Original Article

Impact of Hypertension Education Pamphlets in the Primary Care Setting

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Abstract

Background: Hypertension is the #1 contributing risk to global death. Primary care offices focus on prevention and patient education.
Objectives: Our goal is to measure the impact of an educational pamphlet on hypertension for delivering information in the primary care setting. We hope to improve patient understanding of hypertension.
Methodology: A patient education pamphlet on hypertension was created using graphics and text at a seventh-grade reading level. We created a survey about hypertension for each participant to complete before and after reading the pamphlet. A total of 103 participants completed the surveys at two primary care offices. Data was analyzed to assess for statistical significance between pre- and post-survey scores.
Results: Analysis when comparing pre- and post-scores revealed a p value of 1.25 x 10-7 when analyzing all the data, indicating a statistically significant increase in correct answers on the post-survey. The data showed significant differences based on demographic information including education levels, pre-existing diagnosis of hypertension, and rural vs urban setting.
Conclusions: The results suggest that our educational pamphlet is overall a successful way to education patients on hypertension. Pamphlets can be an efficacious form of patient education. They are highly accessible and cost-effective.

Keywords: Patient education, education pamphlets, hypertension, primary care setting, family medicine, internal medicine, patient-centered care

Introduction

Primary care medical offices focus on patient education, preventative medicine, and long-term relationships with patients to encourage healthy lifestyles and good outcomes. The goal of this quality improvement project is to improve one of these areas of healthcare that is essential to patient care—patient education. The immediate goal of this project is to measure the impact of an educational pamphlet with text and graphics for delivering health information in the primary care setting. The long-term goal is to improve patient understanding of hypertension including consequences and management, especially in regard to lifestyle modifications and medication adherence. Hypertension is the #1 contributing risk to global death. It is the leading risk factor leading to strokes. Per the CDC each year 795,000 people in the United States have a stroke, and 610,000 of these strokes are first time strokes. Hypertension is a leading cause of cardiovascular disease, which

accounts for about 20% of all healthcare costs in the United States (Ferdinand 2012). For this reason, hypertension was selected as the focus of the educational pamphlets. An article by Marzena Dubiel outlines that patient non-adherence with anti-hypertensive drugs is an important reason for insufficient hypertension treatment (Dubiel 2005). In up to 56% of those who become non-adherent, this is due to a lack of understanding of the condition (Dubiel 2005). Additionally, in a study involving 400 hypertensive patients, there was a significant reduction in mortality of hypertension in the group with educational intervention versus the group without educational intervention (Dubiel 2005). Therefore, patient education is essential in the therapeutic process. It is also crucial to focus on differences between patient education success in various demographic groups, so that these differences can be explored, and patient education can be optimized. Some of those categories include level of patient schooling completed, geographic classification (rural vs urban), race / ethnicity, age, and gender.

Methodology

Construction of pamphlet and survey: Patient education materials are ideally written at a reading level that is accessible for large portions of the patient population. In the creation of the pamphlet, recommendations were taken from "Writing and Designing Readable Patient Information Materials" (Aldridge 2004). Recommendations included engaging graphics and use of easily understandable words and phrases.

Information on hypertension was gathered from several sources including the Joint National Committee (JNC 8) regarding the definition, the causes, how to measure blood pressure, current treatments, and when to seek further medical attention (James et. al 2014). This information was compiled and reviewed for content, flow, visual appeal, and accessibility [Appendix A]. It incorporated images, graphs, risk factors, and clear, comprehensible verbiage for ease of reading. These informational pamphlets were printed in color in a folded pamphlet format.

Using the Microsoft Office Word Readability tool, the final pamphlet was determined to be written at a seventh grade reading level, which is inclusive for those with lower levels of functional literacy, especially when combined with the use of graphics, easy to read charts, and diagrams. The readability ease score calculated using the Flesch Reading Ease Readability Formula, which considers factors such as average sentence length and average number of syllables per word, was 66.8 out of 100, which is considered easily understandable for an 8th grade level reader [Appendix B].

The survey was designed to collect demographic information, including age, gender, race/ethnicity, level of education, and de-identified health information regarding previous diagnosis of stroke, hypertension, and diabetes. Given the low prevalence of type 1 diabetes mellitus and diabetes insipidus, the survey did not specify the type of diabetes. We then incorporated information in the pamphlet into a set of seven questions which assessed the test-takers' knowledge of hypertension [Appendix C]. The participants completed the identical survey before and after reading the patient education pamphlet.

Data collection: A partnership was formed with an urban and a rural primary care office in the North Florida / South Georgia area. Pre-surveys, patient education pamphlets, and post-surveys were provided in pre-assembled packets to staff at each of the medical offices. Staff at the offices were instructed to give patients pamphlets with their other intake forms. Staff randomly selected patients over the age of 18 to participate in the study. The patients completed the pre-survey, then read the patient education pamphlet on hypertension, and then completed the post-survey. Demographic information and de-identified health information was also collected at this time. Pre- and post-surveys were collected weekly or every other week from each partnered primary care office. Scores and other information were then recorded, compared, and analyzed. A total of 140 packets were provided, and a total of 103 were completed and returned.

Data analysis: This project consisted of an education pamphlet with pre-education questionnaire and a post-education questionnaire that were identical in order to standardize the data and quantify response rate. The two identical questionnaires consisted of 7 multiple choice questions. Each questionnaire was graded based

out of a total score of 7. Pamphlets with unanswered pre-education tests or post-education tests were nullified and omitted from data analysis. The pre-education and post-education grades were analyzed to see if there was a statistically significant improvement in scores after pamphlet education. The pamphlet and questionnaire packets also included patient self-reporting sections including demographics, education, and medical history which were recorded and used in data analysis. A total of 110 pamphlets were delivered and 103 were received completed and incorporated into the data analysis. This is a 93% successful completion rate. Questionnaires were graded and data was studied through arithmetic means and one-tailed t-test analysis to identify statistical significance. Various categories of comparisons were completed with the collected data, as seen below in the results section.

Results

Results of the study are as noted in the figures below. Table 1 describes the demographics of the participants. Table 2 shows the overall scores before and after reading the patient educational pamphlet, with the associated p value. Graph 1 and Table 3 shows scores based on education level. Graph 2 and Table 4 show scores based on hypertension status. Graph 3 and Table 5 show scores based on urban vs rural setting status.

Table 1: Demographics for the study participants is shown in the table, broken down by categories including age, gender, and education level.

Demographics (Total of 103 Participants)	
Age	
18-29	10
30-59	24
60-79	61
80+	8
Gender	
Female	55
Male	41
Blank	7
Education Level	
Less than High School	2
Completed High School	18
Completed 2 Year AA Degree or Trade School	18
Completed 4 Year Bachelor's Degree	35
Completed Masters or PhD	30

Table 2: The table displays the mean pre-score and mean post-score for all of the study participants. The p value indicates that these results are statistically significant.

Overall Scores Overall Score (Out of 7 Possible)	
Mean Pre-Score	5.73
Mean Post-Score	6.48
P Value for One Tailed T Test	$1.25*10^{-7}$ ***

Graph 1: This graph displays the pre-score and post-score averages for the participants divided by education level. The stars indicate that the p-value for the comparison between pre-score and post-score were statistically significant in the Masters/PhD, Bachelors, AA/Trade, and HS categories. In this graph, AA stands for Associates Degree, HS stands for high school, and <HS stands for less than a high school education.

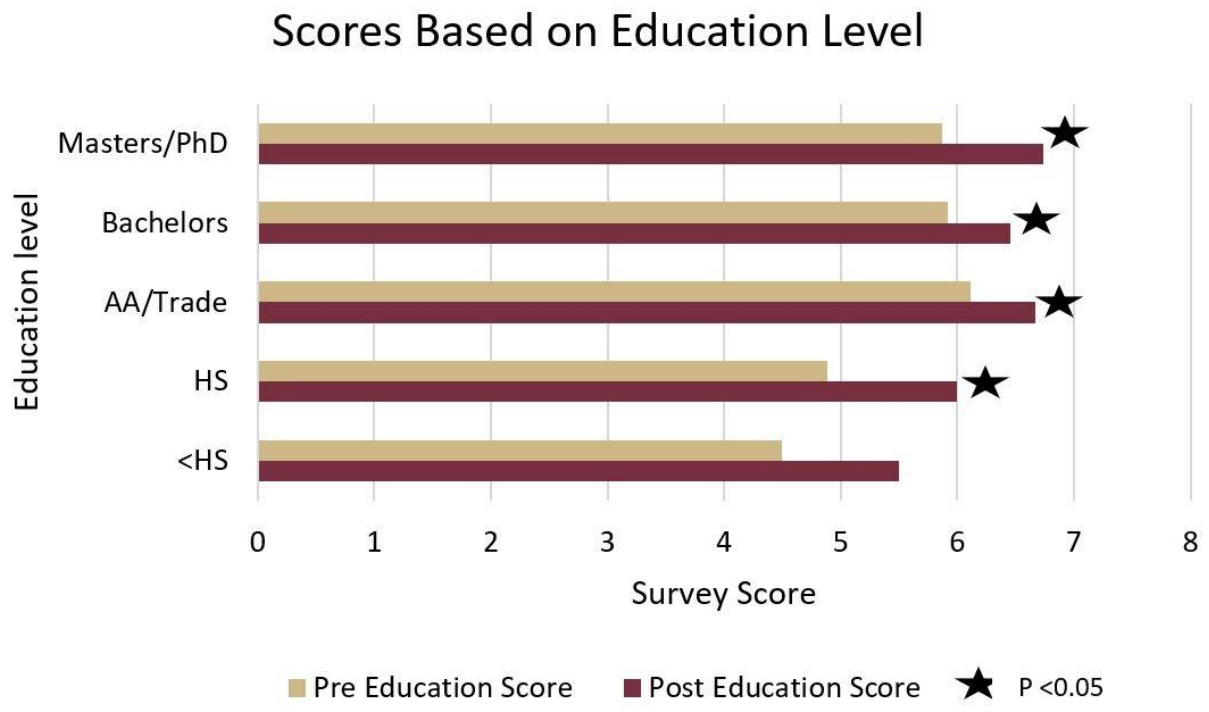

Table 3: This table displays the pre-score and post-score averages for the participants divided by education level. The stars indicate that the p-value for the comparison between pre-score and post-score were statistically significant in the Masters/PhD, Bachelors, AA/Trade, and HS categories. In this chart, AA stands for Associates Degree, HS stands for high school, and <HS stands for less than a high school education

Scores Based on Education Score

	<HS	HS	AA/Trade	Bachelors	Masters/PhD
Pre-Score	4.50	4.89	6.11	6.00	5.87
Post-Score	5.5	6.00	6.67	6.46	6.73
P Value	0.29	0.01***	0.003***	0.007***	.000098***

Graph 2: This graph displays the pre-score and post-score averages for the participants divided by hypertension diagnosis status. The stars indicate that the p-value for the comparison between pre-score and post-score were statistically significant in the diagnosed hypertension and no hypertension categories

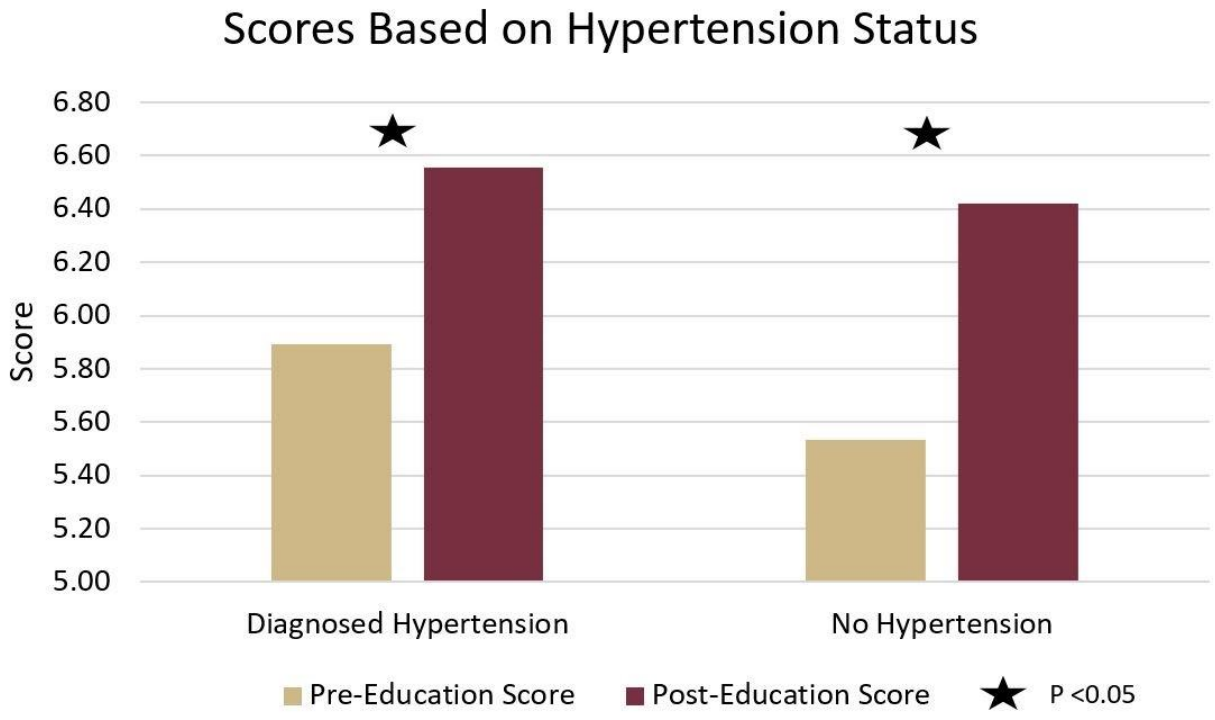

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Table 4: This table displays the pre-score and post-score averages for the participants divided by hypertension diagnosis status. The stars indicate that the p-value for the comparison between pre-score and post-score were statistically significant in the diagnosed hypertension and no hypertension categories.

Scores Based on Hypertension Status

	Diagnosed Hypertension	No Hypertension
Pre-Score	5.98	5.42
Post-Score	6.55	6.42
P Value	0.0002***	0.0002***

Graph 3: This graph displays the pre-score and post-score averages for the participants divided by rural vs urban status. The stars indicate that the p-value for the comparison between pre-score and post-score were statistically significant in the rural and urban categories.

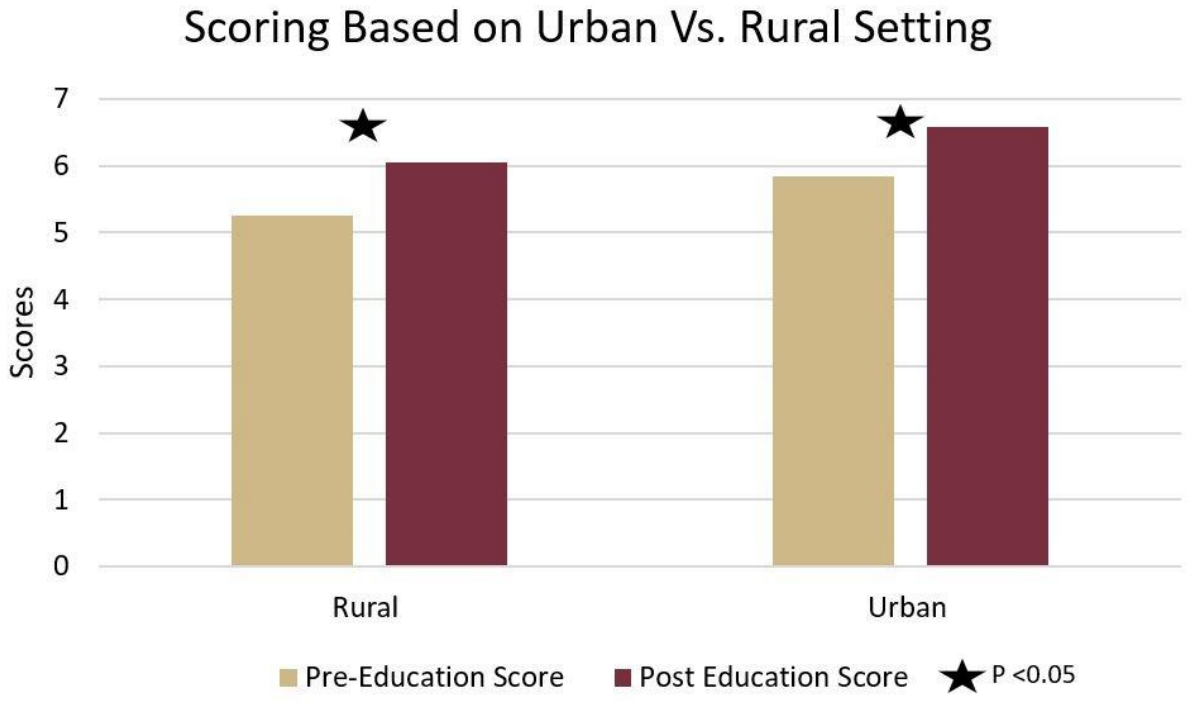

Table 5: This table displays the pre-score and post-score averages for the participants divided by rural vs urban status. The stars indicate that the p-value for the comparison between pre-score and post-score were statistically significant in the rural and urban categories.

Scores based on Rural vs Urban Status

	Rural	Urban
Pre-Score	5.25	5.84
Post-Score	6.05	6.57
P Value	0.0096***	0.0000045***

Discussion

The goal was to determine the efficacy of health education pamphlets when used in the patient education setting. These studies were inspired by the ubiquity of pamphlets in the office setting, and the question of utility. Our limited data indicates that there was a statistically significant overall increase of scores among the 103 total participants in the study. Interestingly, there was a statistically significant increase in scores in those with a high school, AA/trade, Bachelors, Masters/PhD level education. The only education category that did not have a statistically significant increase in participant scores after reading the patient education pamphlet was the less than a high-school education group. This may indicate that the reading materials were not engaging or were written at the incorrect lexicon level. The reading materials were written at a 7th grade reading level, a process described in the methods section above. Another important consideration is that the sample size was too small to deny or support the null hypothesis with this group, as only two participants were noted to be in the less than a high school education group. Future studies with larger sample size may further explain this finding.

Notably, there were statistically significant increases in scores in those with and without a diagnosis of hypertension, perhaps indicating that the information portrayed in the pamphlet was engaging and easy to comprehend for those who were worried about their own health versus those just willing to learn about the health condition with no personal diagnosis. This is important in a hypertension pamphlet, as hypertension is called the silent killer for a reason--often people do not know that they have hypertension until they go to a doctor's office, so it is important for even those without an official diagnosis of hypertension to be comfortable with the reading materials for the condition, as they or their friends and family may be affected presently or in the future by the condition.

Furthermore, there were statistically significant increases in scores in both the urban and rural settings. This is vital to appreciate, because often the rural setting has less access to expensive health resources. This data indicates that the health education pamphlet can only be an affordable way to impart health education but that it can be fruitful in the patient education process. Perhaps this study will encourage primary care offices in the rural setting to develop or locate accessible patient education pamphlets for use in their offices in the future.

It is worth noting that this project reflects the utility of the specific pamphlet our research group has designed, but we believe these results could be replicated with any accessible and up-to-date medical literature. Limitations of this study include the sample size, localization within two offices, and nonresponse bias against patients who denied participation. There are also theoretical limitations in that the patients were specifically asked to read the pamphlet, and were primed with what information to read for due to the pre-test. One fallback of the study is that the participants only took the post-education survey once, immediately after reading the pamphlet. A future study idea would include having each participant take it one minute after reading, one month after reading, and one year after reading, to allow the assessment of

what content from the information pamphlet was truly learned, versus simply regurgitated in their short-term memory.

Additionally, whether our results are reflective of the efficacy of pamphlets in the natural clinical setting may be questionable, which really speaks to the role of the clinician in bringing attention to educational materials. This study suggests that if we ask patients to read something, they most likely will. If an appropriate study could be designed, it would be interesting to observe the impact of active versus passive availability of educational information. Other areas of future study would include optimizing design and readability of materials, as well as different modes of imparting health information, such as phone apps.

Conclusions

The results as indicated above suggest that educational literature such as pamphlets can be a truly efficacious form of patient education, when at an appropriate reading level and freely distributed. They are highly accessible and cost-effective in urban and rural environments, and may lead to increased health knowledge among a variety of portions of the population. While they are no replacement for one-on-one education from clinicians, pamphlets are extremely cost-effective, can provide reliable health information, can be easily referenced at home, and can guide patients to reliable websites for more information.

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References

Aldridge MD. (2004) Writing and designing readable patient education materials. Nephrol Nurs J. 1(4):373-377. PMID: 15453229.

Cuspidi C, Sampieri L, Macca G, et al. (2000) Short and long-term impact of a structured educational program on the patient's knowledge of hypertension. Ital Heart J. 1(12):839-843. PMID: 11152416

Dubiel M, Cwynar M, Januszewicz A, Grodzicki T. (2005) Patient's education in arterial hypertension. Blood Press Suppl. 2:53-56. doi:10.1080/08038020500424731.

Ferdinand, K.C., Patterson, K.P., Taylor, C., Fergus, I.V., Nasser, S.A. and Ferdinand, D.P. (2012) Community-Based Approaches to Prevention and Management of Hypertension and Cardiovascular Disease. The Journal of Clinical Hypertension, 14: 336-343. doi:10.1111/j.1751-7176.2012.00622.x

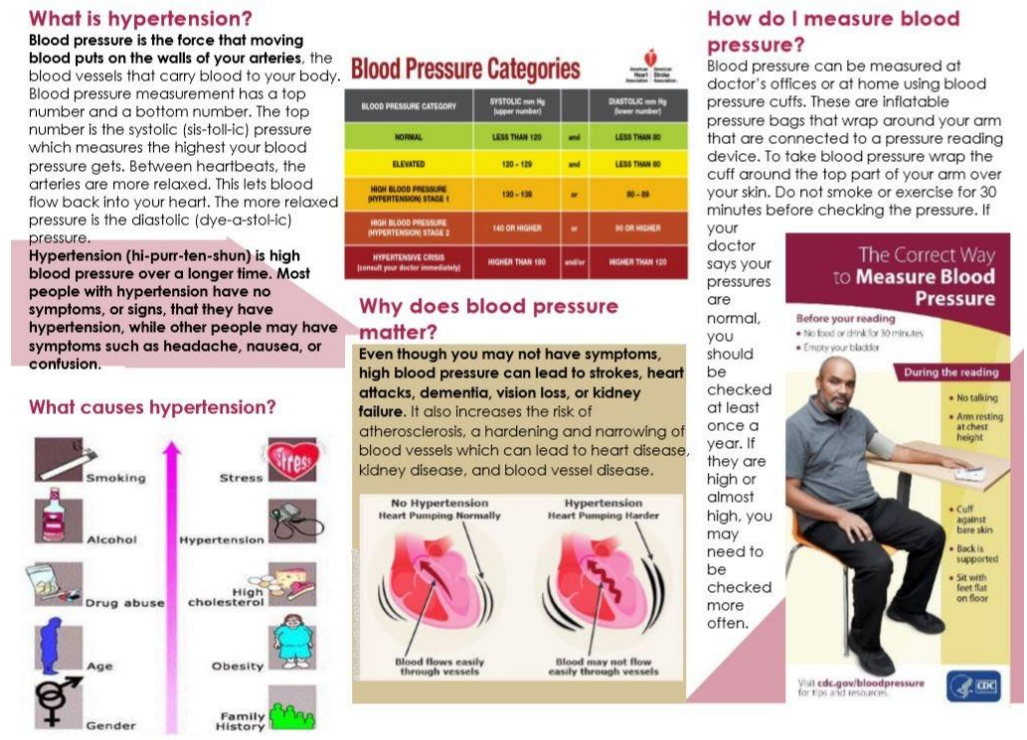
James PA, Oparil S, Carter BL, et al. (2014) Evidence-Based Guideline for the Management of High Blood Pressure in Adults: Report From the Panel Members Appointed to the Eighth Joint National Committee (JNC 8). JAMA. 311(5):507–520. doi:10.1001/jama.2013.284427.

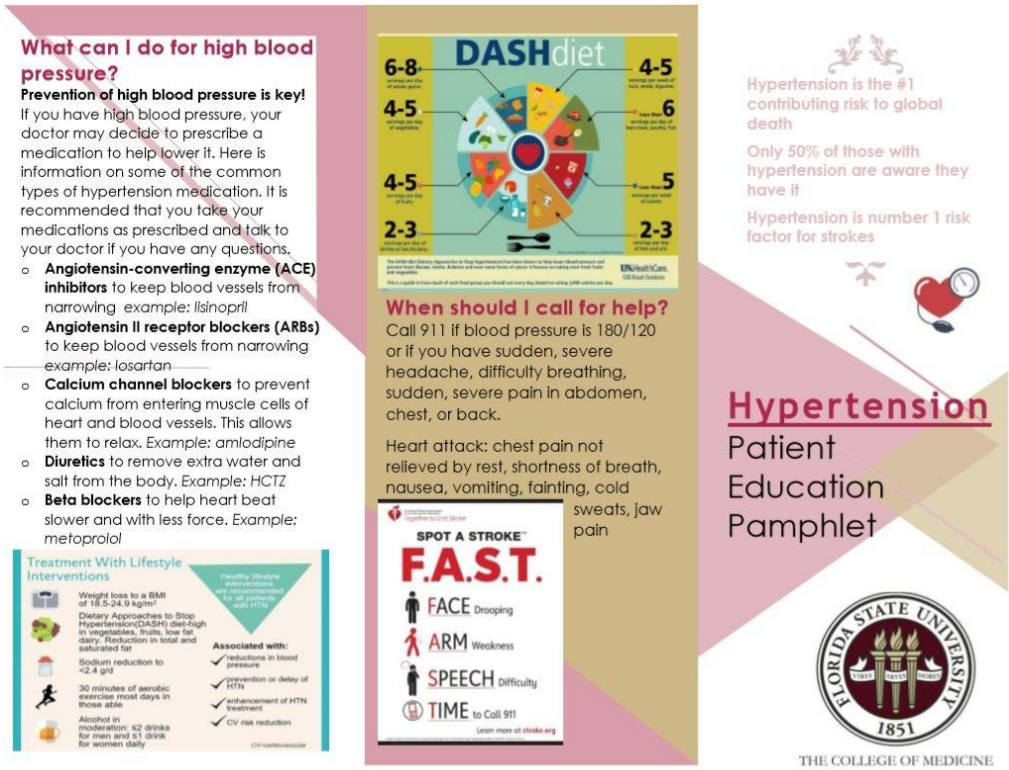
Oparil S, Calhoun DA. (1989) Hypertension. Dis Mon. 35(3):133-232. doi:10.1016/0011-5029(89)90019-9.

Vetto JT, Dubois PM, Vetto IP. The impact of distribution of a patient-education pamphlet in a multidisciplinary breast clinic. J Cancer Educ. 1996;11(3):148-152. doi:10.1080/08858199609528418.

Appendix

A.


What is hypertension?
Blood pressure is the force that moving blood puts on the walls of your arteries, the blood vessels that carry blood to your body. Blood pressure measurement has a top number and a bottom number. The top number is the systolic (sis-tol-ic) pressure which measures the highest your blood pressure gets. Between heartbeats, the arteries are more relaxed. This lets blood flow back into your heart. The more relaxed pressure is the diastolic (dye-a-stol-ic) pressure.
Hypertension (hi-purr-ten-shun) is high blood pressure over a longer time. Most people with hypertension have no symptoms, or signs, that they have hypertension, while other people may have symptoms such as headache, nausea, or confusion.
What causes hypertension?
Smoking
Alcohol
Drug abuse
Age
Gender
Stress
Hypertension
High cholesterol
Obesity
Family History
Blood Pressure Categories
BLOOD PRESSURE CATEGORY
SYSTOLIC mm Hg (upper number)
DIASTOLIC mm Hg (lower number)
NORMAL
LESS THAN 120
and
LESS THAN 80
ELEVATED
120 - 129
and
LESS THAN 80
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 1
130 - 139
or
80 - 89
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 2
140 OR HIGHER
or
90 OR HIGHER
HYPERTENSIVE CRISIS (consult your doctor immediately)
HIGHER THAN 180
and/or
HIGHER THAN 120
Why does blood pressure matter?
Even though you may not have symptoms, high blood pressure can lead to strokes, heart attacks, dementia, vision loss, or kidney failure. It also increases the risk of atherosclerosis, a hardening and narrowing of blood vessels which can lead to heart disease, kidney disease, and blood vessel disease.
No Hypertension
Heart Pumping Normally
Hypertension
Heart Pumping Harder
Blood flows easily through vessels
Blood may not flow easily through vessels
How do I measure blood pressure?
Blood pressure can be measured at doctor's offices or at home using blood pressure cuffs. These are inflatable pressure bags that wrap around your arm that are connected to a pressure reading device. To take blood pressure wrap the cuff around the top part of your arm over your skin. Do not smoke or exercise for 30 minutes before checking the pressure. If your doctor says your pressures are normal, you should be checked at least once a year. If they are high or almost high, you may need to be checked more often.
The Correct Way to Measure Blood Pressure
Before your reading
• No food or drink for 30 minutes
• Empty your bladder
During the reading
• No talking
• Arm resting at chest height
• Cuff against bare skin
• Back is supported
• Sit with feet flat on floor
Visit cdc.gov/bloodpressure for tips and resources.


What can I do for high blood pressure?
Prevention of high blood pressure is key!
If you have high blood pressure, your doctor may decide to prescribe a medication to help lower it. Here is information on some of the common types of hypertension medication. It is recommended that you take your medications as prescribed and talk to your doctor if you have any questions.
Angiotensin-converting enzyme (ACE) inhibitors to keep blood vessels from narrowing example: lisinopril
Angiotensin II receptor blockers (ARBs) to keep blood vessels from narrowing example: losartan
Calcium channel blockers to prevent calcium from entering muscle cells of heart and blood vessels. This allows them to relax. Example: amlodipine
Diuretics to remove extra water and salt from the body. Example: HCTZ
Beta blockers to help heart beat slower and with less force. Example: metoprolol
Treatment With Lifestyle Interventions
Healthy lifestyle interventions are recommended for all patients with HTN
Weight loss to a BMI of 18.5-24.9 kg/m²
Dietary Approaches to Stop Hypertension(DASH) diet-high in vegetables, fruits, low fat dairy. Reduction in total and saturated fat
Sodium reduction to <2.4 g/d
30 minutes of aerobic exercise most days in those able
Alcohol in moderation: ≤2 drinks for men and ≤1 drink for women daily
Associated with:
reductions in blood pressure
prevention or delay of HTN
enhancement of HTN treatment
CV risk reduction
DASHdiet
6-8
4-5
4-5
2-3
4-5
6
5
2-3
When should I call for help?
Call 911 if blood pressure is 180/120 or if you have sudden, severe headache, difficulty breathing, sudden, severe pain in abdomen, chest, or back.
Heart attack: chest pain not relieved by rest, shortness of breath, nausea, vomiting, fainting, cold sweats, jaw pain
SPOT A STROKE
F.A.S.T.
FACE Drooping
ARM Weakness
SPEECH Difficulty
TIME to Call 911
Hypertension is the #1 contributing risk to global death
Only 50% of those with hypertension are aware they have it
Hypertension is number 1 risk factor for strokes
Hypertension
Patient Education Pamphlet
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