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Improving Adherence to Antihypertensive Medications Among Somali Patients in a Primary Care Clinic

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Abstract

Purpose: To evaluate if the use of an evidenced-based educational program delivered to adult Somali hypertensive participants at a community-based clinic in Minneapolis can improve their adherence to antihypertensive medications and blood pressure control.

Methods: A convenient sample of 10 participants who met the inclusion criterion consented to take part of the educational program.

The Hill-Bone Compliance to High Blood Pressure Therapy Scale was utilized to measure outcomes of the program. In addition to

that, each participant's blood pressure was checked at pre and post intervention. *Results:* The statistical test of paired t-test was used to

analyze data. The pre intervention scores had a mean of 21.80 (SD= 1.55) and the post intervention scores had a mean of 18.30

(SD=1.32). The correlation between pre and post scores was 0.44 (P= 0.21). The mean differences between pre and posttest scores

were 3.50 (SD= 4.86). The resulting t-value with 9 degrees of freedom is 2.28, $p= 0.05$. There was no statistical difference found

between pre and post intervention scores and BP measurements. *Conclusion:* Hypertension is known to be a silent killer and poor

adherence to blood pressure medications and treatment therapy is a major risk for cardiovascular diseases and stroke. Even though the

outcome of the educational program did not see a significant change in such a short time, there is a possible lasting effect of the

education in the long run. A culturally appropriate educational program that is employed using oral communication, storing telling or

visual images has the potential to make a profound change both in the individual and within the community.

Keywords: Hypertension, non-adherence, medication, antihypertensive

Introduction and Background

Approximately 68 million American adults aged 18 years or older have hypertension (HTN), which corresponds with 31 % of the total population (Yoon, Gillespie, George, & Wall, 2012). Hypertension is the most common risk factor for cardiovascular disease (CVD), surpassing diabetes mellitus, obesity, dyslipidemia, and smoking, and accounts for 49% of the risk of coronary heart disease, and 62% of stroke risk (American Heart Association, 2013 & Mackay, Mansah, Mendis, & Greenlund, 2004). Additionally, the risk for CVD doubles for every 10mmHg increase in diastolic blood pressure or for every 20mmHg increase in systolic blood pressure (Mackay et al., 2004). Despite the clinical efficacy of antihypertensive medications to control blood pressure (BP), adherence to medication treatment is poor and remains complex in the primary care settings.

Approximately half of all hypertensive patients in the nation are non-adherent to their treatment regimen (Rash, Lavoie, Feldman, & Campbell, 2014). Recognizing barriers to medication adherence is a critical factor and remains a key challenge for clinicians everywhere. According to Rash et al., (2014), barriers to antihypertensive medication adherence consists of many factors that are related to patients, providers, therapy and the health care system. Examples of patient related factors include beliefs about medication, motivation and mental health. Lack of patient-provider communication and failure to appropriately escalate treatment are examples of provider related factors. Hypertension as being an asymptomatic disease, side effects and the complexity of regimens are examples of therapy related factors. Medication cost, health literacy and uncoordinated delivery of services are all examples of system related barriers to antihypertensive medication.

Minnesota is home to the largest population of Somali immigrants in North America (MN Measurement, 2014). A community-based clinic in Minnesota is challenged with improving adherence to antihypertensive medications to a majority of the patients they manage. Most of the patients who seek primary care services at the clinic are Somali immigrants. A small study of Somali psychiatric patients in the United States found a high prevalence of diabetes and hypertension compared with non-Somali patients (Kinzie et al., 2008). Somalis, like most immigrants face many barriers utilizing the health care system. These barriers include language and communication, cultural beliefs and access to health care. In addition to barriers, this population is most likely to experience poor health literacy. Baur & the U.S. Department of Health and Human Services (2010) identified populations that are most likely to experience limited health literacy as the following: adults over the age of 65 years; racial and ethnic groups other than White; recent refugees and immigrants; people with less than a high school degree or GED; people with incomes at or below the poverty level; and non-native speakers of English.

Health literacy is known to play an important role in determining the health outcomes of individuals. Healthy People 2010 defined health literacy as “the degree to which individuals have the capacity to obtain, process and understand basic health information and services needed to make appropriate health decisions.” They have difficulty obtaining, understanding and implementing health information; therefore they have a higher risk of poorer health outcomes. Wångdahl, Lytsy, Mårtensson, & Westerling (2014) investigated health literacy among refugees in different subgroups in Sweden. Among the refugees were Somalis, who were found to have inadequate or limited functional health literacy and comprehensive health literacy. The researchers found that low education and/or being born in Somalia was one of the key factors associated with their increased risk of having inadequate health

literacy. According to a 2014 MN Community Measurement report, Somalis have the poorest health-care outcomes rates among all Minnesota minorities. For example, in vascular care, patients who indicated Somali as their preferred language had the lowest optimal care rate at 37 percent. This rate was significantly below the statewide average. Most data specific to the Somali population is difficult to elucidate because their biographic information is usually collected under ethnic minority, non-Hispanic Black or African American/Black.

Problem Statement

The risk of HTN related complications such as stroke, heart failure, and renal failure among hypertensive adult Somali patients is associated with the high rate of uncontrolled BP readings at a local primary care clinic in Minneapolis resulting from poor adherence to BP medications and lifestyle modifications. Personal health behaviors, cultural ramifications, beliefs and educational levels can be varied and thus can have an effect in adherence to antihypertensive medications and treatment. Nevertheless, improving adherence to BP medications is an important aspect of successful HTN self-management and prevention from complications. Implementation of evidenced-based practice that support educational interventions and self-monitoring of BP is intended to improve medication adherence.

Review of the Literature

A comprehensive search of the literature for interventions that improve adherence to BP control include the following databases: Cochrane and PubMed of the National Library of Medicine. The following Medical Subject Headings (MeSH) terms were used for both Cochrane and PubMed search: *adherence to antihypertensive medications* and *interventions to improve adherence* and

antihypertensive medications. Inclusion criteria included English-language peer-reviewed publications, randomized controlled trials (RCTs) of interventions to improve adherence to antihypertensive medications, and articles that were published from 2007 to 2014. A total of 30 articles were found from Cochrane database, and total of 13 articles from PubMed. After a detail review of the articles, a total of seven articles were chosen for review based on their fit with the project and quality of the review.

In the seven articles chosen for review, six are randomized controlled trials and one is a meta-analysis review. Of the six RCTs, two evaluated use of tailored behavioral/educational interventions targeting patient related factors and four evaluated uses of electronic systems to improve adherence and BP control, and one meta-analysis review evaluated the cost effectiveness of interventions.

Tailored Behavioral/Educational Interventions model

Bosworth et al. (2008) confirmed that nurse-administered interventions that are tailored to target HTN related behaviors/education improve adherence to medications and BP control. Using a randomized controlled trial involving 636 hypertensive patients from two outpatient primary clinics, the nurse-administered behavioral intervention group received a tailored behavioral intervention bi-monthly for two years via telephone and patient factors were targeted. The results showed that from baseline to six months, self-reported medication adherence increased by 9% in the behavioral group versus only 1% in the non-behavioral.

In another study, Bosworth and colleagues (2009) conducted a similar randomized trial using the same sample size to test whether patients receiving a combination of interventions that consisted of a tailored behavioral telephone intervention (bimonthly

nurse-administered targeting hypertension related behaviors), and home BP monitoring (three times weekly) would adhere and have better BP control than the patients in the usual care or those receiving only one intervention. Over a 24-month period, the researchers found that the combined intervention group had the most increase in the proportion of patients with BP control. Both studies signified consistent findings that the implementations of tailored behavioral interventions are effective in improving adherence and BP control. Furthermore, these interventions are feasible to implement in the primary care settings.

Using Electronic Systems to Improve Adherence and BP control

The use of electronic systems such as the medication reminder software helps improve medication adherence and BP control (Patel et al., 2013). By recruiting 50 high-risk urban adults with HTN from the internal medicine, renal/hypertension, and cardiology clinics of the George Washington University Medical faculties, Patel et al. (2013), evaluated if medication reminder software on a mobile phone can improve adherence and BP control. By reviewing pharmacy refill rates before, during, and after availability of the medication reminder software, the researchers found a significant difference between the activation and post-activation phases ($p = .001$).

In addition, other studies have shown that the use of other electronic monitoring devices such as the Medication Event Monitoring System (MEMS) may help improve medication adherence and BP control (Santschi, Rodondi, Bugnon, & Burnier, 2008; & Wetzels et al., 2007). This monitoring system is a pillbox that is equipped with a microchip in its lid and registers the date and time whenever the lid is open. In a five-month study period, Wetzels et al. carried out a randomized control study using a sample of 258

hypertensive participants. Patients in the intervention group were supplied with MEMS and the investigators found that 50.6% of the patients in the control group reached adequate BP compared to 53.7% in the intervention group.

Santschi, Rodondi, Bugnon, & Burnier (2008) conducted a study using the MEMS electronic monitoring device in collaboration with community pharmacists and general practitioners in a 12-month clustered randomized trial. The researchers found that at four-months, the systolic BP was significantly lower in the electronic monitoring group compared to the usual care group. In a more recent study, involving 398 participants over a six-month period, Christensen and colleagues (2010) found that patients using the electronic monitoring reported 91% compliance versus 85% in the control group. However, this difference diminished over time (88% versus 86%) and BP was not affected. The researchers concluded that this intervention was more suitable in newly diagnosed hypertensive patients and in those who have a tendency to forget taking their medications.

In a meta-analysis review, Chapman and colleagues (2010) evaluated adherence intervention studies in order to compare the cost effectiveness of different interventions that have shown to improve adherence with antihypertensive therapy and lipid-lowering medications. After screening twenty-three adherence-improving studies, the researchers found that self-monitoring, reminder and educational materials, and a pharmacist/nurse management program were found to be cost-effective and should be considered before other interventions. The researchers used an analytic framework and they were able to adjust for the different levels of adherence that are often seen in the real world. The researchers concluded that educating the patient is a key component of cost effective intervention although adherence tends to decrease over time.

As stated by Bosworth et al. (2009), improving adherences to HTN medications requires a holistic approach consisting of educational interventions, behavioral interventions and self-monitoring of BP. Within this realm, an intervention that has ultimate capacity for augmenting the adherence to BP medications respective to the Somali patients requires comprehensive and multifaceted approach. The essences of achieving these fundamental steps can be facilitated by a bilingually skilled person, which the DNP student possesses. The Somali patients prefer to be advised and supervised by someone whose language and cultural upbringings is quite similar to their own. Employing educational interventions, and self-management of HTN are effective and inexpensive methods to implement in the clinical setting (Chapman et al., 2010). An educational program offered in smaller class-bases, self-monitoring demonstrations in terms of monitoring BP, and teaching about the disease process including cultural foods high in sodium vs. low salt diet translated into their native language are all conducive for improving adherence of BP medication to Somali hypertensive patients.

Theoretical Framework

Orleans (2008) reports that being non-adherence to prescribed medical screening, prevention and disease management practices are considered to be the four leading behavioral risks factors. This is often seen in low-income and disadvantaged racial and ethnic populations, and in low resources communities. Chronic conditions such as HTN require both immediate behavior change and longer-term behavior maintenance. Therefore, the use of the Health Belief Model (HBM) (Becker, 1974) provided a foundation for this DNP project to help improve adherence to BP medications and overall self-management of HTN for adult Somali patients. The HBM was one of the first models that adapted theories from the behavioral sciences to predict health behaviors (McEwen & Will, 2011). The model was first developed in the 1950s by a group of social psychologists working for the U. S. Public Health Service in

order to improve the public's use of preventive services. The concepts from the HBM are perceived susceptibility, perceived usefulness, perceived benefits, perceived barriers, cues to action, and self-efficacy (Champion & Skinner, 2008).

Perceived susceptibility/seriousness. Perceived susceptibility refers to one's belief about the chances of experiencing a risk or getting a condition or disease (Champion & Skinner, 2008), whereas perceived seriousness refers to one's belief about how serious a condition and its consequences are (McEwing & Wills, 2011). The success or failure of any intervention geared to address the importance of adherence to BP medications depends to a great extent on how the adult Somalis perceive the threat of HTN to their lives and its consequences. The importance of health education on the consequences of poor adherence to BP medications, diet, weight and exercise cannot be overemphasized. Since collectivism is cherished among the Somalis, the hypertensive patients were educated on the dangers of HTN in their communities and the probable cause of that predicament in those communities.

Perceived threat and seriousness of HTN can be gauged by determining how hypertensive Somali adults feel about their disease. To develop an appropriate intervention, it's important to garner from the patients their cultural perspective on HTN and beliefs about medications. It is important that patients are educated about the serious health repercussions of poor adherence to BP medications such as heart attack, stroke, kidney failure and even death. Ethnic minority and African American groups have the highest risk factors for CVD compared to other races (Wong et al., 2002). Providing education should help raise awareness about the negative health impact of being non-adherent to antihypertensive medications and overall disease management. This will hopefully increase their adherence with medication regimens and have the potential of spurring behavioral change in the light of this perceived threat.

Perceived barriers. Perceived barriers refer to one's belief about the tangible and psychological costs of the advised action (Champion & Skinner, 2008). This means that an individual's participation in the health-promoting behavior is restricted due to psychosocial, physical, or financial factors. There are several barriers faced by adult Somalis in their desire to adhere to BP medication and HTN management. These include social determinants of health such as lack of health insurance, financial difficulties, lack of transportation, knowledge deficit, language barriers, illiteracy (inability to record BP logs), which all contribute to lack of managing HTN and adhering to medication regimen. Perceived barriers will hopefully be reduced through education, utilization of resources, and by providing reassurance. In addition, providing live educational sessions demonstrating how to check BP and how to record readings in a BP log and interpret results may overcome some of their perceived barriers.

Perceived benefits. Perceived benefits refer to one's belief in efficacy of the advice action to reduce risk or seriousness of impact (Champion & Skinner, 2008). This means that an individual's belief that engaging in health promoting behavior will minimize the risk of susceptibility and severity. In order to keep HTN under control and prevent complications such as end organ damage, patients must adhere to lifestyle modifications including a low salt diet, healthy eating habits, weight loss program, increase physical activity, smoking cessation as well as adhere to medication regimen. It is necessary to explore the mental and physical benefits of engaging in these lifestyle modifications and educate the Somali adults on these attributes. Improving adherence to antihypertensive medications, along with increasing physical activity, increasing dietary efforts will help keep BP under control.

Cues to action. Cues to action refer to strategies to activate "readiness" (Champion & Skinner, 2008). Some factors are more likely to motivate adult Somali patients to embark on improving their adherence to BP medications than others. These factors could

come in the form of positive or negative reinforcements in the form of symptoms or health measurements. An example of a negative reinforcement in this case is a patient experiencing headache and chest pain from severely elevated BP. Positive reinforcements could include just learning that being adherence to BP medications can significantly prevent adverse cardiovascular events.

Self-efficacy. Self-efficacy refers to confidence in one's ability to take action (Champion & Skinner, 2008). With an adequate amount of education coming from primary care providers and health educators, along with positive feedback and consistent follow-ups, the hypertensive adult Somali patients should be able to develop confidence in their ability to manage their disease and increase adherence to antihypertensive medications by self-monitoring of BP readings. Taking their prescribed medications daily should become a routine part of their lives as they learn and internalize the importance of adhering to medication regimen. Somalis, like many groups, thrive on collectivism to a great extent. The adult Somali patients may share the knowledge they learned with the rest of the people in the community on BP medications and disease management. A diagram of the HBM is demonstrated under appendix A.

Setting and resources

The setting is a primary community clinic located in urban Minneapolis, which serves the majority of the Somali residents living in the area. Many patients with chronic health conditions such as diabetes type II, hypertension, obesity, and hyperlipidemia seek primary care at this clinic. The increasing numbers of patients that are non-adherent to treatment and medications, especially in the older population often challenges the healthcare providers. Even though providers are well aware of the social factors that can influence non-adherence to medications, yet, there is this cultural belief that has been observed among the older Somali population that might influence their decisions on medication use. Some of the older hypertensive patients do not view their disease as a chronic

condition that requires chronic use of antihypertensive medications and management plan. For instance, one of the providers at the clinic site shared an example of a statement that is commonly observed, “I did not take the blood pressure medication for few days now because I felt ‘fine’ [free from symptoms].” There is this strong interest in taking medication only when feeling “ill or symptomatic” then to take medication daily to manage a disease. These same statements concerning the providers were also reputable in a study by Pavlish, Noor & Brandt (2010). The researchers carried out a community-based social action study to explore the health experiences of Somalia-born women who relocated to Minnesota. The study participants included 57 women that were divided into six focus groups. One of the findings that the researchers point out was that the Somali women in most of the focus groups expressed concern for treating symptoms rather than an illness explanation that required daily medication use. Many of the women in the focus groups believed that when symptoms disperse, then treatment should stop. These researchers as well as the providers at the clinic point out that screening, health prevention and managing diseases are unfamiliar to some Somali patients, especially the older populations, who are accustomed to only seeking healthcare when feeling ill or symptomatic. In such cases, providers must first educate patients about what it means to have chronic illness such as HTN versus symptoms or other acute illnesses.

Sample

Participants were recruited by posting flyers in the lobby and in the exam rooms of the clinic. In addition to the flyers, the healthcare providers at the site had created a folder that identified potential candidates for the educational program. The interpreters at the site were also given flyers to distribute to patients in an effort to recruit more participants. Each participant that expressed an interest to take part in the educational program was identified. There were a total of 21 participants that agreed to take part of the

educational program. Out of the 21 participants, only 12 met the inclusion criteria. The goal for the project was to recruit 10 to 20 participants. The inclusion criteria's included (1) background/ethnicity must be Somali, (2) diagnosis of HTN, (3) must be on at least one antihypertensive medication, (4) age of 50 and older, and (5) participants must be able to consent. The exclusion criteria included those under age of 50 and those not taking medications for HTN. Participants who were age 50 and older were chosen for the educational program because they were considered to have a greater challenge in language, education, and cultural and social barriers than the younger adults. In addition, the older immigrant populations are at an increased risk for poorer health. Two qualified participants were unable to participate in the educational program due to leaving the state.

Project Design and Methods

The project provided three sessions of an educational program to a group of hypertensive patients. Since all the patients spoke little English but were fluent in their native language, the DNP student provided the educational program speaking Somali. It is well known that low English proficiency is a barrier to healthcare utilization among immigrants (Ding & Hargraves, 2009). By providing an educational program in Somali this project strove to enhance understanding and knowledge of the disease within their own cultural framework, with the goal to improve adherence to BP medications and improve BP control.

The educational program was carried out using a PowerPoint presentation that included visual content and videos in Somali (Appendix E). Emphasis was placed on teaching patients about the basic knowledge of HTN, its complications, side effects of medications, and benefits of adhering to BP medications. Patients were educated on the Dietary Approach to Stop Hypertension

(DASH) diet, and the importance of adhering to a low salt-diet in order to keep BP under controlled. Following the lecture session, a hands-on teaching/demonstration on how to self-monitor BP was done in order to promote self-management of the disease.

Data Collection

A total of ten participants agreed to take part of the educational program. A written informed consent was obtained from participants (Appendix C). The Hill-Bone Compliance to High Blood Pressure Therapy Scale (Kim, Hill, Bone, & Levine, 2000) was utilized to assess patients behaviors on three important behavioral domains of high blood pressure treatment; (1) reduced sodium intake; (2) appointment keeping, and (3) medication taking. This scale consists of 14 items in three subscales (Appendix B). Each item is a four point Likert type scale. The instrument is considered to be an appropriate tool to use compared to other existing tools, especially in low literacy patients (Kim et al., 2000). The reliability and validity of the scale was tested in two large samples of African American hypertensive adults in urban settings. The scale was found to be clinically useful for diagnosing problems with non-adherence and to predict BP control status. The researchers found significant correlation between the scale total score and its subscale scores to BP control. The tool can be administered by interview in less than 10 minutes. In addition, quantitative measurement was conducted by measuring each patient's BP prior to the educational intervention. To determine if there was a change in BP readings as an outcome of the educational intervention, a posttest was conducted using the same tool and BP was measured post intervention.

Organizational analysis of project site. The clinic has five total providers consisting of one Physician, one Physician Assistant and three Family Nurse Practitioners. Other staff members include management staff, a total of six medical assistants, and at least four to five interpreters available at the site during hours of operation. The providers collaborate with a community pharmacy

that is adjacent to the clinic. Two of the providers at the clinic speak Somali. All the other providers utilize interpreters to bridge the communication barrier. Prior to the implementation of the project, all providers and staff members working at the site were informed and given a brief introduction about the program interventions. One of the family nurse practitioners at the site agreed to identify potential participants for this educational intervention.

Goals, Objectives, and Expected Outcomes

The goal of the educational program was to increase adherence to antihypertensive medications and reach BP target in adult Somali hypertensive patients who participated at a community-based clinic. Table 1 below lists all of the objectives and the outcome measures of the program intervention.

Table 1. Objectives & Expected Outcome Measures of Somali Hypertension Education Project

Objective	Expected outcome measure
1. Increase the basic understanding of HTN, and complications of uncontrolled BP.	By the end of the educational session, 60% of patients will identify at least 3 major complications of uncontrolled BP.
2. Help foster a sense of self-confidence with capacity to self-monitor BP readings.	By the end of the educational/demonstration sessions, 60% of patients will demonstrate how to measure BP readings using manual BP cuff, and patients will demonstrate how to record BP readings in a BP log sheet (date/time).
3. Improve adherences to BP medication regimen to help keep BP under control	A minimum of 50% of all patients will report increased adherence to BP medication using a self-adherence

	questionnaire that will be conducted post program intervention. A minimum of 50% of all patients will reach target BP control by the end of the program intervention
4. Improve adherence to low salt diet to help keep BP under control	A minimum of 50% of all patients will report decreased intake of low salt diet using the Hill Bone Compliance Questionnaire tool at the end of the program intervention

Ethics and Human Subjects Protection

This project involved the implementation of a quality improvement project (QIP) that administered programmatic educational interventions to adult hypertensive patients in an effort to improve their adherence to antihypertensive medications. All interventions that were implemented consisted of educational in-class sessions, and a hands-on educational/demonstration session. Since the program involved human subjects, the program underwent a review by the Institutional Review Board (IRB). After submitting the IRB form to the University of Massachusetts-Amherst, this quality improvement project received IRB waiver (Appendix D).

Patients and clinicians had a right not to participate in the QIP. All patients were kept safe from harm and violations of their rights. The intervention was designed to pose no risks while maximizing potential benefits. Patients’ privacy and confidentiality was maintained throughout the translation project. No patients were identified using names. Informed consents were obtained prior to the implementation of the project. Patients were kept informed throughout the process and they were protected under the policies

surrounding the Health Insurance Portability and Accountability Act (HIPPA). Along with patients, all health care providers at the clinical site received basic information about the activities of the project while patients confidentially were protected.

Materials

The materials used for the educational program consisted of a PowerPoint presentation (Appendix E), BP cuffs, and visual items of common cultural foods. Both visual and actual food items were brought during the educational program to teach patients how to read food labels and to help them learn how to distinguish foods that were high in sodium vs. foods low in sodium vs. sodium-free foods. Some of the food items that were brought to the educational program included pastas, two different types of oatmeal (sodium-free vs. high sodium oatmeal), different kinds of lentils, two different types of tuna packages (one low in sodium and one high in sodium), chicken cubes, canned beans, and empty boxes of other common food items.

Educational Intervention

The contents that were included in the PowerPoint presentation were a total of 49 slides of information, visual pictures, and two audio videos in Somali. There were a total of three educational sessions held on three consecutive months. Each educational session lasted about 60 to 90 minutes long. The information contained in the educational intervention included the following:

- 1). The definition of HTN
- 2). A 12-minute video clip that summarizes the pathophysiology, causes, risk factors, treatment, medications and lifestyle modifications that help control high BP. This video is in Somali and the Somali Health & Social Development created it in 2013.
- 3). Classification of BP in adults

- 4). Recommended BP Goals from JNC-8
- 5). Statistics and facts of HTN by the American Heart Association (2013)
- 6). Modifiable and non-modifiable risk factors of HTN
- 7). Complications of uncontrolled BP
- 8). Benefits of BP medications
- 9). Importance of adhering to prescribed medications
- 10). A 5-minute Medication Safety Video in Somali created by EthnoMed organization
- 11). Importance of self monitoring of BP
- 12). Importance of lifestyle modifications to help keep BP under control
- 13). DASH diet
- 14). Importance of following salt/sodium reduction
- 15). Importance of exercise and weight-loss
- 16). Pictures containing nutritional facts of commonly cultured foods that are eaten on a day-to-day basis.
- 17). Pictures and lists of foods high in sodium vs. those low in sodium

Results, Data Analysis, and Interpretation

Demographic Characteristics

As illustrated on Table 2 below, there were a total of ten participants. For the age of participants, 10.0 percent (n=1) were aged 50-60 years old, 60.0 percent (n=6) were aged 61-70 years old, 10.0 percent (n=1) were 71-80 years old, and 20.0 percent (n=2) were age above 81 years old. The youngest participant was 59 years old and the oldest participant was 83 years old. The mean age of the 10 participants was 69.70 years (SD = 7.74). For the gender of participants, 60.0 percent (n=6) were female, and 40.0 percent (n=4) were male. The majority of the participants (70.0 percent; n=7) attended two educational sessions; two participants (20%, n=2) attended all three educational sessions, while only one participant (10.0 percent; n=1) attended only one educational session out of the three total sessions.

Table. 2. Demographics of subject participants

Assigned ID #	Age	Gender	Number of classes attended	Pre-evaluation Total Score	Post Evaluation Total Score
01	59	M	3	23	11
02	66	F	3	17	17
03	64	M	1	17	15
04	67	M	1	29	18
05	66	F	2	27	27
06	83	F	2	16	18
07	76	F	2	23	18

08	69	M	2	18	18
09	81	F	2	20	19
10	66	F	2	28	22

Data Analysis

Data for the outcome variables was gathered through scoring the pre- and post- tests to evaluate participants’ behaviors on three important behavioral domains of high blood pressure treatment; (1) reduced sodium intake; (2) appointment keeping, and (3) medication taking. The Hill-Bone Compliance to High Blood Pressure Therapy Scale consists of 14 items with a four-point response format: (4) all the time, (3) most of the time, (2) some of the time, and (1) never (Appendix B). Items are assumed to be additive, and, when summed, the total score ranges from 14 (minimum) to 56 (maximum). The higher scores reflect poorer adherence to antihypertensive drug therapy. The medication taking subscale contains 8 items assessing medication-taking behavior; the sodium subscale contains 3 items assessing dietary intake of salty foods; and the appointment keeping subscale contains 3 items assessing appointments for doctor visits and prescription refills. Table 3 below lists the participants’ pre and posttest scores. Analyses were conducted using IBM SPSS version 23.

Table 3. Participant’s Pre/Posttest Scores of each Subscale

Subjects ID	Subscale	Pre Score	Post Score
1. ID #1	Medication Compliance	11	9
	Sodium Use	3	4
	Appointment Keeping	9	5
2. ID #2	Medication Compliance	8	8

	Sodium Use	4	5
	Appointment Keeping	5	4
3. ID #3	Medication Compliance	10	8
	Sodium Use	3	3
	Appointment Keeping	4	4
4. ID #4	Medication Compliance	16	9
	Sodium Use	7	4
	Appointment Keeping	6	5
5. ID #5	Medication Compliance	14	15
	Sodium Use	9	5
	Appointment Keeping	4	6
6. ID #6	Medication Compliance	8	9
	Sodium Use	4	5
	Appointment Keeping	4	5
7. ID #7	Medication Compliance	13	11
	Sodium Use	5	3
	Appointment Keeping	5	4
8. ID #8	Medication Compliance	9	9
	Sodium Use	5	5
	Appointment Keeping	4	4
9. ID #9	Medication Compliance	11	10
	Sodium Use	4	5
	Appointment Keeping	5	4
10. ID #10	Medication Compliance	15	10
	Sodium Use	9	7
	Appointment Keeping	4	5

Statistical Analysis

Table 4 presents the descriptive statistics of the pre-and post-test scores for the three important behavioral domains of high blood pressure treatment. For the pre-test scores for medication use, the lowest score was 8.00, and the highest was 16.00, with an average of 11.5 (SD=2.87). For the post-test scores for medication use, the lowest score was 8.00, and the highest score was 15.00, with an average of 9.80 (SD=2.04). For the pre-test scores for sodium use, the lowest score was 3.00, and the highest score was 9.00, with an average of 5.30 (SD=2.26). For the post-test scores for sodium use, the lowest score was 3.00, and the highest score was 7.00, with an average score of 4.60 (SD=1.17). For the pre-test scores for appointment keeping, the lowest score was 4.00, and the highest score was 9.00, with an average score of 5.00 (SD=1.56). For the post-test scores for appointment keeping, the lowest score was 4.00, and the highest score was 6.00, with an average score of 4.60 (SD= .69).

Table 4.**Descriptive Statistics of Pre-test/Post-test Scores (N=10)**

	N	Minimum	Maximum	Mean	Std. Deviation
Pre Medication Compliance	10	8.00	16.00	11.5000	2.87711
Post Medication Compliance	10	8.00	15.00	9.8000	2.04396
Pre Sodium Use	10	3.00	9.00	5.3000	2.26323
Post Sodium Use	10	3.00	7.00	4.6000	1.17379
Pre Appointment Keeping	10	4.00	9.00	5.0000	1.56347
Post Appointment Keeping	10	4.00	6.00	4.6000	.69921

Paired Sample T-Test

The statistical test of paired t-test was done to determine whether there was a significant difference between pre intervention

scores and post-intervention scores. A level of significant of 0.05 was used in the analysis. Correlations between changes in test scores were explored. The pre intervention scores had a mean of 21.80 (SD= 1.55) and the post intervention scores had a mean of 18.30 (SD=1.32). The correlation between pre and post scores was 0.44 (P= 0.21). The mean differences between pre and posttest scores were 3.50 (SD= 4.86). The resulting t-value with 9 degrees of freedom is 2.28, p= 0.05. The 95% confidence interval is (.0239, 6.976). It appears plausible to conclude that there is no significant difference in the pretest and posttest scores. See the statistical findings in table 5 below.

Table 5. Statistical Analysis using Paired sample T-test

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pretest	21.8000	10	4.91709	1.55492
	Posttest	18.3000	10	4.16467	1.31698

Paired Samples Correlations				
		N	Correlation	Sig.
Pair 1	Pretest & Posttest	10	.437	.206

Paired Samples Test

	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
				Lower	Upper			
Pretest/Posttest	3.50000	4.85913	1.53659	.02399	6.97601	2.278	9	.049

The first objective of the educational program was to increase the basic understanding of HTN and its complications among participants. The outcome of this objective was evaluated by asking all participants to identify at least three major complications of uncontrolled BP. Post educational intervention; all participants (n=10) were able to identify at least three or more complications of uncontrolled BP. The top three complications identified by participants were heart attack, stroke and kidney failure. The second objective of the educational program was to help foster a sense of self-confidence with the ability to self-monitor BP. Increasing one's ability and confidence to self-monitor BP is very important in managing HTN. Participants were thought how to appropriately monitor for their BP at home (timing, position, cuff size). By the end of the educational program, all participants were able to demonstrate how to measure BP correctly using a manual BP cuff. In addition, all participants were able to record their BP reading in a log

The third objective of this educational program was to reach goal BP target in fifty percent of participants. Even though there was no statistically significant reduction in BP between pre and post intervention, however, fifty percent of participants (n=5) did have a reduction in BP in post interventions when it was compared to their pre intervention BP check (See Table 6 below). Following the JNC-8 recommendations, sixty percent (n=6) of participants were identified to reached their target BP goals. Two participants were

identified to have inadequate escalation of medication therapy. Seven of the ten participants had at least one to multiple comorbidities such as diabetes, hyperlipidemia, obesity, chronic kidney disease, coronary artery disease and arthritis. One participant was pre-diabetic and overweight. Two out of the ten participants had no comorbidities. During the pre BP checks, one of the participants was found to have severely elevated BP reading. This particular participant did have multiple comorbidities including diabetes, chronic kidney disease, obesity and hyperlipidemia. The provider was notified immediately to evaluate the patient's uncontrolled BP readings and to assess need for escalation of therapy following recommendations from JNC-8. The participants' medication(s) lists and their BP measurements in pre and post intervention are listed in Table 6 below.

Table 6. Participant's Current Medications Lists & Pre/Post BP Measurements

Subject ID #	Current Medications	Pre -class BP	Post BP	Reduction In BP
01	Hydrochloro-thiazide 12.5	131/73	129/72	N
02	Nifedipine XL 90mg, Doxazosin 8mg	157/77	151/84	N
03	Losartan 25mg	166/72	144/69	Y
04	Losartan/HCTZ 100/25mg, Norvasc 2.5mg	132/72	122/90	Y
05	Losartan 100mg	140/63	153/71	N
06	Losartan/HCTZ 100/25mg	153/86	158/92	N
07	Metoprolol 50mg Losartan/HCTZ 100/25	180/79	142/80	Y
08	Losartan/HCTZ 50/12.5	148/72	141/75	Y
09	Lisinopril 10mg	174/89	161/79	Y
10	Amlodipine 5mg	128/75	129/75	N

Qualitative Data

Engaged Participation & Dialogue

Participants were very engaged and they were encouraged to ask questions and to ask for more clarifications in areas they did not understand. Many participants were very vocal and they asked questions and made comments throughout the educational program. The questions and comments made by the participants were in Somali. The DNP student translated some of the comments and questions that were asked by the participants back to English. The following questions were asked:

“What should my BP be...for someone like my age...?”

“I have been told to take my pills [BP medications] at night time by people before [individuals in the community], should I not take my pills [BP medications] at night time?”

“I have high BP, diabetes and high cholesterol. I am being told to avoid sugar, avoid salt, avoid meats...don't eat this or don't eat that...then what can I eat then?”

“I have a really bad reflux and most of the fruits that I am being told to eat bothers me...what can I eat instead?”

“Can you bring actual food items for the next class and show us which ones are not good [culturally high sodium food items vs. low sodium food items]?”

Learning Experience

In addition to asking questions, participants provided positive verbal feedbacks and comments throughout the educational program. Below are some of the comments and feedbacks made by participants:

“Learning about this disease [hypertension] and learning which foods to avoid are important”

“I used to not take my medications for days at times, now I will try really hard not to do that...”

“It’s nice having a class like this where I can actually ask questions and not feel rushed, so thank you”

“We should have more classes like this in the future”

“It would be helpful to do a class for diabetes too especially for the ones that have both high blood pressure and diabetes”

“I never checked labels when I am doing grocery before, but now I make sure I check the labels”

Discussion

Improving adherence to BP medication(s) is an important aspect of successful HTN management. The goal for this research translation project was to increase participants' adherence to antihypertensive medications, diet and to reach their BP target by incrementing their understanding and knowledge of the disease process. Delivering the education in Somali without the utilization of interpreters provided an opportunity for the Somali participants to be actively involved in their learning experience. Using a third person to interpret can delay communication and can break the bond between the learner and the educator. Providing an educational intervention in which the participants can understand every word that comes out of the educators' mouth can have a profound effect on their learning. The participants in this educational program were very engaged in learning, told stories related to their disease management, and provided positive verbal feedbacks. As an outcome of the educational intervention, there was no significant change seen in pre and post intervention scores and BP measurements.

Explanation as to why there were no significant change in both pre and post BP readings are influenced by multiple factors. It is important to point out that the sample size of the participants was very small, which can make it hard to see a meaningful change in pre and posttest score statistically. In addition, BP measurements can be variable and can be challenging to see a significant change in such a short time. To get an actual picture of a patient's BP control, a one time measurement of BP taken at the doctor's office is not ideal as this can vary and can be influenced by factors such as emotions, diet, etc. (American Heart Association, 2014). Some of the

participants did see a decrease of points in systolic blood pressure and some saw an increase, while others observed no significant change in BP.

A myriad of factors for not adhering to medications exist; however, culture, diet and availability as to having an access to healthier food also play a vital role. Immigrants and refugee populations arrive to this nation with healthier cardiovascular risk profiles than the general population (Singh & Siahpush, 2001), but as time progresses, this advantage tends to decline. The emergence of cardiovascular risk after years of being residents dramatically increases, since their diets change and many among these individuals began to consume fast foods. This is seen by their increasing rates of obesity (Goel, McCarthy, Phillips, & Wee, 2004; Kaplan, Huguet, Newsom, & Mcfarland, 2004) hypertension (Steffen, Smith, Larson, & Butler, 2006), diabetes (Creatore et al., 2010), and cardiovascular diseases (Lear, Humphries, HageMoussa, Chockalingam, & Manicini, 2009; Lutsey et al., 2008). Therefore, Somalis in Minnesota have traveled through the known course, which most immigrants are a destined trajectory, and consequently, many suffer the plague of overweight and obesity (Dalmar et al., 2006).

One noteworthy factor to point out is the utilization of the Hill Bone Scale in this population. An expected interpretational glitch is the loss of transliteration of languages and the drawback can affect the participants' response. The feasibility of the assessment used does not apply to this population since the format of the way questions being phased were found to be culturally insensitive. For instance, one of the questionnaires in the reduced-sodium subscale of the Hill-Bone Compliance to High Blood Pressure Therapy scale asks, "how often do you shake salt, fonder or aromat on for your food before your eat it." The way this particular question is worded does not seem to be culturally sensitive, as it would not constitute any appreciable outcome. For

Somalis, use of flavors are included in the recipe while the food is in the preparation phase; thus, for members in this community, applying additives to their food is a seldom seen event, though the younger generations may practice otherwise.

Even though, the tool was relatively easy to use, using subjective measures are prone to recall bias and respondents might provide answers that confirm to their perceived expectations of their interviewer. An example of another question that has raised many eyebrows when questioned was, “How often do you take someone else’s HBP pills?” Every participant answered this question with “never.” The applicability of whether medications might be used interchangeably among the individuals might not hold much water because it might be quite uncommon for a Somali individual to use a medication prescribed for another person. However, using and sharing herbs and traditional medicines are very common among this community and it is viewed as normally harmless. It is very common to use herbs for medicinal purposes for chronic illnesses and this is passed from one person to another. If this question were adjusted by specifying whether he/she has used someone else’s herbs/traditional medication, then the answer to this question would be completely different.

Nonetheless, the Hill-Bone Scale is a standout amongst the most comprehensively utilized adherence scales. It has been validated in various settings and populations. It has been tested among African Americans (Kim, Hill, Bone, & Levine, 2000) and in the local languages of Turkey and South Africa (Karademir, Koseoglu, Vatansevor, & Van, 2009; & Lambert et al., 2006) and on the medication adherence subscale in Korean language for Korean Americans (Song et al., 2011). However, the psychometric properties of this scale have never been tested among Somalis and it was found to be difficult to administer it to this population without a validated translation, and the only hope foreseeable relies on a single area; translation improvement.

Limitations

There are some limitations that apply to this quality improvement project that are worth mentioning. First, the size of participants in this educational program is very small and inferences cannot be made about casual associations. The timing of the class and lack of access to transportation were found to be two key factors that contributed to the shortage of participants for this educational program. Second, adherence to medication and diet were based on self-assessment tool that is not culturally sensitive and has not been validated for use in this community, which hence, increases the potential for bias. The sample size and the data are only restricted to a small community size clinic located in the heart of Minneapolis most populated Somalis.

Implications for Practice

It is well known that health literacy is increasingly recognized as an important factor in patient's compliance, screening utilization, and chronic disease outcomes (Shaw, Huebner, Armin, Orzech, & Vivian 2009). But unfortunately, low health literacy rates are common in ethnic minorities, the elderly, individuals with lower educational levels, and in individuals with social barriers such as language and culture (Mårtensson & Hensing, 2012; Ingram, 2012). A study that evaluated barriers to physical activity among Somali men in Minnesota identified that men over the age of 45 have an increased risk of difficulty in obtaining, processing, and understanding basic health information (Mohamed, Hassan, Weis, Sia, & Wieland, 2014). Hence, it is vitally important to educate and increase patient's knowledge of HTN in an effort to improve their compliance to medical therapy and improve their outcome.

The oral traditions Somalis have been practicing over many centuries is what needs to be thoroughly appreciated, for there is a profound interest in oral communication above all other forms of communication (Centers for Disease Control & Prevention, 2008). If

intended to acquire much productive results with educational programs, then it would be very useful to implement within their familiarity such as anecdotes, storytelling, chants and epics. Sufficient proof is that most participants of this research translation project highly preferred and requested more educational sessions through oral communication, rather than in written because it is widely practiced and an accepted norm that information travels fast when it is shared or spread orally. Ideally speaking, the improvements needed for future evaluation of educational programs will be prolific with inclusion of larger participants, and with longer time between pre and posttest measurements. Equally important, healthcare providers and health agents need to focus on educating the community at large while concurrently employing oral tradition practices, in lieu of individual selection. In so doing, the totality of above suggestions with awareness of the disease prevention and management will likely bring into greater results.

Conclusion

Hypertension is known to be a silent killer and poor adherence to BP medication is a major risk factor for stroke and heart attack. Treatment of HTN with medication can decrease the risk of stroke by 31 to 45 percent, and myocardial infarction by 8 to 23 percent (Neal et al., 2000). Hence, it is important for patients to adhere to antihypertensive medications. HTN requires both immediate behavioral change and long-term behavior maintenance in an effort to manage the disease and prevent end organ damages. The Health Belief Model provided a foundation for this educational program because the concepts surrounding this model have the potential to steer positive behavioral changes in regards to participant's adherence to medication and BP control. The educational program emphasized the consequences of poor adherence to BP medications, diet, weight and exercise. Considerations were taken to account

for the cultural backgrounds, belief systems, and the traditional diets of the Somali populations as it can have an influence on their decision-making regarding medications use and disease management.

Nevertheless, even though there was no big change seen in this educational intervention in such a short time, there is a possible lasting effect of the education in the long run. Recognize that Somalis are storytellers (Bentley & Owens, 20080). They embrace oral traditions, not written. A culturally appropriate educational program that is employed using oral communication, storing telling or visual images has the potential to make a profound change both in the individual and within the community.

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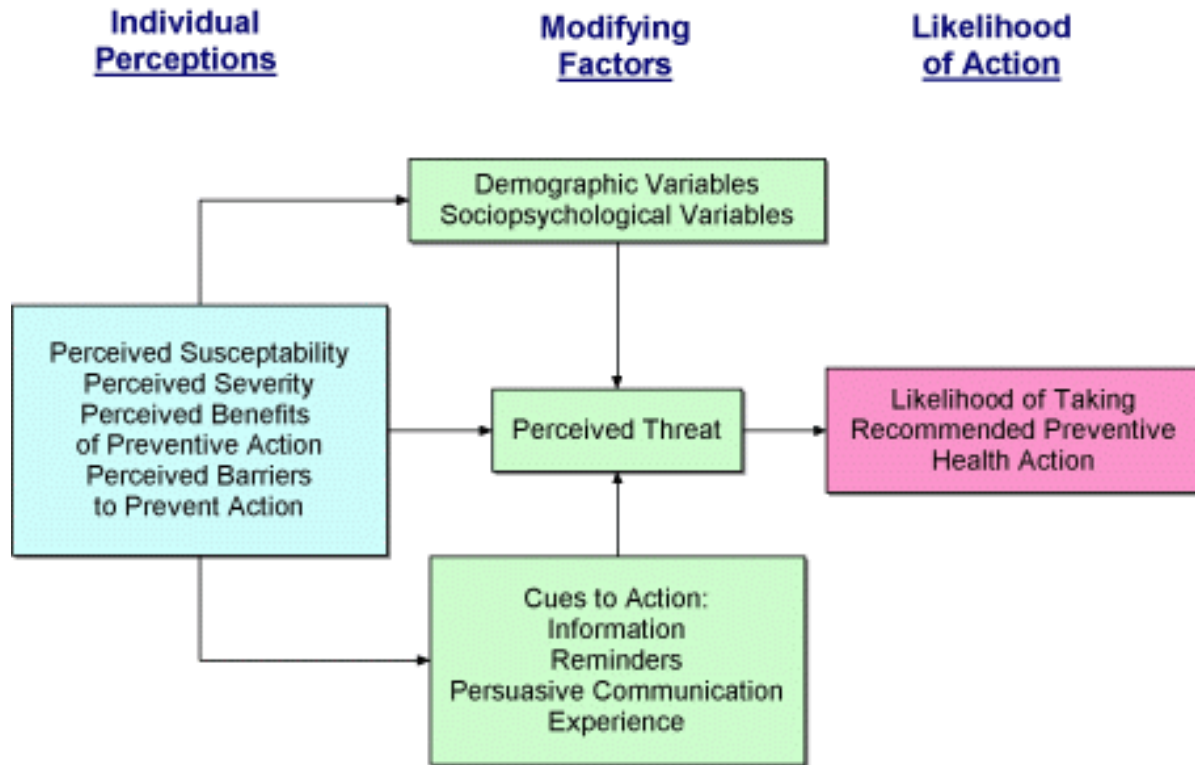
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Appendix A

Sample Diagram of the HBM



From Simons-Morton, et. al., (1995). *Introduction to Health Education and Health Promotion*, 2nd ed. Waveland Press

Appendix B

HILL-BONE COMPLIANCE SCALE HILL-BONE HIGH BLOOD PRESSURE COMPLIANCE SCALE

	(4) All the time	(3) Most of the time	(2) Some of the time	(1) Never
1. How often do you forget to take your HBP medicine?				
2. How often do you decide not to take your HBP medicine?				
3. How often do you eat salty food?				
4. How often do you shake salt, fondor, or aromat on your food before you eat it?				
5. How often do you eat fast food? (KFC, McDonalds, fat cook, fish and chips)				
6. How often do you get the next appointment before you leave the clinic?				
7. How often do you miss scheduled appointments?				
8. How often do you leave the dispensary without obtaining your				

prescribed pills? (due to long line, closure of the clinic, forgot)				
9. How often do you run out of HBP pills?				
10. How often do you skip your HBP medicine 1–3 days before you go to the clinic?				
11. How often do you miss taking your HBP pills when you feel better?				
12. How often do you miss taking your HBP pills when you feel sick?				
13. How often do you take someone else’s HBP pills?				
14. How often do you miss taking your HBP pills when you care less?				

Appendix C

Consent Form for Participation in Quality Improvement Project/Educational Program

University of Massachusetts Amherst

Educator/Investigator: Nimo Abdi, RN, BSN, FNP (c), DNP (c).

Capstone Project Title: Quality Improvement Project: Improving Adherence to Antihypertensive Medications Among Somali Patients in a Primary Care Clinic

1. WHAT IS THIS FORM?

This consent form will give you information you will need to understand why this quality improvement project/educational program is being done and why you are being invited to participate. It will describe what you will need to do to participate. I encourage you to take some time to read this form and ask any questions you may have. If you decide to participate, you will be asked to sign this form and you will be given a copy for your records.

2. WHO IS ELIGIBLE TO PARTICIPATE?

You are encouraged to participate in this quality improvement project if you meet all of the following criterion: (1) background/ethnicity must be Somali, (2) subject must be at least at age 50 and older, (3) must have a diagnosis of hypertension and (4) must be on at least one antihypertensive medication.

3. WHAT IS THE PURPOSE OF THIS QUALITY IMPROVEMENT PROJECT?

The purpose of this quality improvement project is to evaluate if the use of evidenced-based interventions such as offering educational sessions and self-monitoring of BP are effective in improving adherences to antihypertensive medications.

4. WHERE WILL THE QUALITY IMPROVEMENT PROJECT TAKE PLACE AND HOW LONG WILL IT LAST?

This quality improvement project/educational program will take place in Gargar Clinic and Urgent Care in Minneapolis. The educational session will take place once a month for a total of 3 months, starting in December and ending in February. Your participation is required from the beginning to the end of the session. There are two parts of this educational program. The first part is lecture and will last one hour long. Following the lecture, there will be a hands-on-teaching/demonstration session which will demonstrate how to self-monitor BP. The second part will take 30 minutes long.

5. WHAT WILL I BE ASKED TO DO?

If you agree to take part in this educational program, you will be asked to participate in each class and you are encouraged to follow-up with appointments with provider/DNP student. A doctorate of Nursing Practice (DNP) student will carry out this educational program by administrating in-class sessions to participants. The educational program will include a lecture on hypertension using a PowerPoint presentation. The focus on the lecture will be about the basic knowledge of hypertension, its complications, and benefits of adhering to blood pressure medications and diet. The lecture will be one hour long. Following the lectured session, a hands-

on teaching/demonstration will take place, which will demonstrate how to self-monitor blood pressure in order to promote self-management of the disease. The demonstration part will be 30 minutes long. You will be asked to complete a self-assessment tool using the Hill-Bone Compliance to High Blood Pressure Therapy Scale in order to assess your adherence to taking blood pressure medications in both before and after the educational sessions ends.

6. WHAT ARE THE BENEFITS OF BEING IN THIS EDUCATIONAL PROGRAM?

There are many benefits for participating in this educational program. I expect this educational program will help you increase your knowledge of hypertension, and help you learn more about the complications of uncontrolled blood pressure and the importance of adhering antihypertensive medications and diet. I expect this educational program will help nurture a sense of self-confidence with your capacity to self-monitor blood pressure and disease management.

7. WHAT ARE my RISKS OF being in THIS QUALITY IMPROVEMENT PROJECT?

The interventions being implemented are designed to pose no risks while maximizing potential benefits. There are known risks associated with this educational program, however, a possible inconvenience may be the time it takes to complete the educational program.

8. How WILL MY PERSONAL INFORMATION BE PROTECTED?

Your privacy and confidentiality will be maintained throughout this translation project. You will not be identified using names. You will be kept informed throughout the process and you will be

protected under the policies surrounding the Health Insurance Portability and Accountability Act (HIPPA). All of your health information will be kept confidential and protected.

9. WHAT IF I HAVE QUESTIONS?

Take as long as you like before you make a decision. We will be happy to answer any question you have about this this educational program. If you have further questions about this project or if you have a problem related to this educational program, you may contact the educator (Nimo Abdi, email: nabdi@nursing.umass.edu) or you may contact the clinic or your primary care provider by this phone number (612- 339-3300). If you have any questions concerning your rights as a participant, you may contact the clinic and notify your primary care provider and/or DNP student.

10. CAN I STOP BEING IN THE QUALITY IMPROVEMENT PROJECT?

You do not have to participate in this educational program if you do not want to. If you agree to be in the program but later change your mind, you may drop out at any time. There are no penalties or consequences of any kind if you decide that you do not want to participate.

11. SUBJECT STATEMENT OF VOLUNTARY CONSENT

When signing this form I am agreeing to voluntarily participate in this educational program. I have had a chance to read this consent form, and it was explained and translated to me in a language, which I use and understand. I have had the opportunity to ask questions and have received satisfactory answers. I understand that I can withdraw at any time. A copy of this signed Informed Consent Form has been given to me.

Participant Signature: Print Name: Date:

By signing below I indicate that the participant has read and, to the best of my knowledge, understands the details contained in this document and has been given a copy.

Signature of Person Print Name: Date:

Obtaining Consent

Appendix D**University of Massachusetts Amherst**108 Research Administration Building
70 Butterfield Terrace
Amherst, MA 01003-9242**Human Research
Protection Office
Research Affairs****Telephone:** 545-3428**FAX:** 577-1728**MEMORANDUM**

To: Nimo Abdi
From: Human Research Protection Office
Date: November 3, 2015

Project Title: Improving Adherence to Antihypertensive Medications among Somali Patients in Primary Care Clinic

IRB Number: 15-027

The Human Research Protection Office (HRPO) has evaluated the above named project and has made the following determination:

- The activity does not involve research that obtains information about living individuals.
- The activity does not involve intervention or interaction with individuals OR does not use identifiable private information.
- The activity is not considered research under the human subject regulations. (Research is defined as “a systematic investigation designed to develop or contribute to generalizable knowledge.)
- The activity is determined to meet the definition of human subject research under federal regulations, but may qualify for exemption. If uncertain as to whether the scope of the research falls within an exempt category, please contact the HRPO for guidance. Exempt determinations must be made by the IRB.
- The activity is determined to meet the definition of human subject research under federal regulations and is not exempt. The research must be reviewed and approved by the IRB and requires submission of applicable materials.

Information regarding **Types of Review** for human subject research protocols may be found at <http://www.umass.edu/research/irb-guidelines-levels-review>

For additional information, please contact the Human Research Protection Office at 545-3428.

Cc: OGCA

Appendix E

Understanding blood pressure

Waa Maxay Cadaadiska Dhiigu?

- ▶ “Blood pressure (BP) is a measurement of the force against the walls of your arteries as your heart pumps blood through your body” (National Institutes of Health [NIH], 2014).

Systolic measures

the pressure in your arteries

while your heart is **BEATING** →Systolic/Diastolic ← *Diastolic* measures the pressure in your arteries when your heart is **AT REST**.

Waa Maxay Cadaadiska Dhiigu?

- ▶ Wadnahaagu marku garaac samaynayo wuxuu dhiiga u diraa jirkaga si uu u siiyo tabar iyo oksajiinta uu u baahan yahay.
- ▶ Qulqulka dhiiga ayaa cadaadis ku sameeya gidaarada xididada dhiiga. Xooga cadaadiskan ayaa la yirahaa dhiig-kar.



Vidiiyow Ku saabsan Dhiik-Kar

- ▶ <https://www.youtube.com/watch?v=qSkGJZT0ULU>

Classification of Blood Pressure in Adults (Age ≥ 18)

Classification	Systolic Blood Pressure (mmHg)		Diastolic Blood Pressure (mmHg)
Normal	<120	AND	<80
Prehypertension	120-139	OR	80-89
Stage I HTN	140-159	OR	90-99
Stage 2 HTN	≥160	OR	≥100

Blood Pressure Goals

Population	Blood Pressure Goal (Systolic/Diastolic)
< 60 years old	<140/90 mmHg
> 60 years old	<150/90 mmHg
Chronic Kidney Disease	<140/90 mmHg
Diabetes	<140/90 mmHg

Maxaa Sababa Dhiig-karka?

Ma jiro sabab kaliya oo keenta dhiigkar.

- ▶ Da'da
- ▶ Jinsiyadaada
- ▶ Dhaxal qoys
- ▶ Xaalad caafimaad oo kale sida
 - ▶ Kalyo xanuun (kidney disease)
 - ▶ Sonkor (Diabetes)
 - ▶ Wadna xanuun (Heart attack)
 - ▶ Subaga dhiiga (High cholesterol)

Halis baad ku jirtaa Haddii

- ▶ Aanad cunin khudaar kugu filan
- ▶ Aad badsato milix/cusbo
- ▶ Aanad firfircoonayn
- ▶ Miisaankaagu sareeyo
- ▶ Sigaar cabtid
- ▶ Istares badan

Halista U Keeno Dhiig-Karka

- ▶ Haddii cadaadiska dhiigaagu uu sareeyo, wuxuu culays dheeraad ah saaraa wadnaha iyo xididada dhiiga. Markaay muddo sidaa ahaato, ayaa culayskani waxyeelo u keena wadnahaaga iyo xubnaha jirkaaga taas oo halis ku noqon karta caafimaadkaaga.

Halista U Keeno Dhiig-Karka

- ▶ Wadno xanuun
- ▶ Wadno-istaago (Heart attack)
- ▶ Istarook (stroke)
- ▶ Kilyo xanuun (kidney disease)
- ▶ Xasuus la 'aan
- ▶ Camoole (Indho beel)

Waxtarka Dawada

- ▶ Dhiigkarka lagama bogsado
- ▶ Haddii aad u baahato inaad qaadato dawooyin, waxaa hubaal ah inaad waligaa qaadnayso dawooyinka.
- ▶ Haddii aad joojiso dawooyinka dhiig karkaagu mar kale ayuu kacayaa.
- ▶ Waxaa muhim ah inaad qaadato dawooyinkaaga, xataa haddii aanad ku niyadsamayn.
- ▶ Dhiigkarkaaga oo aad hoos u dhigta waxay kaa ilaalinaysaa wadnahaaga iyo xididada dhiiga inay waxyeelo soo gaarto.

Waxtarka Dawada

▶ **MEDICATION SAFETY VIDEO**

- ▶ <https://ethnomed.org/patient-education/medication/medication-safety-somali.flv/view>

Waxtarka Dawada

- ▶ Approximately half of all hypertensive patients in the nation are non-adherent to their treatment regimen
- ▶ Treatment of HTN with medication can:
- ▶ Decrease the risk of stroke by 31 to 45 percent
 - ▶ Myocardial infarction by 8 to 23 percent

Ka Faa'iidsiga Dawada

- ▶ Qaado dawadaada subax kasta sidii lagugu talagaley
- ▶ Qaado dawadaada isku waqti kasta subaxii
- ▶ Qaado dawadaada sida lagu talagaley
- ▶ Qaado dawadaada hadi cadaadiskaaga dhiiga xataa u maraayo meeshi logu talagaley
- ▶ Ha iska joojin dawadaada ado la'hadlin dhaqtarkaaga
- ▶ Take medication exactly as prescribed, even if your BP reading is within the normal range
- ▶ Do not stop or self-discontinue a medication on your own without consulting with your doctor first.

Muhiimka La shaqeynta dhaqtarkaaga

- ▶ Waxaa muhiim ah in aad dhaqtarkaaga la'kulanto marwalba oo aad bilowdid dawo cusub. Tan macnaheedu waa in la habsado in dawadu wax kuu tartey iyo in aad wax dhibaato ah kala kulantey
- ▶ Haddii aad dareento isbedel marka aad bilowdid qaadashada daawo cusub, waxaa muhiim ah inaad dhaqtarkaaga la kulantin sida uga dhaqso badan

Is-Cabirka Dhiigkarka marka aad Guriga Joogto

- ▶ Iska cabir dhiiga marki daawo cusub lagu qoro
- ▶ Isbadal lagu suubiyo dawadaada
- ▶ Iyo markaad joogto guriga inta u dhaxeysa ballamaha aad la leedahay dhaqtarka.

Is-Cabirka Dhiigkarka marka aad Guriga Joogto

- ▶ Make sure you take your BP reading at the same time each day
- ▶ Don't smoke, drink caffeinated beverages, or exercise within 30 minutes before measuring your blood pressure.
- ▶ Sit with your back straight and supported on a chair and have your feet flat on the floor.
- ▶ Your arm should be supported flat on a table with the arm at heart level

Qaab-Nololeed Caafimaad Qaba oo Hoos u Dhigi kara Dhiigkarkaaga

- ▶ Cun khudrad badan
- ▶ Milixda oo aad iska yarayso
- ▶ Culeeyskaaga ilaali
- ▶ Noqo Qof Firfircoon

DASH DIET



DIETARY APPROACHES TO STOP HYPERTENSION

- ▶ CUNTOOYIN WAXTAR U LEH DHIIG-KARKA
- ▶ MAALIN WALBA CUN CUNTADAAN KALA DUWAN:
 - ▶ KHUDAAR BADAN
 - ▶ FRUITS/MIRO BADAN
 - ▶ BADAR, QAMADI AMA SARREEN
 - ▶ LAWS/DIKIRTA QALA LAN
 - ▶ CUNTOYINKA CAANAHA LA GA SAMEEYO OO DUFANKU KU YAR YAHAY
 - ▶ HILIBKA AAN BARUURTA LAHAYN/DIGAAGGA/KALLUNKA
 - ▶ SALIIDAHA/DUFANKA KU YAR YAHAY
 - ▶ IYO MACMAAN YAR

FA'IIDADA DASH DIET

- ▶ WAXAA LA HUBAA IN EY CADAADISKA SAREEYO UU HOOS U DHIGAAYO
- ▶ WAXEY KAA CAWINEYSAA:
 - ▶ WADNO XANUUN
 - ▶ ISTAROOK
 - ▶ KILYO XANUUN
 - ▶ SONGOR/KAADI MACAAN
 - ▶ KAANKARO

<u>Koox Cunto</u>	<u>Size Adeegaya</u>
<u>Badar, qamadi ama sarreen</u>	<u>Hal jeex oo rooti</u> <u>Hal koob oo badar/cereal diyaarsan</u> <u>Koob barkiisa oo ah baasto/bariis ama cereal karsan</u>
<u>Khudaar</u>	<u>Hal koob o ah khudaar cayriin</u> <u>Koob barkiisa oo ah khudradda la kariyev</u>
<u>Miraha/Fruits</u>	<u>Dhoor xabo fruit/miro dhexdhexaad ah</u>
<u>Cuntooyinka caanaha laga sameeyo oo dufanka ku yar yahay</u>	<u>Hal koob oo caano ah ama hal yogurt</u>
<u>Hilibka aan baruurta lahayn/Digaagga/kalluunka</u>	<u>1 ounce oo hilib/digaag/kalluun, ama hal ukun</u>
<u>Lawska/digirta qalalan</u>	<u>Labo qaando oo laws ah ama koob barkiisa oo digir karsan</u>
<u>Saliidaha/dufanka</u>	<u>Hal qaando saliid ah.</u>
<u>Macmacaanka</u>	<u>Macmacaan oo dufanka ku yar yahay.</u> <u>Sonkor hal qaando kaliya</u>

Milixda oo aad iska vareeysid

- ▶ Inta badan milixda aad cunto ma aha tan aad ku darto raashinka aad karsato ee waa ta ku jirta cuntooyinka diyaarsan sida rootiga, qureecda, iyo cuntooyinka kale ee diyaarsan.
- ▶ Markaa aad cunto soo gadanaysid, fiiri waraaqda ku dhegsan oo dooro midda milixdu ku yar tahay.

WAA MA'XAY SOODHIYAM?

- ▶ SODIUM
AMA

- ▶ SOODHIYAM

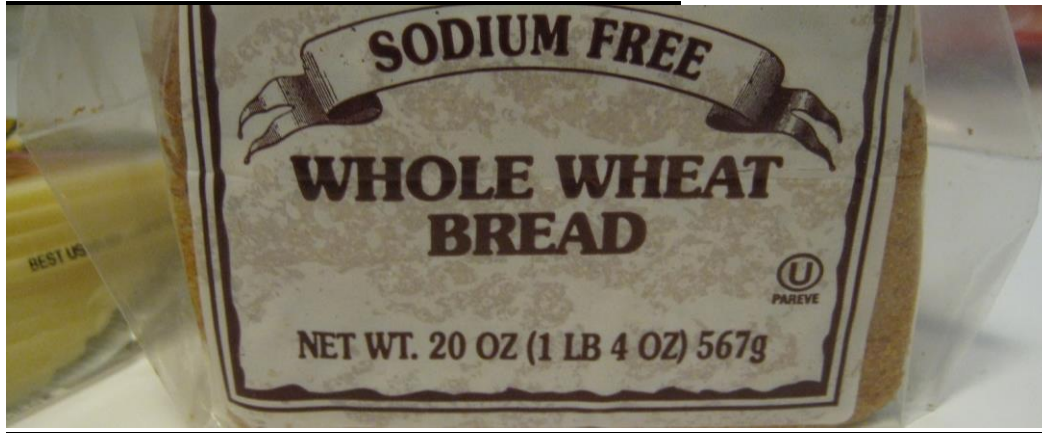
WAA MA'XAY SOODHIYAM?

- ▶ Soodhiyam wuxuu kaalin weyn ka ciyaaraa cusbada iyo dheelitirka biyaha jirkaada.

MILIX/CUSBO AMA SOODHIYAM

- ▶ IIBSO CUNTOOYINKA LAGU DHUL QORAY:
 - ▶ “MA LAHA SOODHIYAM” (SODIUM FREE)
 - ▶ SOODHIYMA YAR (LOW SODIUM) ama
 - ▶ SOODHIYAM LA YAREEYAY (REDUCED SODIUM)

SODIUM FREE/MALAHA SODHIYEM



LOW SODIUM/SOODHIYAM YAR




REDUCED SODIUM/SOODHIYAM LA YAREEYE



QIIYAASTA SODIUM/SOODHIYAM

- ▶ Ha cunin in ka badan 1,500mg oo soodhiyam maalinti
- ▶ BARO MARKASTA INAAD CUNTADA ISKA FIIRISID
 - ▶ MARKAAD ADEEYGANEYSID
 - ▶ MARKAAD CUNTADA KARSANEYSID

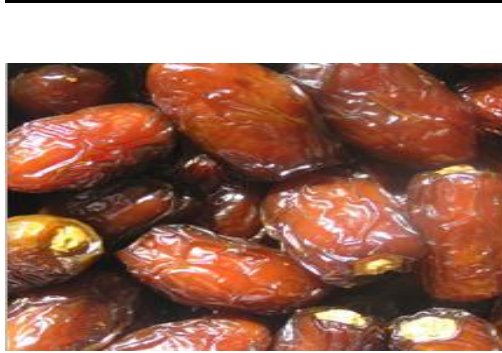
HAL KII BARADHO?



Total Fat 0g	0%
Saturated Fat 0g	0%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 5mg	0%
Total Carbohydrate 15g	5%
Dietary Fiber 1g	4%
Sugars 0g	
Protein 2g	
Vitamin A 0%	Vitamin C 30%
Calcium 0%	Iron 4%

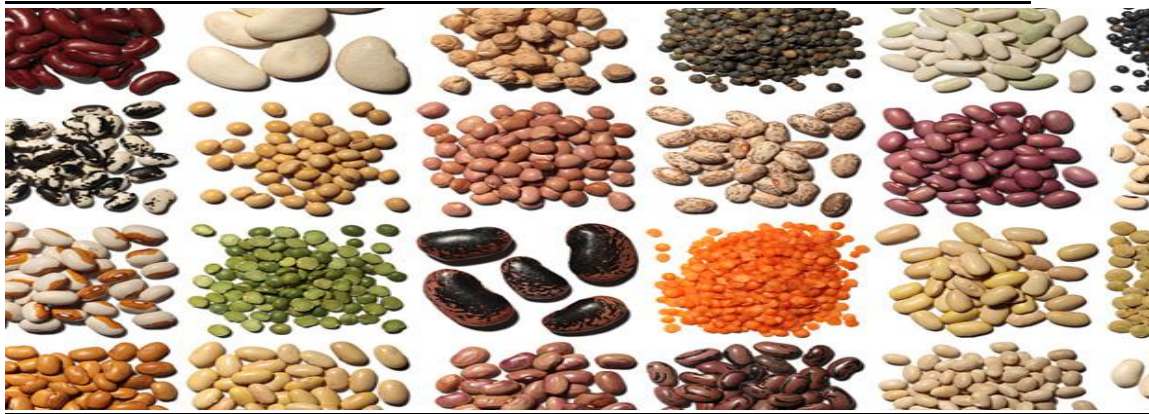
*Percent Daily Values are based on a 2,000 calorie

IMISA SODIUM KU JIRTO AFARTII XABO TIMIR?



Total Fat 0g	0%
Saturated Fat --g	--%
Trans Fat --g	
Cholesterol 0mg	0%
Sodium 0mg	0%
Total Carbohydrate 75g	25%
Dietary Fiber 7g	28%
Sugars 66g	
Protein 2g	
Vitamin A 2%	Vitamin C 0%
Calcium 6%	Iron 6%

*Percent Daily Values are based on a 2,000 calorie



CULEYS KAAGA ILAALI

- ▶ Hadii miisaan kaagu sareeyo,inaad rido culeeyska waxay kaa caawin doontaa ineey hoos u dhigto dhiigkarkaaga waxeeyna yaraynaysaa mushkiladaha caafimaad
- ▶ Habka ugu fiican ee aad iskaga dhimi karto miisaanku waa inaad cunto raashinada ay ku yar yihiin dufanka iyo kaloorigu isla markaana aad jimicsi samayso. Sidan ayaad miisaanku u ridi kartaa addiga oo aan ‘cuntada iska dayn’

BMI CHART

Adult BMI Chart																	
BMI	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Height	Weight in Pounds																
4'10	91	96	100	105	110	115	119	124	129	134	138	143	148	153	158	162	167
4'11	94	99	104	109	114	119	124	128	133	138	143	148	153	158	163	168	173
5'	97	102	107	112	118	123	128	133	138	143	148	153	158	163	168	174	179
5'1"	100	106	111	116	122	127	132	137	143	148	153	158	164	169	174	180	185
5'2"	104	109	115	120	126	131	136	142	147	153	158	164	169	175	180	186	191
5'3"	107	113	118	124	130	135	141	146	152	158	163	169	175	180	186	191	197
5'4"	110	116	122	128	134	140	145	151	157	163	169	174	180	186	192	197	204
5'5"	114	120	123	132	138	144	150	156	162	168	174	180	186	192	198	204	210
5'6"	118	124	130	136	142	148	155	161	167	173	179	186	192	198	204	210	216
5'7"	121	127	134	140	146	153	159	166	172	178	185	191	198	204	211	217	223
5'8"	125	131	138	144	151	158	164	171	177	184	190	197	203	210	216	223	230
5'9"	128	135	142	149	155	162	169	176	182	189	196	203	209	216	223	230	236
5'10"	132	139	146	153	160	167	174	181	188	195	202	209	216	222	229	236	243
5'11"	136	143	150	157	165	172	179	186	193	200	208	215	222	229	236	243	250
6'	140	147	154	162	169	177	184	191	199	206	213	221	228	235	242	250	258
6'1"	144	151	159	166	174	182	189	197	204	212	219	227	235	242	250	257	265
6'2"	148	155	163	171	179	186	194	202	210	218	225	233	241	249	256	264	272
6'3"	152	160	168	176	184	192	200	208	216	224	232	240	248	256	264	272	279
	Healthy Weight						Overweight					Obese					

Noqo Qof Firfircoon

- ▶ 30 daqiiqo oo jimicsi dhexdhexaad ah oo aad samayso shan goor todobaadkii ayaa ka dhigi kara wadnahaaga mid caafimaad qaba sidoo kalana yarayn kara dhiigkarkaaga.
- ▶ Haddii 30 daqiiqo aad waqtigaaga maalintii ka dhex samayn kari waydo, hawlaha gacanta aad ka qabato oo aad in yar kordhiso laftoodu wax bay kuu tarayaan.

Noqo Qof Firfircoon

- ▶ Ka fikir siddii aad u noqon lahayd mid aad u firfircoon maalintii.
- ▶ Isbedel kooban ku samee raashinkaaga iyo heerka jimcisigaaga kaas oo aad waddi karto waligaa



MODIFICATION	RECOMMENDATION	APPROXIMATE SBP REDUCTION (RANGE) [†]
Weight reduction	Maintain normal body weight (body mass index 18.5–24.9 kg/m ²).	5–20 mmHg/10kg ^{92,93}
Adopt DASH eating plan	Consume a diet rich in fruits, vegetables, and lowfat dairy products with a reduced content of saturated and total fat.	8–14 mmHg ^{94,95}
Dietary sodium reduction	Reduce dietary sodium intake to no more than 100 mmol per day (2.4 g sodium or 6 g sodium chloride).	2–8 mmHg ^{94,96}
Physical activity	Engage in regular aerobic physical activity such as brisk walking (at least 30 min per day, most days of the week).	4–9 mmHg ^{97–98}
Moderation of alcohol consumption	Limit consumption to no more than 2 drinks (e.g., 24 oz beer, 10 oz wine, or 3 oz 80-proof whiskey) per day in most men, and to no more than 1 drink per day in women and lighter weight persons.	2–4 mmHg ⁹⁹