening and HBPM study.

Limitations

Initially 24 individuals had blood pressure screenings and consented to participate in the study but did not return to get blood pressure cuff and participate in the second phase of the project. Six individuals did complete the study. This sample size of six was small, however this did allow the ability to make changes relatively easy to meet the needs of the participants such as quick and user-friendly blood pressure records and schedule changes to accommodate participant schedule. The sample size and homogeneity related to age limits the ability to generalize to a larger population, however this study was looking at feasibility of implementing a program for the agency population. The short study of time of six weeks is not congruent with the literature that supports studies of 18 – 24 months in length to establish behavioral changes consistent with HTN control. Monetary constraints regarding gas money and availability of transportation for the CLW and purchase of automatic BP cuffs did provide a barrier of increasing sample size due lack of funds for more blood pressure cuffs beyond the initial twenty. One unique factor that was encountered and needs consideration was to provide some compensation that will not influence financial aid that the individual may be receiving for living expenses. Eighteen participants chose not to return to do follow-up BP readings and decreased the ability to explore a more significant impact of HBPM on hypertension control.
Implications

Home blood pressure monitoring program implementation following developed protocols for HTN control was assisted through relationship building with community volunteers and non-profit agency staff. Participants validated that this method was effective in meeting their needs to control their BP through community services. Next steps will be to continue with monthly BP screening to allow tracking of prevalence of HTN in individuals utilizing service of the non-profit agency. The HBPM program should follow the standard of six-week CLW team interaction to establish accurate and consistent monitoring for the participating individuals. The current participants have expressed interest in continuing the program and can serve as a framework for expanding the program for both usual care and CLW home participants. Program development will be enhanced through seeking funding that will provide assistance for utilizing undergraduate and graduate nursing students to assist with maintenance of the HBPM program. Funding will also assist with education costs, stipend, and blood pressure cuffs to provide HBPM services for at least 2 years to validate effectiveness of the program. The relationship building with the non-profit agency staff, volunteers and principle investigator enhanced the success in implementing the HBPM monitoring program. Strengthening the academia/community relationship will continue to increase resource availability and opportunities for optimal blood pressure control in a vulnerable population.
References


Community Worker Guided Home-based Monitoring Program for Hypertension Control  
Sandra Schlup Woods, DNP, RN, CCRN  
Cindy Costanzo, PhD, RN, CNL  
Creighton University  
August 8, 2012

Tables and Figures in the Order they Appear in the Manuscript

Table 1

*JNC7 High Blood Pressure Guidelines*

<table>
<thead>
<tr>
<th>Type of Blood Pressure</th>
<th>Systolic (mmHg)</th>
<th>Diastolic (mm Hg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>&lt;120</td>
<td>and &lt;80</td>
</tr>
<tr>
<td>Prehypertension</td>
<td>120-139</td>
<td>or 80-89</td>
</tr>
<tr>
<td>Hypertension Stage 1</td>
<td>140-159</td>
<td>or 90-99</td>
</tr>
<tr>
<td>Hypertension Stage 2</td>
<td>&gt;160</td>
<td>or &gt;100</td>
</tr>
</tbody>
</table>

Chobanian et al JAMA 2003, Vidt and Borazanian, 2003
### Table 2

**Socioeconomic Demographics of Blood Pressure Screening Participants**

<table>
<thead>
<tr>
<th></th>
<th>Women</th>
<th></th>
<th>Men</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>n = 14</strong></td>
<td></td>
<td></td>
<td><strong>n=10</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Age Mean = 50</strong></td>
<td></td>
<td><strong>HBPM Screening</strong></td>
<td><strong>Age Mean = 53.5</strong></td>
<td><strong>HBPM Screening</strong></td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8th Grade</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>High School</td>
<td></td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GED</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Some College</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td><strong>Marital Status</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Married</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Divorced</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Widowed</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Income</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unemployed</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>&lt;$10,000</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Disability</td>
<td>1</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Retired</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 3. Health History of Blood Screening Participants

<table>
<thead>
<tr>
<th>Medical History</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertension N=14</td>
<td></td>
</tr>
<tr>
<td>Diuretic n = 4</td>
<td></td>
</tr>
<tr>
<td>ACE Inhibitor n= 3</td>
<td></td>
</tr>
<tr>
<td>Angiotensin Renin n= 7</td>
<td></td>
</tr>
<tr>
<td>Diabetes n = 5</td>
<td></td>
</tr>
<tr>
<td>Cardiovascular n = 2</td>
<td></td>
</tr>
<tr>
<td>Stroke n = 2</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Health History</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Diet N = 17</td>
<td></td>
</tr>
<tr>
<td>Eat Fast Foods n=11</td>
<td></td>
</tr>
<tr>
<td>Smoking N= 17</td>
<td></td>
</tr>
<tr>
<td>Actively Smoking n= 11</td>
<td></td>
</tr>
<tr>
<td>Quit Smoking n= 6</td>
<td></td>
</tr>
<tr>
<td>Alcohol N= 21</td>
<td></td>
</tr>
<tr>
<td>1 or more drinks daily n= 8</td>
<td></td>
</tr>
<tr>
<td>Physical Activity N= 19</td>
<td></td>
</tr>
<tr>
<td>&lt;150 minutes/week n= 12</td>
<td></td>
</tr>
<tr>
<td>&gt;150 minutes/week n=7</td>
<td></td>
</tr>
<tr>
<td>BP Category</td>
<td>BP Values</td>
</tr>
<tr>
<td>-----------------</td>
<td>------------</td>
</tr>
<tr>
<td>Normal</td>
<td>120/80</td>
</tr>
<tr>
<td>PreHypertension</td>
<td>120-139/80-89</td>
</tr>
<tr>
<td>Stage 1</td>
<td>140-159/90-99</td>
</tr>
<tr>
<td>Stage 2</td>
<td>&gt;169/&gt;100</td>
</tr>
</tbody>
</table>
Figure 1

Chronic Care Model Figure 1: Edward H. Wagner, MD, MPH, Chronic Disease Management: What Will It Take To Improve Care for Chronic Illness? Effective Clinical Practice, Aug/Sept 1998, Vol 1

Permission received and letter attached. Approval for use of original model and modified by Barr, 2003.
Figure 2. Systolic and Diastolic B/P of Usual Group (yellow lines) and Home visit (green) during bi-monthly monitoring. Significant Group Effect for Systolic B/P p=0.0002*
August 24, 2012

Creighton University Medical Center
601 N. 30th Street, Suite 3820
Omaha, NE 68131

Dear Ms. Woods:

Thank you for your request for poster presentation and print format of the following from Effective Clinical Practice:

Figure 1: Edward H. Wagner, MD, MPH, Chronic Disease Management: What Will It Take To Improve Care for Chronic Illness? Effective Clinical Practice, Aug/Sept 1998, Vol 1

Permission is granted to republish the preceding material with the understanding that you will give appropriate credit to Effective Clinical Practice as the original source of the material. Any translated version must carry a disclaimer stating that the American College of Physicians is not responsible for the accuracy of the translation. This permission grants non-exclusive, worldwide rights for this edition / volume in poster presentation and print format only. ACP does not grant permission to reproduce entire articles or chapters on the Internet. This letter represents the agreement between ACP and Creighton University Medical Center for request ROECP1217710 and supersedes all prior terms from the requestor.
Thank you for your interest in *Effective Clinical Practice*. If you have any further questions or would like to discuss the matter further, please contact me at 856-489-8555 or fax 856-489-4999.

Sincerely,

Gina Brown
Permissions Coordinator