

# Weight Management and Hypertension Services in a Rural Public Health Clinic

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## Abstract

**Objective:** To improve chronic disease health outcomes through a culturally competent, preventive care intervention for the underserved, economically disadvantaged, underinsured, and other people of a rural Alabama county.

**Design:** One-group pre-test/post-test design.

**Setting:** Public health department in a rural county in the Southeastern part of the United States.

**Methods:** A free, weekly clinic was held at the county health department. The clinic was staffed by Samford University pharmacy and exercise science faculty, a public health pharmacy practice resident, senior pharmacy students, and undergraduate exercise science majors. During weekly visits patients had baseline measures assessed and they were interviewed on medication therapy, dietary practice, and exercise regimen. Weekly follow-up to previous sessions provided opportunities for health coaching and monitoring of goal-setting.

**Results:** The intervention clinic averaged 10 patients per week. Adult participants (n=357) had a mean age of 53.6±17.3. Comparison of year 1 (201.3±51.5) and year 2 (187.1±67.6) weight was statistically significant (p=0.004). Year 1 systolic blood pressure was 141.6±18.4 mmHg and diastolic blood pressure was 79.2±10.6. Where follow-up measures were available (n=81), the year 2 systolic blood pressure was 139.2±20.4 mmHg while the year 2 diastolic blood pressure was 77.1±11.8 mmHg. Year 1 BMI was 32.1±12.7 and year 2 BMI was 31.5±14.9 (n=23).

**Conclusion:** Preventive services provided by pharmacists and health educators had a statistically significant effect on weight loss. While not statistically significant, clinical significance is noted on other key measures as blood pressure and BMI were trending in a positive direction. Further efforts towards weight loss will likely result in statistically significant changes to blood pressure and BMI.

**Keywords:** Hypertension; Weight Management; Rural Health; Chronic Disease; Body Mass Index

## Introduction

Chronic diseases remain a significant concern in the United States (US) as the number of people with these conditions in the US has reached the 50% mark, and of those, about 25% suffer from more than one disease [1]. Chronic disease among the elderly is even more prevalent, as four out of five Medicare recipients are affected [2]. Van Cleeve et al. [3] found an increase of chronic disease in children and adolescents over an eighteen year period with over 50% of one cohort reporting a chronic condition; and, as a group, these chronic diseases (heart disease, cancer, chronic lower respiratory disease and diabetes) account for most of the deaths in the US [4]. These diseases disproportionately affect the underserved, uninsured, underinsured, and rural populations [5-7]. Among those chronic diseases, heart disease affects more than 81 million adults and is the number one cause of death in the US and high blood pressure affects over 90% of those impacted by heart disease [8]. Overweightness and obesity continue to rise among both adults and children, increasing the prevalence of chronic diseases in both groups. Multiple programs have been initiated to combat these health disparities, with differing levels of success [9-12].

In 2007, Landon [9] reported on a study of care at community based health clinics examining patients with diabetes, asthma and hypertension. These health clinics instituted quality improvement methods to change patient care. Although the clinics were able to increase measures of patient care, patient outcomes were not significantly affected. In addition, a study of a rural sample of 48

adults with at least one chronic disease found that following a 6-week program, patients were able to improve their ability to self manage their symptoms and disease [10]. In contrast, Bayliss et al. [13] investigated barriers to self-care and reported that over 90% of respondents indicated their physical limitations due to the chronic condition, and multiple chronic conditions, were barriers to exercise to improve their chronic condition.

Patients may have a difficult time finding care in rural areas due to a lack of medical personnel in these settings. Research in the western part of the United States suggests that although the percentages of family physicians practicing in rural areas matched the percentage of the general population living in rural areas, there were very few disease specialists who practiced in the same rural areas [14]. Grumbach et al. [14] also reported a higher percentage of non-physician care providers caring for the rural areas. Even with successful programs in place to increase the number of physicians in rural areas, there is

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still a shortage of providers [15]. Individuals in rural areas who live in the southern US, and are black and uninsured, are least likely to have seen a physician in the preceding year [16]. Contrary to most studies on utilization of health care services, Hueston and Hubbard [17] found that with adequate access, there were no differences in rural and urban African-Americans' utilization of preventive screening. Moreover, a relationship exists between distance from a medical center and utilization of health care services [18]. Research on patients in the rural southeastern United States has found those living in rural areas not near health care centers reduced the utilization of health care services for chronic diseases [19].

Another concern among an underserved population with a chronic condition is engaging in an exercise regimen. Research in the northern US found that women with a chronic condition were less likely to exercise than men, and other than diabetes and a respiratory condition, chronic disease is not an indicator of daily exercise [20]. The same study found respondents with minors were less likely to be currently exercising or had any intention to do so. Additionally, these patients did not appear to be receiving support or guidance from their primary care physicians. Moreover, a recent study found that physicians asked their patients about their physical activity in approximately 40% of office visits; and most of these discussions did not include assistance designing an exercise plan [21].

Weight loss in underserved areas is a possibility. In a population of sedentary, urban African Americans referred by a physician to a weight loss clinic, overweight and obese patients averaged weight loss of 2 lb/week, without a strict diet or exercise plan [11]. Following an eight week exercise and healthy living program for obese African American females, longitudinal follow-up revealed the majority of those in an intervention group maintained weight or experienced weight loss as compared with the control group. Additionally, the intervention and control groups were heavier after a year [12].

As a result of the fact that concerns exist related to health care for those living in rural areas, the purpose of this project was to improve chronic disease health outcomes through a culturally competent, preventive care intervention for the underserved, economically disadvantaged, underinsured, and other people of a rural Alabama county.

## Method

A free weekly cardiovascular risk reduction clinic was designed to provide adults who live in rural Perry County, Alabama access to regular, organized health education and health coaching efforts related to weight management and hypertension. The goal of the intervention was to educate patients about chronic diseases and promote a lifetime of medication adherence, healthy eating patterns, and regular physical activity. Follow-up meetings to previous sessions provided opportunities for health coaching and monitoring of goal-setting. This study was approved by the institutional review board at Samford University in Birmingham, Alabama, USA.

The target population of this clinic was the underserved, uninsured, and underinsured residents of Perry County, Alabama, a rural county located approximately 75 miles southwest of Birmingham with a population of about 11,800. Just over 31% of the population is below the poverty level with 68% of the population African American and 30% white. In Perry County there are four physicians and three nurse practitioners that see an estimated combined total of 8,000 people annually. Three-hundred fifty-seven people in the county (~3% of the population) have been seen and are being monitored by the health

department clinic. All individuals in the county were invited to join the free weekly clinics via newspaper advertisement, local radio shows, and through provider offices. Thus, participants in this study self-selected their own participation.

Prior to any interaction by faculty with patients, a weekly meeting of the healthcare team was held to discuss concerns and recommendations for particular patients. In addition, there was regular discussion of health disparities, appropriate communication with patients (cultural awareness, etc.), as well as a desire to better understand the social environment that influenced the patient population.

In addition to hypertension, diabetes, hyperlipidemia, obesity, Chronic Kidney Disease and stroke patients are monitored. The intervention was delivered twice weekly during half day clinics. These clinics were supported by Samford University School of Pharmacy faculty, the Samford University Exercise Science faculty and a Samford University sponsored public health pharmacy resident (graduate, licensed pharmacist) along with two senior pharmacy students. In these clinics, patients were interviewed, current health status evaluated (height, weight, waist circumference, BMI, blood pressure, pulse, blood glucose, cholesterol, etc.), appropriateness of patient drug therapy regimen assessed (using Joint National Commission-7 HTN treatment guidelines [22]), and drug-related problems identified (adherence, drug prescribed but not indicated, drug indicated but not prescribed, drug interactions, etc.). Where needed, appropriate drug therapy was recommended to the patient's physician. Patient response to therapy was monitored (safety, side effects, effectiveness), pharmacy care plan documented and communicated to the physician, and the patient was educated as to drug therapy, diet, physical activity, weight management, and disease state. In the educational and health coaching sessions, the pharmacist discussed various problems with the patient and they mutually agreed on a suggested plan. With the permission of the patients, prescription refill rates were also reviewed with the local pharmacies as necessary to help determine compliance. Barriers to accessing medicines were addressed and individualized plans jointly arrived at (the patient may have been enrolled in Medicare, Medicaid, or referred to social services for assistance with the cost of medicines, etc). Barriers to adherence (e.g., forgetting, inconvenience, dislike of medications etc.) were also addressed. At least once a week the pharmacist made a home visit to one of the patients who were unable to attend the clinic. Phone calls were made to patients who have did not return to the clinic as scheduled. Where indicated, the patient's physician was consulted and copies of the care plan were forwarded to the physician's office.

Following the medication adherence counseling, the exercise science faculty met with patients to provide health coaching in the area of exercise and nutrition. Goal-setting was monitored and assessed on a regular basis to encourage participants to follow a regimen of physical activity and healthy eating. Pharmacy and exercise science faculty members and students remained together with the patient during the counseling session.

At the time of enrollment, patients were interviewed so as to complete a health history questionnaire, a dietary patterns assessment, and a physical activity and behavior questionnaire. Blood pressure, height and weight were measured in week one and were assessed weekly thereafter.

A paired samples t-test was used to determine if there were significant changes from year 1 to year 2 for weight, BMI, and blood pressure.

## Results

The intervention clinic averaged 10 patients per week. Adult participants (n=357) had a mean age of 53.6±17.3 and the sample was about 68% female. Paired sample t-tests revealed significant differences (p=0.004) from year 1 (201.3±51.5) to year 2 (187.1±67.6) for weight and clinically positive changes in systolic and diastolic blood pressure, as well as BMI (see Table 1).

## Discussion

The Institute of Medicine (IOM) has suggested that without better information and data on the effectiveness of different patient-care models the result may be the delivery of services that are unnecessary, unproven, and perhaps harmful [23]. Various health care workers have been active in developing and evaluating assorted patient-care models to demonstrate effectiveness. For example, pharmacists, working in collaboration with other health care providers, have become increasingly proactive in the public health arena [24]. As a result, improvements in health care outcomes and sustainability of health care models have been demonstrated [25-29]. Community pharmacists in a rural setting have demonstrated positive outcomes in the care of patients with hypertension [30]. Physician and pharmacist collaborative intervention has shown significantly better mean blood pressure control rates compared with a control group [31].

The purpose of this study was to assess the effectiveness of an interdisciplinary chronic disease clinic in rural Alabama. Using a pre-post test design adult participants (n=357) showed a statistically significant (p=0.004) decrease in weight from baseline at one year follow-up (201.3 ± 52 and 187.1 ± 68, respectively). BMI decreased slightly from 32.1 to 31.5. Blood pressure measurements trended downward with the baseline systolic /diastolic blood pressure measured at 142/79 mmHg and follow-up at one year at 139/77 mmHg.

It is important to note that an average weight loss of almost 14 pounds in this particular setting is extremely significant. The general health of the population, as well as the general education level of the patient pool, indicate that many of these individuals have not been making healthy choices for an extended period of time. Thus, to have this kind of weight loss in this population where the primary intervention is a weekly meeting is significant. The individuals participated in physical activity on their own and made any dietary changes on their own. We suggest that additional monitoring be conducted during the week to examine when and how individuals are participating in activity. But,

	Mean	N	Std. Deviation	Std. Error Mean	Sig
WGT 1	201.3	81	51.5	5.7	.004*
WGT 2	187.2	81	67.6	7.5	
BMI 1	32.1	70	12.7	2.6	.763
BMI 2	31.6	70	14.9	3.1	
SBP 1	141.6	81	18.4	2.0	.279
SBP 2	139.2	81	20.4	2.2	
DBP 1	79.2	81	10.6	1.1	.159
DBP 2	77.1	81	11.8	1.3	
PULSE 1	72.9	67	10.2	1.2	.387
PULSE 2	74.2	67	10.8	1.3	

WGT = Weight; BMI = Body Mass Index; SBP = Systolic Blood Pressure; DBP = Diastolic Blood Pressure

Year 1 systolic blood pressure was 141.6±18.4 mmHg and diastolic blood pressure was 79.2± 10.6. Where follow-up measures were available (n=81), the year 2 systolic blood pressure was 139.2±20.4 mmHg while the year 2 diastolic blood pressure was 77.1±11.8 mmHg. Year 1 BMI was 32.1±12.7 and year 2 BMI was 31.5±14.9 (n=23).

**Table 1:** Differences in Measures from Year 1 to Year 2.

again, the fact that the average weight loss is about 14 pounds with little to no monitoring during the week is important.

The weekly clinic is offered in a setting where many individuals do not have access to regular transportation. Thus, attendance varied greatly based on the ability of patients to gain access to the clinic. It is important to note that patients were contacted via phone and house visits were offered on occasion when individuals did not attend for three consecutive weeks.

The IOM has made recommendations for identifying clinical service models that are effective, sustainable and replicable [32]. In the model described in the current study, evidence demonstrated that subjects did experience clinically significant decreases in weight, blood pressure, and BMI. The model is sustainable as long as there is a continued need for a university-based experiential teaching site and the university budget is sufficient. Replication of the model using county health department facilities in collaboration with the university is feasible as long as there is a continued need for the clinical site for the education of students and there is sufficient university budget. Universities that teach health care related students should explore this type of collaborative program that involves cooperation with a county health department and other for-profit and non-profit local health care organizations. This study has demonstrated that this health care delivery model improves the cardiovascular health profile of the people of a rural Alabama county where there are significant health disparities and the majority of the population is economically disadvantaged, medically underserved, and African-American.

## Limitations

This study has limitations inherent in working in a public health setting. Individual participation in the clinic is voluntary, consequently regular attendance is sporadic. As noted, transportation is a major issue for many of the patients so this should be addressed in future programs. In addition, health education and health coaching is provided only in the clinic and each individual is responsible for their own adherence. Thus, monitoring of behavior outside the clinic is not part of this project and individual behavior may influence results. An additional potential limitation is that the individuals conducting assessments and providing health education change on a monthly basis, leading to the potential for variation in data collection. However, the fact that the majority of providers are students in training allows for an excellent teaching site for future healthcare practitioners. Furthermore, the study lacks sufficient power to demonstrate statistical differences in blood pressure and BMI. Also, the percent of patients who were diabetic was not noted and the percent of subjects attaining the JNC-7 blood pressure goal of less than 140/90 mmHg was not calculated. Both of these pieces of data could possibly have added important information to the study.

## Implications

The strength of this study is that it provides important data on an underserved population in a predominately African American population (70%) in rural Alabama. Additionally the study provided information on the effectiveness of a patient-care model using a pharmacist, a public health pharmacy resident, exercise science faculty, pharmacy and exercise science students, and local health care providers. Results are generalizable only to rural, community-based public health patients in which the majority of the population is African American.

In conclusion, it appears that a free weekly clinic in a rural setting provides increased opportunities for regularly attending patients to improve medical outcomes. Additional research should be conducted

to address attrition rates and to further establish a detailed plan for implementation of this kind of work in other rural areas of Alabama.

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