Published in final edited form as:

Res Social Adm Pharm. 2013 ; 9(4): 467–481. doi:10.1016/j.sapharm.2012.05.007.

A qualitative analysis of perceptions and barriers to therapeutic lifestyle changes among homeless hypertensive patients

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Abstract

Background—Homeless individuals have higher rates of hypertension when compared to the general population. Therapeutic lifestyle changes (TLCs) have the potential to decrease the morbidity and mortality associated with hypertension, yet TLCs can be difficult for homeless persons to implement due to competing priorities.

Objectives—To identify: 1) Patients' knowledge and perceptions of hypertension and TLCs; and 2) Barriers to implementation of TLCs.

Methods—This qualitative study was conducted with patients from an urban healthcare clinic within a homeless center. Patients 18 years old with a diagnosis of hypertension were eligible. Three focus groups were conducted at which time saturation was deemed to have been reached. Focus group sessions were audio recorded and transcribed for data analysis. A systematic, inductive analysis was conducted to identify emerging themes.

Results—A total of 14 individuals participated in one of three focus groups. The majority were female (n = 8) and African-American (n = 13). Most participants were housed in a shelter (n=8). Others were staying with family or friends (n=3), living on the street (n=2), or had transitioned to housing (n=1). Participants had a mixed understanding of hypertension and how TLCs impacted hypertension. They were most familiar with dietary and smoking recommendations and less familiar with exercise, alcohol, and caffeine TLCs. Participants viewed TLCs as being restrictive, particularly with regards to diet. Family and friends were viewed as helpful in encouraging some

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lifestyle changes such as healthy eating, but less helpful in having a positive influence on quitting smoking. Participants indicated that they often have difficulty implementing lifestyle changes because of limited meal choices, poor access to exercise equipment, and being uninformed about recommendations.

Conclusions—Despite the benefits of TLCs, homeless individuals experience unique challenges to implementing TLCs. Future research should focus on developing and testing interventions that facilitate TLCs among homeless persons. The findings from this study should assist healthcare practitioners, including pharmacists, with providing appropriate and effective education.

Keywords

homeless; hypertension; perceptions; barriers; lifestyle

BACKGROUND

Hypertension is one of the most prevalent chronic diseases in the United States (U.S.), affecting 76.4 million Americans.¹ Left uncontrolled, hypertension contributes to significant morbidity and predisposes patients to serious cardiovascular complications, including stroke, myocardial infarction, and congestive heart failure. In 2007, hypertension was listed as a primary or contributing cause of death in more than 18% of U.S. deaths.² Further, the World Health Organization (WHO) has identified cardiovascular disease, for which hypertension is a significant risk factor, as the leading cause of death in developing countries.³

Hypertension is also associated with significant health care costs. In 2007 alone, the combined direct and indirect costs of hypertension totaled \$43.5 billion.¹ As the American population continues to age, it is likely that this cost will continue to increase. It is estimated that by 2030, the annual cost of hypertension will exceed \$200 billion.²

Many studies have demonstrated the positive impact of therapeutic lifestyle changes (TLCs) on hypertension outcomes, and according to the WHO, at least 80% of deaths associated with hypertension could be prevented by eating a healthy diet, engaging in exercise, and avoiding tobacco smoke.^{3–19} Additionally, clinical practice guidelines, including The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure recommend TLCs as the first line therapy for the management of high blood pressure.²⁰ Despite the benefits, TLCs can be challenging for patients who do not understand recommended therapeutic goals, lack access to necessary resources, or find TLC incompatible with their current lifestyles.^{21–23}

TLCs are of particular interest among homeless persons because persons of low socioeconomic status suffer higher morbidity and mortality from cardiovascular disease than the general population.²⁴ Moreover, studies suggest that homeless patients may be at higher risk for hypertension than housed persons of low socioeconomic status.^{25–26} This may be a result of a greater number of modifiable risk factors for hypertension in homeless patients, such as poor diet, lack of exercise, and increased use of alcohol and nicotine.^{23,25–28} Homeless patients also have competing priorities for basic needs, such as food and shelter, which may take precedence over TLCs. Further, food insufficiency has been associated with hypertension, and may interfere with implementation of a therapeutic diet.^{29–30} Shelter restrictions, such as limited food choices and strict shelter schedules, also may interfere with the implementation of TLCs.^{31–32}

While previous research has demonstrated that TLCs can make a significant impact on hypertension management, little is known about homeless patients' perspectives and experiences with implementing TLCs. This information will help homeless care providers,

including pharmacists, health centers, and shelters address the unique needs of homeless patients with hypertension. Further, homeless patients' limited knowledge and understanding of TLCs may also complicate the management of hypertension. By identifying specific areas of poor understanding, homeless care providers can tailor their patient education to assure that the therapy plans are effectively communicated. The objectives of this study were to identify: 1) Patients' knowledge and perceptions of TLCs for management of hypertension and 2) Barriers to implementation of TLCs recommendations.

METHODS

The study setting was an urban Federally Qualified Health Care for the Homeless (HCH) Center which provides medical, dental, vision, and behavioral health care to those experiencing or at risk of homelessness. Patients 18 years of age and older with a diagnosis of hypertension and who spoke English were eligible for the study. All diagnoses of hypertension were verified by inspection of the patients' medical records. Signage inviting patients to participate in the study was placed throughout the clinic and interested individuals contacted one of the researchers to enroll. Three focus groups were planned with an assessment for saturation at the end of the third focus group. Since no new themes emerged in the third focus group, it was determined that saturation had been reached. The focus groups were conducted by a facilitator who had experience conducting focus groups. The focus group guide (Appendix) was structured and included questions regarding patients' perceptions of TLCs, what it means to them when their healthcare provider discusses TLCs, and the barriers they encounter when they attempt to implement these changes. The questions were designed from a literature that assessed patient perceptions and barriers to care.^{21, 33–36} The focus groups were 60 minutes in duration and allowed for interactions among participants and probing by the facilitator, when appropriate. The sessions were audio-recorded and subsequently transcribed verbatim. The participant data had personal identifiers removed but retained the original wording to the extent possible. Pseudonyms were used to protect patient confidentiality. Participants received \$25 and reimbursement for bus transportation upon completion of the focus group session. This study was approved by the Virginia Commonwealth University Institutional Review Board.

A thematic analysis of the transcribed focus group data was conducted. A systematic, inductive process³⁷ was used to code the data and identify emerging themes. The framework approach, where responses were organized by question, was used. This approach is common when using a structured guide.³⁷ Two researchers (LM and AK) conducted an analysis independently, and comparison revealed 79% agreement. The researchers resolved discrepancies and agreed upon names for each theme at a consensus meeting.

RESULTS

A total of 14 individuals participated in one of the three focus groups. The majority were female (n = 8) and African-American (n = 13). The mean age of participants was 44.1 years old (SD: 7.7). Many participants were housed in a shelter (n = 8). Other participants were staying with family or friends (n = 3), living on the street (n = 2), or had transitioned to stable housing (n = 1). The mean number of chronic medications taken was 1.9 (SD: 0.7). Most participants (n = 12) were smokers and currently used alcohol (n = 7). Five participants were in recovery for alcohol abuse. The most common level of education was high school/GED (n = 5), followed by some high school (n = 4), 8th grade or lower (n = 4), and community college (n = 1).

Knowledge and Perceptions of Hypertension and TLCs

Tables 1 and 2 display the themes and representative quotes for the questions related to knowledge and perceptions of hypertension and TLCs.

What does the word hypertension mean to you?—Six of the participants associated the word hypertension with 'increased blood pressure'; however 6 participants also associated hypertension with 'physical symptoms,' such as headaches, sweating, and vision changes, that they experienced as a result of the disease. A few demonstrated poor understanding of the meaning of the word hypertension, indicating it meant 'hyperactivity' (n = 2) or 'emotion' (n = 2).

What can happen as a result of uncontrolled blood pressure?—Participants demonstrated a mixed understanding of the consequences of uncontrolled hypertension. Less than half (n=6) were able to state the 'long-term health complications' of hypertension, including heart attack or stroke, and some (n = 3) expressed 'emotional strain' about such potential outcomes. Other participants (n=6) related hypertension to 'acute physical symptoms,' such as headaches or dizziness.

What types of things do you feel impact blood pressure?—Participants most commonly identified 'lifestyle modifications,' including diet and smoking, (n=11) and 'stress' (n=5) as factors that elevate blood pressure.

Do you know what your blood pressure goals are?—Only two participants were 'aware of blood pressure goals' and associated the goal with a specific measurement. Most other participants (n=8) identified specific 'lifestyle modifications' as their blood pressure goals. Some (n=5) patients mentioned 'control blood pressure' as their primary goal, although there was limited discussion regarding the definition of proper control.

What does it mean when the health care provider says you need to change how you eat, exercise or drink?—Many patients (n=8) indicated that when providers recommend TLCs 'lifestyle changes' are discussed. Some (n=5) viewed health care providers' recommendations as 'restrictions,' and others (n = 3) said it was an indication about a 'need to make changes to improve health.'

What does the word diet mean to you?—Some (n=3) participants expressed 'dislike' of the word diet, and others (n = 3) indicated that it meant some type of 'restriction.' Several participants (n=5) interpreted diet as making a 'lifestyle change,' while others (n=2) associated the word with 'weight loss.'

What type of diet is recommended for patients with high blood pressure?—Participants discussed the importance of incorporating nutritious foods and limiting consumption of unhealthy foods. The majority mentioned 'fruits and vegetables' (n = 9) and 'salt restriction' (n = 8). Other responses were related to 'foods that are not greasy/fried' (n = 6) and 'baked foods.'

What does the word 'exercise' mean to you?—There was little consensus among participants regarding the definition of exercise. 'Walking' was the most popular response (n=5). Others indicated that exercise meant 'challenging' (n = 4), 'physical' (n = 2), and 'active' (n = 2).

What are the recommended weekly exercise goals?—Participants only had vague understandings of current exercise recommendations for patients with hypertension. Again,

`walking' was the most common response (n = 5). Some (n = 3) mentioned `vague recommendations' but specific information regarding frequency or duration of recommendations for exercise were not described. Several (n=3) participants indicated that `recommendations were not provided.'

How does smoking affect blood pressure?—Several (n=5) participants understood that smoking `increases blood pressure.' Some (n = 3) understood that smoking was `bad for health', even if they lacked knowledge of its hypertension related effects. The majority (n = 9) mentioned `physical symptoms' of smoking that in turn, impact blood pressure.

How does caffeine affect blood pressure?—Several (n=4) understood that caffeine `increases blood pressure', while just as many participants were `unsure' of the relationship. Four participants noted that caffeine `increases energy.'

What is the recommendation for daily caffeine intake?—Two participants indicated that `decaffeinated coffee' was the recommended choice for daily caffeine intake, whereas one believed the recommendation was to `avoid' caffeine.

How does alcohol affect blood pressure?—Many (n=6) of the participants understood that alcohol `increases blood pressure', but some (n=2) also believed that alcohol `decreases blood pressure.' There were also some (n=2) misconceptions related to hypertension and alcohol, specifically regarding using alcohol as a `home remedy for hypertension.' A few (n=3) stated that they experienced `physical symptoms', such as headaches or blurred vision, when they drank.

What is the recommendation for daily alcohol intake?—Some participants (n = 4) believed that alcohol, in general, is `not recommended,' whereas two responses indicated that `no recommendations had been provided' by their health care providers.

How does stress affect blood pressure?—The majority (n=9) understood that stress `increases blood pressure,' while many others (n=8) indicated that they experience `physical symptoms' related to their hypertension (headaches, vision changes, sweating) when their stress level increases.

Barriers to TLCs

Table 3 summarizes the themes and representative quotes regarding barriers to TLCs.

What challenges exist for you to modify your diet?—Participants (n=6) reported that a major challenge to improving their diet was `feeling deprived or restricted.' They (n = 6) were also concerned about the `taste' of foods and preferred the taste of their usual foods. Some (n = 4) noted `access and cost' concerns and others (n = 4) mentioned `shelter constraints' as a limitation to preparing healthy meals.

What challenges exist for you to exercise?—`Scheduling time' (n = 4), `accountability' (n = 3), `cost' (n = 3), and `motivation' (n = 3) were the challenges to engaging in exercise discussed by participants. Shelter living, in particular, was portrayed as incompatible with a stable exercise routine due to strict enforcement of meal and bedtimes. While some participants mentioned inexpensive activities, like walking, as their primary form of exercise, others maintained that cost to join a gym was a significant barrier.

What challenges exist for you to quit smoking, if you smoke?—Four of the participants reported that the `routine/habit' of smoking had become such an integral part of

their lives that they were having trouble quitting. Four others talked about the influence of 'peers' and how it was difficult to quit when they were around other people who smoked. Three participants discussed how the 'enjoyment' of smoking did not facilitate quitting.

What challenges exist for you to lower the amount of caffeine in your diet?—

Similar to the diet challenges, participants said 'taste' (n=3) was a concern. Some (n = 2) reported that 'availability' of drinks impacted their caffeine intake. Although they try to avoid caffeine, they will generally drink whichever beverage is available. For some (n = 3), there appeared to be 'misunderstanding between diet and caffeine-free soda, as they associated diet beverages as caffeine-free alternatives.

What challenges exist for you to reduce stress in your life?—Half of the participants cited 'family/relationships' as the biggest stressors in their lives. Participants (n=3) also cited 'job and housing instability' as challenges for reducing stress.

DISCUSSION

Overall, participants expressed a limited understanding of hypertension, blood pressure goals, and recommendations for TLCs. The challenges to implementing TLCs in the homeless population were complex. Many barriers reported during the focus group sessions were related to obstacles which are inherent to a transient lifestyle; however some themes reflect challenges that are common among the general population as well.

Knowledge

A study in the general public indicated that patients only receive counseling on the risks of hypertension and individual blood pressure goals about 25% of the time, so it is not surprising that many patients in the current study were not well informed.³⁸ Studies of both the general public and minority populations have identified gaps in understanding of the long-term consequences of hypertension as barriers to adequate blood pressure control. This lack of knowledge surrounding hypertension may indicate a need for improvement in communication between primary care providers and patients, particularly marginalized populations.^{22, 39–40} Further, although health literacy was not assessed in this study, it is likely that health literacy levels were not optimal in these patients. A patient's health literacy level should be considered when providing verbal education and counseling regarding hypertension and TLCs. Also, prior to choosing written education materials to provide to patients, homeless care providers can test the comprehension of the materials in a subset of their patients, and make modifications, if needed.

Perceived Physical Symptoms

Many participants described physical symptoms, including dizziness and headaches, which they associated with hypertension. This was a surprising theme because hypertension has traditionally been described as a 'silent' disease. It is possible that patients in this study had uncontrolled hypertension, perhaps as the result of poor adherence with medications, which could have contributed to these physical symptoms. It has also been reported that those with limited knowledge of the disease perceive hypertension as an acute illness with physical symptoms.⁴⁰ This is a concern because it could delay diagnosis and treatment if patients believe that treatment is not required if symptoms are absent.⁴⁰

TLCs Recommendations

Participants expressed limited knowledge of TLC recommendations. Many had misconceptions about the roles of nutrition, caffeine, and alcohol in hypertension management. These results are supported by a similar study of an urban minority

population.³⁵ This suggests that marginalized populations may have a limited understanding of the influence of diet on hypertension.³⁵ While basic knowledge of the value of fruits and vegetables and the harmful effects of alcohol was displayed by many participants, lack of knowledge regarding the importance of other food groups, including dairy products, whole grains, and lean protein, may indicate that patients would benefit from additional counseling and specific nutritional recommendations to help them make better food choices. Interestingly, many participants associated the consumption of pork products with hypertension. This association has been documented in other studies in African-American populations, so it is likely that there is a cultural connection to this perception.^{40–41}

Poor knowledge of TLC recommendations is not a phenomenon strictly observed in marginalized communities. Studies have shown that at least 25–30% of hypertensive patients do not receive any TLCs counseling, and when counseling is given, it is often insufficient, vague and difficult for patients to follow.^{22,35,40,42–45} One study did find that African-Americans and patients whose net household income was less than \$25,000 were more likely to receive advice on TLCs for hypertension than other races and patients with higher household incomes.⁴⁵ Thus, it is possible that providers are beginning to recognize the importance of TLCs recommendations in marginalized communities; however, patient education in homeless populations remains an area for improvement.⁴⁵

Challenges and Barriers

Diet—Cost and access to nutritious foods were perceived by many participants to be barriers to implementing dietary changes. Studies in other marginalized populations have echoed this theme, showing that low income patients find nutritious foods, such as fresh fruits, vegetables and lean protein, to be unattainable due to their high cost and limited accessibility.^{21, 29, 35} Patients who suffer from nutritional instability also tend to value the quantity of food over the quality, leading to the purchase of less expensive, less healthy foods.²⁹ As a consequence of the higher cost of nutritious foods, many grocery stores in urban areas tend to carry less expensive food items, which are often high in fat and sodium, further limiting access to nutritious choices.³⁵ Patients who receive meals from homeless shelters or soup kitchens may have even more diminished access to recommended foods because they have very limited control over the food they are served.²⁷ A previous study of sheltered women indicated that few participants perceived shelter foods to be nutritious and tasty, so it is not surprising that participants in this study confirmed shelter food to be a barrier to healthy eating.³⁶

In addition to the challenges of cost and access, homeless patients in the study also identified barriers that are common among dieters in the general population. Taste preferences and feelings of restriction are commonly cited in other populations as barriers to starting and maintaining a healthy diet, so it is not surprising that homeless individuals also experience these challenges.^{21,46–49} Other studies have indicated that persons of lower socioeconomic status believe that dietary changes negatively affect their quality of life, possibly due to the restriction of traditional foods and isolation from family and friends who are not following the same diet.^{23,41} It is important for health care providers and shelter staff to work with patients to find solutions that facilitate healthy eating. However, this can be difficult because many shelters and food facilities are trying to feed large numbers of homeless people with a limited budget. Some participants seemed to respond well to eating food such as bacon in moderation, so this may be one approach to helping patients feel less restricted.

Exercise—Previous studies have demonstrated that low-income patients perceive the cost of gym memberships, exercise programs, and exercise equipment as a barrier to exercising

regularly.^{50–51} While this perception was voiced by participants, walking was also consistently identified as a low-cost exercise technique, indicating that walking may be a reasonable TLC recommendation for homeless patients. Strict shelter schedules were identified as a major barrier to exercise, but incorporating an exercise routine into one's daily schedule is also a common complaint among the general population.^{23,52–54} The additional challenge for homeless persons is that they may not have control over their schedule.

Smoking—The prevalence of smoking among homeless persons has been reported to be as high as 76%.⁵⁵ Despite the high number of smokers in this population, only half receive regular advice to quit smoking.⁵⁵ Although there is a vast difference in the prevalence of smoking between the homeless population and the general public, many of the challenges identified by patients in the focus groups, including habit and enjoyment, were similar to those of the general population. The influence of family and friends was also identified as a significant barrier. Other studies have also noted the negative influence of peers, particularly in homeless shelters, so it is possible that shelter environments create an additional challenge because patients are likely to be surrounded by other smokers.^{56–57} Homeless patients may require interventions with significant social support in order to successfully quit smoking.

Practice Implications

This study highlights the need for continued discussion about TLCs for all homeless patients with hypertension at each and every visit. Pharmacists, in particular, can play a key role in providing patient education related to TLCs. This includes re-enforcing key education points and offering encouragement at each pharmacist visit. Given the information presented, motivational interviewing is one approach that can be used to determine what goals patients can reasonably accomplish from TLCs recommendations. For example, if a patient is not interested in discussing smoking as a TLC, focusing on a different aspect such as exercise in that particular visit may be more worthwhile. Additionally, pharmacists and other health care providers should be willing to modify recommendations based upon the patient's ability to adhere. If a patient can only afford canned vegetables, the provider can recommend that the patient rinse the vegetables multiple times to decrease the impact of sodium on their blood pressure.

For practitioners who treat the homeless, it may be beneficial to emphasize the silent aspects and risks of hypertension. Lack of symptoms does not indicate good outcomes, while the presence of symptoms does not always equate to severity. The results from our study indicate that patients view walking as an important component of exercise. Therefore, it is important to educate homeless patients about the health benefits of walking, which does not require the cost of equipment or a gym membership. In addition to the education and counseling aspects detailed above, pharmacists must be vigilant about the impact TLCs may have on medications as changes in smoking status can affect the efficacy of medications.

Limitations

The generalizability of this study results is limited due to recruiting individuals from one HCH. Therefore, it is possible that some issues regarding TLCs and those who experience homelessness were not captured in this study. Also, the results may not be applicable to non-urban settings. Selection bias should also be considered in this study, as individuals that participated volunteered. Also, the patients were diagnosed and receiving treatment for hypertension. The study did not capture knowledge, perceptions, and barriers of those who were not receiving treatment.

CONCLUSIONS

Homeless individuals have high rates of hypertension, and TLCs can be a beneficial intervention. Our results suggest that homeless individuals experience challenges above and beyond the challenges experienced by others. It is important that homeless health care providers understand these challenges and individualize TLCs recommendations, when possible. Future research should focus on developing and testing TLCs interventions that address the unique needs of homeless individuals.

Acknowledgments

Funding for this project was provided in part by the American College of Clinical Pharmacy Ambulatory Care PRN Seed grant program and by CTSA award No. KL2TR000057 from the National Center for Advancing Translational Sciences to Dr. Moczygemba. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the National Institutes of Health.

The authors gratefully acknowledge Jodi Mincemoyer, MSW for her role as the focus group moderator, and Dianne L. Reynolds-Cane, MD and Judy R. Parker-Falzoi, FNP for their support of this study. Portions of this research have been previously presented at the American Pharmacists Association Annual Meeting in 2010.

Appendix A. Focus Group Script

[Introduction, consent, `breaking the ice']

[Completion of demographic forms]

What questions can I answer for you?

How did everyone find out about the study?

Knowledge and Perceptions of Hypertension

1. What does the word hypertension mean to you?
2. Do you know what your blood pressure goals are?
3. What can happen as a result of uncontrolled blood pressure?

Knowledge and Perceptions of Therapeutic Lifestyle Changes

1. What types of things do you feel impact blood pressure?
2. What does it mean when your healthcare provider says you need to change how you eat, exercise or drink?
3. What does the word exercise mean to you?
4. What the recommended weekly exercise goals?
5. What does the word diet mean to you?
6. What type of diet is recommended for patients with high blood pressure?
7. How does smoking affect blood pressure?
8. How does caffeine affect blood pressure?
9. What is the recommendation for daily caffeine intake?
10. How does alcohol affect blood pressure?

11. What is the recommendation for daily alcohol intake?
12. How does stress affect blood pressure?

Barriers to Implementation of Therapeutic Lifestyle Changes

1. What challenges exist for you to exercise?
2. What challenges exist for you to modify your diet?
3. What challenges exist for you to lower the amount of caffeine in your diet?
4. What challenges exist for you to lower the amount of alcohol in your diet?
5. What challenges exist for you to quit smoking, if you smoke?
6. What challenges exist for you to reduce stress in your life?

What other issues have we not explored today that you feel may be important?

REFERENCES

1. American Heart Association. Heart disease and stroke statistics: 2011 update. A report from the American heart association statistics committee and stroke statistics subcommittee. *Circulation*. 2011; 123:e18–209. [PubMed: 21160056]
2. American Heart Association. Forecasting the future of cardiovascular disease in the United States: a policy statement from the American heart association. *Circulation*. 2011; 123:933–944. [PubMed: 21262990]
3. Cardiovascular Disease Fact Sheet. World Health Organization. [Accessed November 17th,2011] Available at <http://www.who.int/mediacentre/factsheets/fs317/en/index.html>.
4. Appel LJ, Moore TJ, Obarzanek E, et al. A clinical trial of the effects of dietary patterns on blood pressure. *N Engl J Med*. 1997; 336:1117–1124. [PubMed: 9099655]
5. Conn VS, Hafdahl AR, Brown SA, Brown LM. Meta-analysis of patient education interventions to increase physical activity among chronically ill adults. *Patient Educ Couns*. 2008; 70:157–172. [PubMed: 18023128]
6. Cushman WC, Cutler JA, Hanna E, et al. Prevention and treatment of hypertension study (PATHS): Effects of an alcohol treatment program on blood pressure. *Arch Intern Med*. 1998; 158:1197–1207. [PubMed: 9625399]
7. Fagard RH, Cornelissen VA. Effect of exercise on blood pressure control in hypertensive patients. *Eur J Cardiovasc Prev Rehabil*. 2007; 14:12–17. [PubMed: 17301622]
8. He FJ, Markandu ND, MacGregor GA. Modest salt reduction lowers blood pressure in isolated systolic hypertension and combined hypertension. *Hypertension*. 2005; 46:66–70. [PubMed: 15956111]
9. Horvath J, Jeitler K, Siering U, et al. Long-term effects of weight-reducing interventions in hypertensive patients. *Arch Intern Med*. 2008; 168:571–580. [PubMed: 18362248]
10. Kokkinos PF, Narayan P, Collieran JA, et al. Effects of regular exercise on blood pressure and left ventricular hypertrophy in African-American men with severe hypertension. *N Engl J Med*. 1995; 333:1462–1467. [PubMed: 7477146]
11. Miller ER 3rd, Erlinger TP, Young DR, et al. Results of the diet, exercise, and weight loss intervention trial (DEW-IT). *Hypertension*. 2002; 40:612–618. [PubMed: 12411452]
12. Neter JE, Stam BE, Kok FJ, Grobbee DE, Geleijnse JM. Influence of weight reduction on blood pressure: a meta-analysis of randomized controlled trials. *Hypertension*. 2003; 42:878–884. [PubMed: 12975389]
13. Ohta Y, Tsuchihashi T, Kiyorhara K. Relationship between blood pressure control status and lifestyle in hypertensive outpatients. *Intern Med*. 2011; 50:2107–2112. [PubMed: 21963727]
14. Pongwecharak J, Treeranurat T. Lifestyle changes for prehypertension with other cardiovascular risk factors: Findings from Thailand. *J Am Pharm Assoc*. 2011; 51:719–726.

15. Rigsby BD. Hypertension improvement through healthy lifestyle modifications. *ABNF J.* 2011; 22:41–43. [PubMed: 21675668]
16. Robbins CL, Dietz PM, Bombard J, Tregear M, Schmidt SM, Tregear SJ. Lifestyle interventions for hypertension and dyslipidemia among women of reproductive age. *Prev Chronic Dis.* 2011; 8:A123. [PubMed: 22005616]
17. The Trials of hypertension collaborative research group. The Effects of nonpharmacologic interventions on blood pressure of persons with high normal levels. *JAMA.* 1992; 267:1213–1220. [PubMed: 1586398]
18. Whelton SP, Chin A, Xin X, He J. Effects of aerobic exercise on blood pressure: a meta-analysis of randomized, controlled trials. *Ann Intern Med.* 2002; 36:493–503. [PubMed: 11926784]
19. Xin X, He J, Frontini MG, Ogden LG, Motsamai OI, Whelton PK. Effects of alcohol reduction on blood pressure: a meta-analysis of randomized, controlled trials. *Hypertension.* 2001; 38:1112–1117. [PubMed: 11711507]
20. The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. National Institute of Health; Available at <http://www.nhlbi.nih.gov/guidelines/hypertension/jnc7full.pdf>. [Accessed December 1, 2011]
21. Gee ME, Bienek A, Campbell NR, et al. Prevalence of, and barriers to, preventative lifestyle behaviors in hypertension (from a national survey of Canadians with hypertension). *Am J Cardiol.* 2011 Epub ahead of print.
22. Douglas JG, Ferdinand KC, Bakris GL, Sowers JR. Barriers to blood pressure control in African-Americans. Overcoming obstacles is challenging, but target goals can be attained. *Postgrad Med.* 2002; 112:51, 2, 55, 59–62. [PubMed: 12400149]
23. Scisney-Matlock M, Bosworth HB, Giger JN, et al. Strategies for implementing and sustaining therapeutic lifestyle changes as part of hypertension management in African-Americans. *Postgrad Med.* 2009; 12:147–159. [PubMed: 19491553]
24. Eliminate Disparities in Cardiovascular Disease. Center for Disease Control and Prevention, Office of Minority Health and Health Disparities; Available at <http://www.cdc.gov/omhd/AMH/factsheets/cardio.htm>. [Accessed April 19, 2012]
25. Kim DH, Daskalakis C, Plumb JD, et al. Modifiable cardiovascular risk factors among individuals in low socioeconomic communities and homeless shelters. *Fam Community Health.* 2008; 31:269–280. [PubMed: 18794634]
26. Szerlip MI, Szerlip HM. Identification of cardiovascular risk factors in homeless adults. *Am J Med Sci.* 2002; 324:243–246. [PubMed: 12449444]
27. Kinchen K, Wright JD. Hypertension management in health care for the homeless clinics: results from a survey. *Am J Public Health.* 1991; 81:1163–1165. [PubMed: 1951828]
28. Lee TC, Hanlon JG, Ben-David J, et al. Risk factors for cardiovascular disease in homeless adults. *Circulation.* 2005; 111:2629–2635. [PubMed: 15897342]
29. Dammann KW, Smith C. Factors affecting low-income women's food choices and the perceived impact of dietary intake and socioeconomic status on their health and weight. *J Nutr Educ Behav.* 2009; 41:242–253. [PubMed: 19508929]
30. Vozoris NT, Tarasuk VS. Household food insufficiency is associated with poorer health. *J Nutr.* 2003; 133:120–126. [PubMed: 12514278]
31. Hwang SW, Bugeja AL. Barriers to appropriate diabetes management among homeless people in Toronto. *CMAJ.* 2000; 163:161–165. [PubMed: 10934977]
32. Wilk T, Mora PF, Chaney S, Shaw RD. Use of an insulin pen by homeless patients with diabetes mellitus. *Acad Nurse Pract.* 2002; 14:372–379.
33. Hart PL. Women's perceptions of cardiovascular disease: an integrative review. *J Cardiovasc Nurs.* 2005; 20:170–176. [PubMed: 15870587]
34. Ogedegbe G, Mancuso CA, Allegrente JP. Expectations of blood pressure management in hypertensive African-American patients: a qualitative study. *J Natl Med Assoc.* 2004; 96:442–449. [PubMed: 15101664]
35. Ravenell JE, Johnson WE, Whitaker EE. African-American men's perception of health: a focus group study. *J Natl Med Assoc.* 2006; 98(4):544–550. [PubMed: 16623067]

36. Davis LR, Weller NF, Jadhav M, Holleman WL. Dietary intake of homeless women residing at a transitional living center. *J Health Care Poor Underserved*. 2008; 19:952–962. [PubMed: 18677082]
37. Patton, MQ. *Qualitative Research & Evaluation Methods*. 3rd ed.. Sage Publications; Thousand Oaks, California: 2002.
38. Bell RA, Kravitz RL. Physician counseling for hypertension: what do doctors really do? *Patient Educ Couns*. 2008; 72:115–121. [PubMed: 18328663]
39. Düsing R. Overcoming barriers to effective blood pressure control in patients with hypertension. *Curr Med Res Opin*. 2006; 22:1545–1553. [PubMed: 16870079]
40. Wilson RP, Freeman A, Kazda MJ, et al. Lay beliefs about high blood pressure in a low-to-middle-income urban African-American community: an opportunity for improving hypertension control. *Am J Med*. 2002; 112:26–30. [PubMed: 11812403]
41. Horowitz CR, Tuzzio L, Rojas M, Monteith SA, Sisk JE. How do urban African-Americans and Latinos view the influence of diet on hypertension? *J Health Care Poor Underserved*. Nov.2004 15:631–644. [PubMed: 15531820]
42. Booth AO, Nowson CA. Patient recall of receiving lifestyle advice for overweight and hypertension from their General Practitioner. *BMC Fam Pract*. 2010; 11:8. [PubMed: 20113530]
43. Heaton PC, Frede SM. Patients' need for more counseling on diet, exercise, and smoking cessation: results from the National Ambulatory Medical Care Survey. *J Am Pharm Assoc*. 2006; 46:364–369.
44. Mellen PB, Palla SL, Goff DC Jr, Bonds DE. Prevalence of nutrition and exercise counseling for patients with hypertension. United States, 1999–2000. *J Gen Intern Med*. 2004; 19:917–924. [PubMed: 15333055]
45. Vladerrama AL, Tong X, Ayala C, Keenan NL. Prevalence of self-reported hypertension, advice received from health care professionals and actions taken to reduce blood pressure among US adults—HealthStyles, 2008. *J Clin Hypertens*. 2010; 12:784–792.
46. Bennet SJ, Lane KA, Welch J, Perkins SM, Brater DC, Murray MD. Medication and dietary compliance beliefs in heart failure. *West J Nurs Res*. 2005; 27:977–993. [PubMed: 16275694]
47. Koikkalainen M, Lappalainen R, Mykkanen H. Why cardiac patients do not follow the nutritionist's advice: barriers in nutritional advice perceived in rehabilitation. *Disabil Rehabil*. 1991; 18:619–623. [PubMed: 9007419]
48. Shepherd J, Harden A, Rees R, et al. Young people and healthy eating: a systematic review of research on barriers and facilitators. *Health Educ Res*. 2006; 21:239–257. [PubMed: 16251223]
49. van der Wal MH, Jaarsma T, Moser DK, van Gilst WH, van Velhuisen DJ. Unraveling the mechanisms for heart failure patients' beliefs about compliance. *Heart Lung*. 2007; 36:253–261. [PubMed: 17628194]
50. Kruger J, Carlson SA, Kohl HW 3rd. Fitness facilities for adults: differences in perceived access and usage. *Am J Prev Med*. 2007; 32:500–505. [PubMed: 17533065]
51. Rimmer JH, Hsieh K, Graham BC. Barrier removal in increasing physical activity levels in obese African-American women with disabilities. *J Womens Health*. 2010; 19:1869–1876.
52. Heesch KC, Masse LC. Lack of time for physical activity: perception or reality for African-American and Hispanic women. *Women Health*. 2004; 39:45–62. [PubMed: 15256355]
53. Lovell GP, El Ansari W, Parker JK. Perceived exercise benefits and barriers of non-exercising female university students in the United Kingdom. In *J Environ Res Public Health*. 2010; 7:784–798.
54. Welch N, McNaughton SA, Hunter W, Hume C, Crawford D. Is the perception of time pressure a barrier to healthy eating and physical activity among women. *Public Health Nutr*. 2009; 12:888–895. [PubMed: 18647424]
55. Baggett TP, Rigotti NA. Cigarette smoking and advice to quit in a national sample of homeless adults. *Am J Prev Med*. 2010; 39:164–172. [PubMed: 20621264]
56. Connor SE, Cook RL, Herbert MI, Neal SM, Williams JT. Smoking cessation in a homeless population: there is a will, but is there a way? *J Gen Intern Med*. 2002; 17:369–372. [PubMed: 12047734]

57. Okuyemi KS, Caldwell AR, Thomas JL, et al. Homelessness and smoking cessation: insights from focus groups. *Nicotine Tob Res.* 2006; 8:287–96. [PubMed: 16766421]

Table 1

Knowledge and perceptions of hypertension (N=14)

Prominent Themes	N	Representative Quotes
<i>What does the word 'hypertension' mean to you?</i>		
Increased blood pressure	6	“High blood pressure” “Hypertension mean to me not being able to control your blood pressure, yeah”
Physical symptoms (headaches, blurred vision)	6	“I have headaches and I see little shiny things, shiny dots, sometimes be disoriented, you know.” “Dots, sweating, sometimes I feel like I want to pass out, head be hurting.”
Excitability/hyperactivity	2	“Means hyper” “Um, going up of the pressure, as to over excitability.”
Emotion	2	“Like, um, me getting upset” “Getting upset, I do that all the time”
<i>What can happen as a result of uncontrolled blood pressure?</i>		
Long-term health complications (heart attack, stroke)	6	“Long-term, stroke, heart attack, an as that's about it.” “Um, heart attack, stroke” “I mean, if you're not controlling your blood pressure and you have a heart attack or stroke, that could leave some serious problems”
Acute physical symptoms	6	“Um headaches, um dizziness, shortness of breath, some, um, jittery handshakes, blurred vision. I'm thinking about me, how I get when I know my pressure's up.” “Really bad headaches” “I get really bad headaches bad headaches and my vision gets blurry”
Emotional Strain (fear, worry, stress)	3	“I have a lot to worry about because it really bothers me” “It's, you know, quite scary to think of it as one of the top reasons to cause death.” “Blood pressure still goes up when somebody put pressure on me, and when I'm under too much pressure, I can tell my pressure goes up.”
<i>What types of things do you feel impact blood pressure?</i>		
Lifestyle (smoking, diet, exercise)	11	“Smoking makes my pressure go up, I know that.” “Food is prepared in the shelter” “Salt, greasy food, grease, my diet.” “Not getting enough exercise. I could do a lot more walking than I do.” “Sleep, drinking, druggin, smoking cigarettes, too much exercise, the wrong foods, eating, wrong exercises.”
Stress	5	“For me, it would be stress.” “Stress, frustration, when I get hyped.”
Emotions (anger, worry, frustration)	4	“When I get upset, somebody makes me mad. I tell them to back off. I get so upset. That will run my blood pressure up, if I have to get rough with somebody, when I don't want to do.” “I get worried a lot, thinking a lot, I worry about things so bad.”
<i>Do you know what your blood pressure goals are?</i>		
Lifestyle modifications (smoking cessation, dietary changes)	8	“Um, try not to eat as much salt, um, sometimes my husband makes me take walks” “My goal is to stop smoking first.” “Change my diet and stuff.”
Medication adherence	6	“Continue to take care of my medicine”
“Control” blood pressure (nonspecific)	5	“To continue with the medicine that I'm on.” “Keep it under control”

Prominent Themes	N	Representative Quotes
		"My goal is to get it under control." "Don't want it too high or too low, yeah, keep it in range."
Aware of blood pressure goals	2	"Yeah, my blood pressure goal has been accomplished, 120/80, which is the ideal."

Table 2

Knowledge and perceptions of therapeutic lifestyle changes. (N=14)

Prominent Themes	N	Representative Quotes
<i>What does it mean when the health care provider says you need to change how you eat, exercise or drink?</i>		
Lifestyle changes	8	“Get up and take a walk” “I know that I have to change my diet. Fried food fanatic.” “For me, it's like, dang, I gotta stop eating bacon. I don't put salt in the food...I love bacon, so I'm stuck on that.”
Restrictions	5	“Good things I really like are things I'm told to give up.” “You know, I can't eat what I want to eat.”
Accountability	3	“I mean, she's not telling it to you for her health. Hopefully you care enough about your body to do it.” “I'm not taking care of myself like I should. I'm not doing proper things to keep my pressure at its right level.”
Need to make changes to improve health	3	“It let me know I have to make changes” “It means she's telling me to take better care of myself because she sees something might happen to me”
Higher risk of complications	2	“What that means to me is if you don't follow your medical doctor advice, you can go into stroke mode.” “Minimize complications.”
<i>What does the word 'diet' mean to you?</i>		
Lifestyle change	5	“It's you have to change your eating habits for the rest of your life.”
Restriction	3	“Say I can't eat this now.” “Also, means not eating the good things you really want to eat.
Dislike	3	“Diet is, um, I don't like the word diet.” Um, first of all, I don't like that word. Makes me feel too sick or I am too old.”
Eating nutritious foods	2	“Diet, well for one thing, you know, eating your proper foods.” “Just eat nutritional things.”
Weight loss/control	2	“Means controlling my weight. When you say the word 'dieting', means controlling my weight.”
<i>What type of diet is recommended for patients with high blood pressure?</i>		
Fruits and vegetables	9	“Eating plenty of vegetables, not too much salt/sodium.” “Try eating, maybe, more salads, fruits, and stuff like that.”
Salt restriction	8	“Low salt diet, salads, broiled foods, and stuff like that.” “Stay away from salt and salty food, eat other spice, use herbs and spice for taste, find other ways to give food flavor and color.”
Foods that are not greasy/fried	6	“Take grease off your stuff.”
Baked foods	5	“They tell you no greasy foods, do a lot of baked foods, do a lot of fruits and salads.” “Baked, baked foods, um, not greasy food, salads, vegetables.”
No pork/bacon	4	“Anything from pig is bad for your pressure.” “I don't eat pork, neck bones, spareribs, stuff like that.”
Moderation	2	“One strip of bacon, not five or six.”

Prominent Themes	N	Representative Quotes
		"Eat [pork] in moderation, not every day, three times a day."
<i>What does the word 'exercise' mean to you?</i>		
Walking	5	"Everything I do, everywhere I go, I'm walking." "Cause I do a lot of walking, walk four miles to get the bus. "You have to get up and walk."
Challenging	4	"Work" "I know I need to do it, but it's impossible."
Physical	2	"Doing things physical." "Building yourself up, toning yourself up."
Active	2	"Getting yourself in shape, um, being active, um, moving around, um keeping yourself fit." "...Get active, keep your heart beating sweat a little bit."
Important	2	"I say it all the time, I should exercise."
Emotion	2	"Worry. Not gonna happen because of the asthma." "Same time, I feel guilty, but I'm not right if I don't do it."
<i>What are the recommended weekly exercise goals?</i>		
Walking is recommended	5	"Um, like I said, I do a lot of walking." "Trying to walk more."
Recommendations were not provided	3	"Nobody said anything about it to me." "No, she didn't tell me nothing about exercise."
Complicated due to physical limitations	3	"Can't run due to hardware embedded in knees and ankles."
Vague recommendations (no indication of frequency, intensity, or duration)	3	"Mine is to walk as much as possible." "Walking until I know it's enough." "Recommend to go and get active."
Access	2	"Limited due to facility." "We have a treadmill right there in the facility."
<i>How does smoking affect blood pressure?</i>		
Causes physical symptoms (headaches, light headedness, blurry vision)	9	"It makes me dizzy, makes my blood pressure go up, cause headaches." "When I have that first one in the morning, I really notice it." "Headaches, dizziness, it'll make your pressure just jump sky high at that moment. You feel it goes straight to your head and starts banging."
Increases blood pressure	5	"Elevates my pressure." "My nurse told me that, um, used to see up, when you smoke cigarettes it can send pressure up a bit." "I know it elevates your blood pressure after smoking, 'cause they wait to measure my pressure if I've had a cigarette."
Bad for health, in general	3	"Um, I never been told. Know it is not good for a number of reasons. Never been told one of the reasons was blood pressure. Don't know how it affects blood pressure."
<i>How does caffeine affect blood pressure?</i>		
Increases blood pressure	4	"High blood pressure, caffeine accelerates it."
Increases energy	4	"Gives me a hyperactive boost when I drink coffee, sort alike, gets you going."

Prominent Themes	N	Representative Quotes
Unsure or unaware of its effects	4	"I don't know if caffeine can do anything to me." "I don't know that it does." "I don't drink sodas, drink coffee in meetings or something. I haven't heard anything about coffee and blood pressure."
<i>What is the recommendation for daily caffeine intake?</i>		
Decaffeinated coffee	2	"Recommendation that I got says decaf coffee, that's probably why I drink so much of it."
Avoid	1	"Um, I think the recommendation is to avoid it as much as you can."
<i>How does alcohol affect blood pressure?</i>		
Increases blood pressure	6	"Raises blood pressure." "Alcohol is very dangerous to high blood pressure." "I think alcohol plays a major part in high blood pressure for me."
Increases physical symptoms	3	"Neck hurts, automatically get a steady, constant throbbing, pounding during and after drinking."
Home remedy for hypertension	2	"Gin plus raisins can lower blood pressure."
Decreases blood pressure	2	"Scotch lowers it." "When I went to drink, it would alleviate it."
<i>What is the recommendation for daily alcohol intake?</i>		
Alcohol is not recommended, in general	4	"Don't do it, taking and giving the recommendation." "Don't do it. I've been clean and sober for four years."
No recommendations provided	2	"No doctor has talked to me about blood pressure and alcohol."
Moderation	1	"I've heard not to drink it. Drinking a little wine, nothing wrong with it, don't get all drunk up with shots."
<i>How does stress affect blood pressure?</i>		
Increases blood pressure	9	"Makes it go up." "Affects me by getting it up high."
Causes physical symptoms	8	"It gives me headaches, make feel like I'm ready to pass out." "I get headaches." "I get headaches when I get stressed or annoyed."

Table 3

Barriers to therapeutic lifestyle changes (N=14)

Prominent Themes	N	Representative Quotes
<i>What challenges exist for you to modify your diet?</i>		
Taste	6	“My challenge is taste and preparation. Taste, because I like greasy foods, fast foods.” “I see different foods that are low in sodium and all that, my only thing is when I eat it, it's not going to have the taste that I'm used to.” “I wouldn't mind eating healthy, like really, if it tasted good.”
Feeling deprived or restricted	6	“Stuff I like, I'm not allowed to eat.” “I don't really like vegetables, so the challenge is to back away from the fried foods and try to eat a little healthier.” “The only problem I have is to stay away from the sweets.”
Access and cost	4	“Well, where I am now, we do get tossed salad for lunch and dinner, lots of baked foods, there's lots of foods on your plate, breads, lots to eat.” “If I always had it around.”
Shelter constraints	4	“I'm in shelter, so a lot of things they give I can't eat 'cause my pressure's not regulated.” “In shelter, we use canned vegetables, not frozen.”
<i>What challenges exist for you to exercise?</i>		
Scheduling time	4	“Finding time during the day with the shelter schedule.” “When you have to work, it's kinda hard to find time.”
Accountability	3	“Just getting started. I don't like to put nothing off, if I says 'I'm going to do it, I'm going to do it.'”
Cost	3	“Biggest challenge to me is not working. I can't pay to go to the gym or something. “If I had the money, I would. Like, registering the gym, you know, where you can exercise more with someone helping you.”
Motivation	3	“Right now, I have the time, but me having the motivation to do it, that's it right now.”
Competing priorities	1	“I don't know, exercise is, like, far from my mind.”
<i>What challenges exist for you to quit smoking, if you smoke?</i>		
Routine/Habit	4	“Start breaking the routine. In the morning, after I eat that's usually when I smoke. Follows up throughout the rest of the day.”
Peers	4	“See somebody else with it, I want it, even if I've stopped. I smoke anyway, but it's more when I see them smoking.” “I be smoking 'cause everyone else is, stand around, smoking, socialize, and hear some gossip. That's for real.”
Enjoyment	3	“I like buying them, I like smoking 'em.” “Nothing, I'm not in a relationship, my kids are grown, and I'm alone. The cigarettes are like company.” “I don't believe in quitting smoking.”
<i>What challenges exist for you to lower the amount of caffeine in your diet?</i>		
Taste	3	“Don't drink water or decaf coffee 'cause I don't like the taste of diet vs. caffeine free.” “It's going to be missing that factor in the drink.”
Misunderstanding between diet and caffeine free soda	3	“Will be challenge, I hate diet sodas.”

Prominent Themes	N	Representative Quotes
Availability	2	“But will drink what's available.” “If coffee is there, I'm gonna drink it.”
Moderation	1	“Rather have the good sodas once a week vs fake soda daily.”
<i>What challenges exist for you to reduce stress in your life?</i>		
Family/relationships	7	“My family, my daughter not accepting me `cause I haven't been mere for her.” “No able to see my kids like I wants to.” “I would say other people, family situations once a week, the phone calls don't stop.”
Job and housing instability	3	“Finding somewhere to stay and a job.” “Challenges at the facility where I am. It's like 40 women in one place.”