

**HOW TO IMPROVE THE QUALITY OF CARE FOR PATIENTS WITH
HYPERTENSION AT MOSHUPA CLINICS, MOSHUPA DISTRICT,
BOTSWANA: QUALITY IMPROVEMENT CYCLE**

BY DR C.N KANDE

SUPERVISOR:

PROF BOB MASH


**THIS RESEARCH ASSIGNMENT IS SUBMITTED IN PARTIAL
FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE OF MASTER
OF MEDICINE (MMED) IN FAMILY MEDICINE. DIVISION OF FAMILY
MEDICINE AND PRIMARY CARE, DEPARTMENT OF
INTERDISCIPLINARY HEALTH SCIENCES, UNIVERSITY OF
STELLENBOSCH.**

NOVEMBER 2012

DECLARATION

Rectangular Snip

I, The undersigned, hereby declare that the work contained in this assignment is my original work that I have not previously submitted it, in its entirety or in part, at any university for a degree.

Signature  Date 08 November 2012

ABSTRACT

INTRODUCTION

Although there are no prevalence studies in Botswana, hypertension is thought to be very common. It is commonly asymptomatic, readily detectable by blood pressure measurement and can lead to complications if untreated. Treatment can reduce these complications and yet the quality of care is thought to be poor. The aim of this project was to assess and improve the quality of care for hypertension at Moshupa clinics in Botswana.

METHODS

This project was a quality improvement cycle comprising the following steps: establishment of the quality improvement team, setting up of target standards, data collection and analysis, comparison of results to target standards, reflection and planning of change to clinical practice, implementation of the changes, and re-audit after 6-months to detect any improvement in the quality of care. Target standards were set for structure, process and outcome.

RESULTS

200 participants were included in the audit, 68% women with a mean age of 55 years. In the baseline audit none of the targets standards were met. During the re audit the structural criteria were the most improved with six targets out of nine achieved. The process criteria showed five targets were achieved out of 11 and the outcome criteria met one target out of two. Significant improvement in performance was shown in ten criteria although the target standard was not always met. In the re-audit the target of achieving control (<140/90) in 70% of patients was achieved.

CONCLUSION

The quality of care of hypertension was suboptimal in our setting as highlighted by the baseline audit. Simple interventions were designed and implemented to improve the quality of care of hypertensive patients. These interventions led to significant improvement in structural and process criteria. A corresponding significant improvement in the control of blood pressure was also seen. It is recommended that the quality improvement process be continued, expanded to other clinics and to other chronic conditions.

1. INTRODUCTION, BACKGROUND AND MOTIVATION

Hypertension is likely to be very common, although there are no prevalence studies in Botswana. It is commonly asymptomatic, readily detectable by blood pressure measurement and can lead to complications if untreated.(1) It is estimated that 1 billion people are affected worldwide, 50 million in the United States of America and more than 7 million in South Africa.(2) The extrapolated statistics for Botswana suggest that there may be 301,300 hypertensive individuals, which represents approximately 20% of the total population.(3) A cross sectional study in Gaborone city council clinics in Botswana showed an even higher prevalence of 61% amongst the diabetic patients.(4) Hypertension is the most prevalent disease and most common reason for outpatient medical review.(4,5)

Hypertension has significant morbidity and mortality, and is associated with adverse outcomes such as coronary artery disease, congestive cardiac failure, stroke and end of stage renal disease. This imposes more financial constraints on the health system which is already burdened by the HIV pandemic. Based on the available evidence, the current US guidelines, published in the Seventh report of the Joint National Committee on prevention, detection, evaluation and treatment of high blood pressure (JNC 7) recommend maintaining blood pressure at less than 140/90mmHg for most patients and less than 130/85mm Hg for patients with diabetes mellitus and renal disease.(5) However the Society for Endocrinology, Metabolism and Diabetes of South Africa recommend a target of 130/80mmHg for type 2 diabetes type 2 (SEMDSA).(6)

There is evidence that treatment to specific targets can reduce morbidity and mortality.(5,8) A reduction of 5-6 mmHg in diastolic pressure has shown to reduce the incidence of stroke by 40%, coronary events by 15% and heart failure by 50%.

Non pharmacological measures as well as medication can contribute to systolic blood pressure reduction. For example the Dietary Approaches to Stop Hypertension (DASH) low sodium diet reduces the SBP by 2-8 mmHg, and weight reduction of 10Kg can contribute to a reduction of 5-20mmHg.(5)

However treatment in many settings (both high and middle income) is not very successful at achieving control and meeting these targets. Management remains poor due to limited resources, poor adherence to medication as well as inappropriate choice of medication. The National Health and Nutrition Examination Survey (NHANES III), conducted in the United States of America (USA) from 1988 to 1991, showed that 76% of known hypertensive patients had BP measurements of 140/90 mmHg or higher.(5) A study conducted on veterans in the USA from 1990 to 1995 showed that more than 65% had blood pressure measurement above 140/90 or higher and 40% had measurements of 160/90mmHg or higher.(5) Only 24 % had BP controlled to less than 140/80 in a study conducted at five department of veterans affairs site in USA.(7)

There are guidelines that have been developed locally to improve the care of hypertensive patients .The Southern African of Hypertension Society guideline was published in 2011 and a Botswana guideline in 2007.(8,9) Both guidelines address the processes of care of hypertensive patients.

It is likely that the quality of care in Botswana is also problematic. Blood pressure measurement is the basis for diagnosis, management, treatment, epidemiology and research of hypertension. Indeed, the decisions affecting these aspects will be influenced positively or negatively by the accuracy of the measurement. An accurate blood pressure is therefore a prerequisite regardless of the technique use. A study conducted in Gaborone showed that health workers frequently measured the blood pressure incorrectly; the most common mistakes included use of inappropriately sized cuff (97%), failure to allow rest before measurement (96%), deflating the cuff too fast (82%), not measuring BP in both arms (77%), and failure to palpate maximal pressure before auscultation (62%).(4)

Our research took the form of a quality improvement cycle project at Moshupa clinic in Botswana. This study aimed at assessing and improving the quality of care.

3. PROJECT AIM AND OBJECTIVES

The aim of this project was to improve the quality of care for hypertension at Moshupa clinics in Botswana. The specific objectives were:

1. To assess the current quality of care for hypertension
2. To plan and implement changes to improve the quality of care
3. To assess if these changes were associated with a measurable improvement in the quality of care.
4. To make recommendations to the local Department of Health on how to improve the quality of care in primary care clinics.

4. METHODS

4.1 STUDY DESIGN

This project was a quality improvement cycle comprising the following steps:

- The involvement of the quality assurance team.
- Setting up of criteria and target standards.
- Data collection.
- Data analysis.
- Data interpretation.
- Planning of changes in the facility and the implementation of the changes.
- Re-audit to detect changes in the quality of care. (10)

4.2 THE SETTING

Moshupa district is situated in the southern part of Botswana. It has an estimated population of 22,811 (11) who are served by 26 health facilities (8 clinics and 18 health posts). There is no Hospital in Moshupa. The district relies on a Mission hospital in Kanye for referral.

Clinics are staffed with an average of 6 health workers whilst health posts have an average of 3 health workers (a nurse, general duty assistant, a health educator assistant). Moshupa clinic (the main clinic in Moshupa) offers 24-hours services. It is staffed with 10 nurses working in shift, a lay counsellor, one health auxiliary, 2 cleaners and 2 ambulance drivers.

There are 6 doctors in the district. They are involved in the following primary health care activities: consultation of general patients and paediatric patients, maternity care, HIV and emergency care. Each doctor is allocated a number of health facilities that he/ she visits based on a monthly schedule. Clinics receive more visits by doctors than health posts.

Laboratory, X ray facilities and ECG machines are non-existent in the district. All health facilities rely on the mission hospital for investigations. Specimens are collected at each individual health facility and transported to Kanye SDA hospital before midday.

A dedicated hypertension clinic does not exist in the district and hypertensive patients are seen daily together with other general patients by doctors and nurses with different levels of expertise. Antihypertensive drugs are refilled monthly at the local clinics. The following antihypertensive classes are available: thiazide diuretics, loop diuretics (furosemide), calcium channel blockers (Nifedipine), beta blockers (propranolol, atenolol), angiotensin converting enzyme inhibitors (captopril, enalapril). Health education is organised in each health facility in the morning and covers a variety of topics. Each health worker is assigned to give a health talk on a daily basis. At times patients are assigned to deliver a health talk under the supervision of a nurse or health education assistant.

The present study focussed on 4 health facilities: Moshupa council clinic, Lothlakane West health post, Moshupa health post and Ralekgetho health post. These facilities were selected by the audit team due the fact that Moshupa clinic is the mother clinic and the 3 health posts belong to the Moshupa catchment area.

4.3 THE AUDIT TEAM

The audit team was headed by the main researcher and included 2 doctors, 1 health auxiliary and 4 nurses. The team members felt motivated to participate in the quality improvement cycle as this would serve as a basis to audit other health programmes in which they were actively involved. Prior to the audit, members had training on blood pressure measurement, which was not assessed in the study.

4.4 SETTING OF CRITERIA AND TARGET STANDARDS

The audit team opted to use the Southern African Society of Hypertension guideline, which is the latest regional guideline based on internationally accepted evidence. This guideline also addresses the process of care in more detail and stratifies the risks. The performance levels were set to be achievable targets and were based on the opinion of the audit team.

The South African Hypertension Society has established steps to follow to control blood pressure. The first step remains to evaluate the hypertensive patients with the following three objectives:

- (1) to assess lifestyle and identify other cardiovascular risk factors or concomitant disorders that may affect prognosis and guide treatment,
- (2) to reveal identifiable causes of high BP,
- (3) to assess the presence or absence of target organ damage and CVD.

Once the details of the first step are established, the management of the hypertensive patients may be tailored accordingly. All patients require lifestyle modification. The adoption of healthy lifestyles by all individuals is critical for the prevention of high BP and is an indispensable part of the management of those with hypertension. Indeed, weight loss of as little as 4.5 kg reduces BP and/or prevents hypertension in a large proportion of overweight persons, although the ideal is to maintain normal body weight. BP control may also benefit from the adoption of the Dietary Approaches to Stop Hypertension (DASH) eating plan. The DASH describes a diet rich in fruits, vegetables, low dairy product. The DASH eating plan is also rich in potassium and calcium content. Dietary sodium should be reduced to no more than 100 mmol per day (2.4 g of sodium). Furthermore, regular aerobic physical activity is recommended. Physical activity such as brisk walking for at least 30 minutes per day most days of the week has shown a positive impact on BP control. Finally, alcohol intake should be limited to no more than 1 oz (30 mL) of ethanol, the equivalent of two drinks, per day in most men and no more than 0.5 oz of ethanol (one drink) per day in women and lighter weight persons. (5)

In a nutshell, lifestyle modifications reduce BP, prevent or delay the incidence of hypertension, enhance antihypertensive drug efficacy, and decrease cardiovascular risk.(5) Further decisions to introduce anti-hypertensive medications depend on the current blood pressure and the level of risk as described by the first step of evaluation of all hypertensive patients.

The choice of anti-hypertensive medications is also influenced by specific compelling factors with the aim to also control the compelling factors or to avoid adversely impacting on them. For instance, hypertensive patients with angina will benefit from beta-blockers (BB) or calcium channel blockers (CCB); and hypertensive patients with prior myocardial infarct benefit from BB or angiotensin converting enzyme inhibitors (ACE-I) or verapamil; patients with heart failure will benefit from ACE-I, BB, aldosterone antagonist, angiotensin receptor blockers (ARB), loop diuretics for volume overload. Patients with LVH will benefit from ARB or ACE-I; stroke patients from ACE-I or ARB, diabetes type 1 or 2 ACE-I or ARB, patients with chronic kidney disease will benefit from ACE or ARB. Patients with isolated systolic pressure will benefit from low dose thiazide or thiazide like diuretic or long acting CCB.

Without compelling factors and in patients without complications, the first anti-hypertensive medications include the thiazide or thiazide-like diuretics.

The guideline classifies hypertension as follow:

Normal SBP 120-129 or DBP 80-84 mmHg

High normal SBP 130-139 or DBP 85-89mmHg

Stage 1 (mild hypertension): SBP 140-159 or DBP 90-99mmHg

Stage 2(moderate hypertension) SBP 160-179 or DBP 100-109mmHg

Stage3 (severe hypertension) SBP >180 or DBP >110mmHg

Furthermore, the guideline has established routine investigations as follow:

- Body weight at every visit
- Height at first visit
- Body mass index at every visit
- Abdominal obesity (wait circumference or waist to hip ratio) at every visit
- Urinalysis at first visit and then yearly if normal. Repeated at the next visit if abnormal. If +2protein or +1haematuria refer for or perform further investigation.
- Blood tests: creatinine done yearly if normal, potassium done yearly if normal, fasting blood sugar done yearly if normal, random total cholesterol done yearlyif normal.
- ECG done yearly if normal.

Additional investigations are performed if secondary causes are suspected at the first visit or if refractory hypertension exists.

Treatment of hypertension should aim to achieve a goal $BP \leq 140/90$ mmHg for most patients; and a goal $BP \leq 130/80$ mmHg for patients with diabetes mellitus or chronic kidney diseases.

The criteria were discussed during a meeting with the members of the audit team that agreed upon the performance level. The team referred to the guidelines developed by the Southern African Hypertension Society. Performance levels were set for the structures relevant to hypertension management, the process of managing hypertensive patients and the outcome of the management of hypertension.

A- STRUCTURE

One would expect these items to be available: one per facility. A score of 2 was assigned for full compliance, a score of 1 for partial compliance and 0 for non-compliance. Partial compliance meant that items were present but not in good working condition, in insufficient quantities or expired. Target standards for the structure were:

- There is one functional aneroid sphygmomanometer BP machine at each facility
- There is a small, medium and large blood pressure cuff at each facility
- There is one functional weighing scale at each facility
- There is one functional height scale at each facility
- There are hypertension guidelines (2011 Southern African hypertension Society) at each facility
- There are investigation request forms (Laboratory and ECG) at each facility
- There are specimen tubes for blood tests at each facility
- There is an ECG machine at each facility
- There are specimen bottles for urine at each facility

B- PROCESS

Target standards for process were the following:

- 90% of records should have the height recorded once
- 90% of records should contain a weight measurement at each visit in last year
- 90% of records have a classification of hypertension (stage 1, stage2, stage 3) in last year
- 70% of records demonstrate appropriate drug management as per the SA guidelines at each visit
- 60% of records have a serum creatinine recorded once yearly
- 60% of records have a fasting blood sugar recorded once yearly
- 60% of records have protein, blood, glucose in urine recorded once yearly for each component if normal.
- 90% of records have a random total cholesterol recorded once yearly
- 60% of records have an ECG recorded once yearly
- 80% of records have health education documented (either smoking, physical activity, diet, alcohol consumption) each year for and tailored to the patient
- 90% of records have a BMI recorded at each visit

C- OUTCOME

Target standards for outcomes were:

- 70% of records have a BP <140/90mmHg
- 70% of records have a BP<130/80mmHg for high risk patients.

4.5 STUDY POPULATION

Our study population included all adult hypertensive patients aged 18 years and above, who visited the facilities with a documented diagnosis of hypertension over at least a 6 month period. A sample size calculation based on 80% power to detect a before-after difference with a p value of 0.05 recommended that 233 be included in the audit. Exclusion criteria were defined as pregnant women, patients from outside Moshupa and hypertensive patients aged less than 18 years. Thirty three patients were lost to follow up and the sample size with paired data was reduced to 200. The sample however appeared to be adequately powered to detect significant differences in the re-audit.

4.6. DATA COLLECTION

Clients were systematically selected by taking every second hypertension patient who walked into the consulting room for their usual review from 2011. The folders were put aside and analysed afterwards by the audit team. Retrospective data were then collected from the patient's file using a data collection tool (hypertension audit form) in order to measure the defined criteria. This was done by doctors and nurses in charge at each of the selected sites. The structural criteria were evaluated by an inspection of the facility by the audit team

4.7 DATA ANALYSIS

Data was captured using a Microsoft Excel spread sheet and analysed by the Centre for Statistical Consultation at Stellenbosch University. Data analysis included frequency tables and comparison for significant change between the baseline audit and re audit. Data was categorical in nature and a Chi-square test was used to detect significant differences ($P < 0.05$).

4.8 DATA INTERPRETATION

The results of the actual performance were presented to the audit team for discussion and comparison to the targets standards.

4.9 THE PLANNING AND IMPLEMENTATION OF CHANGE

Plans for changes were devised by the audit team to improve the quality of care of our hypertensive patients. The team had the mandate from the main researcher to ensure implementation and monitoring of changes. A draft of the plan was submitted to every sister in charge and the management in the district.

4.10 THE RE AUDIT

Data collection, data analysis and interpretation were repeated 6 months after the initial audit. This period allowed time for the changes to be implemented. Further recommendations were formulated to improve the quality of care to an optimal level. The same hypertension tools and same standards were used during the re audit.

5. ETHICAL CONSIDERATIONS

The dignity, human rights, safety and well being of participants were assured. An approval to conduct the present study was granted by the Health Research Unit, Ministry of Health, Botswana (HRU 00582) as well as the Health Research Ethics Committee of Stellenbosch University (N11/06/188)

As initial data was collected from the medical record while the patient consulted, it was felt necessary to obtain written informed consent from the patient (Appendix 1). The consent form was available in English and Setswana. Confidentiality was preserved at every stage of the study and it was not necessary to report patient

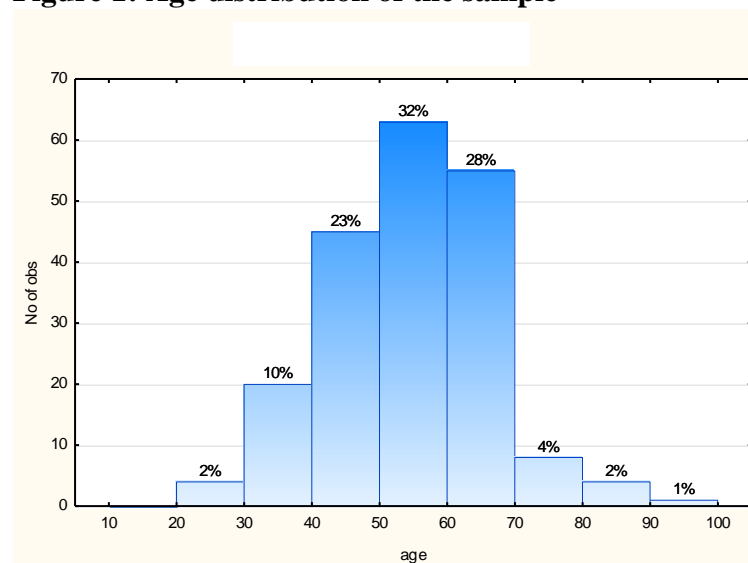
identifiers. A separate file was kept by the main researcher to associate the patient's name and folder number with the study code for easy identification in the re-audit.

6. RESULTS

6.1 PATIENTS CHARACTERISTICS

There were 200 participants recruited from the 4 different sites: Moshupa clinic (108, 54.0%), Moshupa Health post (56, 28%), Lotlhakane Health post (20, 10%) and Ralekgetho Health post (16, 8%). Moshupa had a larger population and the facilities there were busier compared to the smaller health posts. The participants' mean age was 55 years and their age distribution is shown in Figure 1. Out of this sample 68% were female and 32% were male

Figure 1: Age distribution of the sample



6.2 STRUCTURAL STANDARDS

The performance levels for structural criteria in both audits are compared in Table 1. There were 4 clinics and a maximum score of 8 for compliance with the structural standards. Table 1 shows that 6 standards were achieved at baseline and 9 standards in the re-audit.

Table 1 Results for structural criteria

	Baseline audit November 2011 N=8		Re audit June 2012 N=8	
Structure standards	n(%)	Standard achieved	n(%)	Standard achieved
There is at least a weighing scale in each facility	8(100)	Yes	8(100)	Yes
There is at least a height scale in each facility	0(0)	No	8(100)	Yes
There are lab request form in each facility	5(62.5)	No	8(100)	Yes
There are specimen bottles for blood collection in each facility	4(50)	No	6(75)	No
There are hypertension guideline available in each facility	2(25)	No	8(100)	Yes
There are functional BP machine in each facility	8(100)	Yes	8(100)	Yes
There is a small, medium, large cuff in each facility	8(100)	Yes	8(100)	Yes
There are specimen bottles for urine collection in each facility	4(50)	No	6(75)	No
There is a functional ECG machine in each facility	0(0)	No	0(0)	No

6.3. PROCESS STANDARDS

The performance level for process criteria are compared in Table 2 for both the baseline audit and the re-audit. Table 2 shows that none of the standards were achieved at baseline, but 5 out of 11 standards were achieved in the re-audit. There was a statistical significant improvement during the re-audit for all the process criteria.

Table 2: Results for the process standards (N=200)

Process standard	Baseline audit September 2011		Re audit June 2012		P value
	N n(%)	Standard achieved	N n(%)	Standard achieved	
90% of patients have hypertension classified	48(24)	No	112(56)	No	<0.001
90% of patients have height measured	31(15)	No	157(78.5)	No	<0.001
90% of patients have weight measured	144(72)	No	167(84)	No	0.002
90% of patients with BMI calculated at each visit	25(12)	No	156(78)	No	<0.001
60% of patients with cholesterol checked at least once yearly	51(26)	No	137(69)	yes	<0.001
60% of patients with FBS checked once yearly	22(11)	No	120(60)	Yes	<0.001
60% of patients with urine checked for protein, glucose and blood	19(10)	No	120(60)	Yes	<0.001
60% of patients with ECG done and interpreted	44(22)	No	122(61)	Yes	<0.001
60% of patients with creatinine checked once yearly	44(22)	No	117(58)	No	<0.001
80% of patients with health education documented in OPD card at each visit	71(35.5)	No	144(72)	No	<0.001
70% of patients with appropriate drug management at each visit	108(54)	No	152(76)	Yes	<0.001

6.4 OUTCOME STANDARDS

Table 3 shows that control of blood pressure improved significantly during the audit and that the target of 70% controlled with BP below 140/90 was just achieved in the second audit

Table 3 Results for outcome standards

	Baseline audit November 2011 N=200		Re audit June 2012 N=200		
Outcome standards	n(%)	Standard achieved	n(%)	Standard achieved	P value
70% of record with BP <140/90 for most patients	97(48.5)	No	139(70)	Yes	<0.001
70% of record with BP<130/80 for high risk patients	32(16)	No	53(26.5)	No	<0.001

6.5 CHANGES AND IMPLEMENTATION OF CHANGES

Recommendations were formulated by the audit team to address the poor performance seen in the baseline audit. Implementation of changes involved doctors, nurses and the pharmacist. The changes are summarized below in Tables 4 and 5.

Table 4: Changes in clinical practice for structural standards

Structure standards	Recommendations	Actual situation
There is at least a weighing scale in each facility	Weighing scale should be ordered by the nurse in charge of the facility	Audit meeting were held every Thursday. The nurse in charge at each facility checked weighing scale on daily basis and ensure that patients vitals are taken at each visit
There is at least a height scale in each facility	Height scale should be ordered by the nurse in charge	Audit meeting were held every Thursday. Nurse in charge checked height scale on daily basis and ensured that height was taken at least once.
There are specimen bottles for blood and urine collection	Each nurse in charge should order enough specimen bottles for his/her facility	A physical count was made on a daily basis. An order was made to the central medical store on monthly and the hospital for supply.
There are functional BP machine in each facility	Each nurse in charge should order BP machine for her/his facility	An order of BP machines was placed by the district pharmacist at the central medical store as part of her action plan.

There are hypertension guidelines in each facility in the consulting room	Doctors should photocopy guidelines and make them available in each consulting room	Guidelines were available in the consulting room for easy and quick reference. The guidelines were made available at each facility.
There are investigations request forms	Nurse in charge should order or photocopy enough investigation request forms for his/her facility. Soft copies should be available on the main clinic computer	Investigation forms were printed from the computer on daily basis and distributed to facilities where the audit was conducted. Forms were also ordered from central medical stores

Table 5: Recommendations and actual changes for process standards

Process standards	Recommendations	Actual situation
90% of patients have their hypertension classified	Doctors and nurses to ensure that hypertension is classified for every patient	An in service training on hypertension guideline was held in clinics attended by nurses and doctors before the baseline audit. Guidelines were distributed to participants. Meeting were held every Thursday afternoon. This need to be reinforced by audit team
90% of patients have their height measured	Doctors and nurses to ensure that height is measured at first visit	The health auxiliary officer at the screening point measured height for each patient .Height scale was checked every morning
90% of patients have weight measured	Doctors and nurses to ensure that weight is measured at each visit	The health auxiliary measured weight for each patient and checked the weight scale every morning.

90% of patients have BMI calculated	Doctors and nurses to ensure that BMI is calculated at each visit	BMI calculation was taught during training. Calculation was done at screening point or in the consultation room.
60% of patients have cholesterol checked and interpreted	Doctors and nurses to ensure that cholesterol is checked yearly if normal	Samples were collected from Monday to Thursday and transported to the hospital laboratory for analysis. The nurse in charge ensured specimens were transported in time. During our Thursday meeting emphasis was laid on the importance and interpretation of investigations in managing hypertensive patients.
60% of patients have fasting blood glucose checked and interpreted	Doctors and nurses to ensure FBS checked yearly if normal	Samples were collected and sent to hospital for analysis. An order for glucometers has been placed. Thursday meeting discussed interpretation of results.
60% of patients have urine checked for protein ,glucose and blood	Doctors and nurses to ensure urine checked yearly if normal and repeated at next visit if abnormal	Samples were transported to the hospital from Monday to Thursday. Thursday meeting discussed urinalysis results.
60% of patients have ECG done and interpreted	Doctors to order ECG yearly if normal.	There was a need to have an ECG machine locally. Clinics relied on the ECG machine at the hospital. Meeting were held to teach basics on ECG interpretation. LVH defined by Sokolow Lyon SinV1+RinV5orV6 >38mm. The audit team has advocated for purchase of at least one ECG machine in the district.

60% of patients have creatinine checked and interpreted	Doctors and nurses to order creatinine yearly if normal	There was need to have laboratory facility in Moshupa. Meeting were held on Thursdays to review shortfalls in conducting the audit.
80% of patients have health education done and documented	Doctors and nurses to ensure ongoing health education	Needs to be reinforced. Counselling on life style modification- diet, exercise, smoking and alcohol consumption in the management plan. The points discussed were to be documented on the patient's card. Patients were issues with a written plan documented in the OPD card and tailored to individual patients. Health educators assisted with morning health talks
70% of patients have appropriate drug management	Doctors and nurses to ensure appropriate medication is prescribed	Hypertension guidelines were made available in the consulting room. In service training assisted with adherence to the guidelines.

7. DISCUSSIONS

7.1 KEY FINDINGS AND COMPARISON TO LITERATURE

The baseline audit demonstrated a poor quality of care of our hypertensive patients and none of the targets standards were met. During the re audit the structural criteria were the most improved with six targets out of nine achieved. The process criteria showed five targets were achieved out of 11 and the outcome criteria met one target out of two. Significant improvement in performance was shown in ten criteria although the target standard was not always met. Significant improvement in performance was the more important finding as the levels set were somewhat arbitrary and may have been too high and ambitious in many cases. It was possible to implement changes with simple interventions designed by the audit team and with regular follow up.

Improving the use of investigations was limited by the performance of the hospital-based laboratory, which often lacked reagents or had broken equipment. At the clinic level the use of incorrect specimen bottles and forms resulted in some specimens rejected.

Our study showed a better BP control with 70% of records recording a BP less than 140/80 mmHg in the re audit. This is supported by the Cleveland Clinics Hypertension improvement project that also showed a gradual trend in the BP control.(12) Furthermore, an audit conducted in the Western Cape on hypertension suggested significant improvement of BP control to less than 140/90mmHg from 40% in 2010 to close to 56% in 2012.(13) .Another quality improvement project conducted in a community health centre in the Cape Town Metropole showed an improvement in the BP control with only 33% of the patients remaining poorly controlled after the intervention .(14) An audit of hypertension management conducted in a primary health care facility in South Johannesburg also managed to achieve their target standard for BP. (15) These results therefore all concur that improving the technical quality of care is an effective strategy for improving BP control and can be achieved by relatively simple interventions within quality improvement cycles.

Furthermore the Seventh report of the Joint National Committee on prevention, detection, evaluation and treatment of high blood pressure (JNC7) report suggests that health care providers give insufficient attention to health education (5). This study demonstrated that the frequency of health education improved close to the target. However the audit cannot assess the content or quality of the counselling.

Routine laboratory tests recommended before initiating therapy included a 12 lead ECG, urinalysis, blood glucose, creatinine and lipid profile. These were seldom carried out in the baseline audit, though this improved in the re audit. This shows a lack of aggressiveness on the part of the health care providers as suggested by the JNC 7 report.(5) Primary care in Botswana has not been organised for the adequate management of non-communicable diseases, such as hypertension, and yet this audit shows that significant improvement can easily be made when attention is given to the requirements. At the end of the study however none of the clinics had easy access to an ECG machine.

7.3. LIMITATION AND STRENGTH OF THE STUDY

Poor record keeping meant that not all activities were recorded in the notes and some patients kept their own record, which could not be traced at subsequent visits, resulting in missing data.

The aneroid sphygmomanometer blood pressure machines were not calibrated regularly and therefore the BP measurements used in the audit were not taken under ideal conditions. The adherence of staff to the rules for BP measurement were also not observed or assessed, although training on this was given prior to the audit.

The participation and the willingness of the team members to work together was a strength that made change possible. This process can be extended to other clinics in the district and serves as a model for other districts to emulate.

7.4. RECOMMENDATIONS AND IMPLICATIONS

Performance improvement should be seen as an ongoing process so that improvements are maintained and further improvements targeted. Such a commitment must involve the local facility staff and the district management. Realistic performance targets should be set from the baseline findings and the audit extended to other facilities and health programmes run in the district.

The process criteria need additional interventions with regards to access to investigations and essential equipment. ECG machine, glucometers, and urine dipsticks need to be procured. The district still relies on the mission hospital for most of the investigations. The audit team advocated for procurement of basic equipment for the main clinics as well as a laboratory facility for the district.

8. CONCLUSIONS

The quality of care of hypertension was suboptimal in our setting as highlighted by the baseline audit. Simple interventions were designed and implemented to improve the quality of care of hypertensive patients. These interventions led to significant improvement in structural and process criteria. A corresponding significant improvement in the control of blood pressure was also seen. It is recommended that the quality improvement process be continued, expanded to other clinics and to other chronic conditions.

9. ACKNOWLEDGEMENTS

I would like to acknowledge and extend my gratitude to the following persons who have made the completion of this project possible:

1. First all to God for making everything possible.
2. To Prof Bob Mash My supervisor for all his valuable suggestions and guidance.
3. To the audit team for making this project possible.
4. To the clinic staff for their support.
5. To my family and friends for their encouragement.
6. To my colleagues for their contribution.

10. REFERENCES

1. Pinkney-Atkinson V. Hypertension treatment algorithm. PNT 2008;12(1):37-41.
2. Steyn K; Bradshaw D; Norman R; Laubscher R. Determinants and treatment of hypertension in South Africans: The first demographic and health survey. South African Medical Journal 2008;98(5):376-380
3. Statistics by country for hypertension. Available from http://www.cureresearch.com/h/hypertension/stats_country.htm. (Accessed 14 April 2009)
4. Mengesha AY. Hypertension and related risks factors in type 2 diabetes mellitus in Gaborone city council clinics, Gaborone, Botswana. African Health Sciences 2007;7(4):244-245
5. Chobanian AV; Barkris G L; Black HR; Cushman WC; Green L A ;Izzo JL et al. The national high blood pressure education program coordinating committee.JNC7: complete report. Seventh report of the joint national committee on prevention, detection and treatment of high blood pressure. Available from www.nhlbi.nih.gov/guidelines/hypertension/(Accessed 11 May 2011)
6. Amod A,Motala A,Levitt N,Berg J,Young M,Grobler N et al.Guideline committee.The 2012 Society for Endocrinology,metabolism and diabetes guideline for the management of type 2 diabetes.Journal of endocrinology,metabolism and diabetes of South Africa .2012;17(1):S1-S94

7. Steyn K. Hypertension in South Africa. Chronic Diseases of Life style in South Africa since 1995-2005. Cape Town: Medical Research Council, 2007: 80-95
8. Seedat YK ;Rayner BL. South African hypertension guidelines 2011.S Afr Med J 2012;102:57-84
9. Ministry of Health. Botswana treatment guide 2007. Gaborone: Ministry of Health, 2007:75-82
10. Mash B;Blitz-lindeque J.South African familypractice manual.2006;151(402-403)
11. Central statistics office. Population of towns, villages and associated localities. Gaborone: Central Statistics Office, 2002.
12. Cleveland clinic Medicine institute. The hypertension improvement project. American Medical Group Association hypertension and Daiichi Sankyo.Alexandria2008:1-17
13. De Vries E. Conference presentation. Auditing chronic disease care: does it make a difference .Available from http://saafp.org/conferences/index.php/congress/index/pages/view/speaker_presentations.(Accessed 28 August 2012)
14. Slingers N, De Villiers PJT. Evaluation of the effect of introduction of hypertension club on the management of hypertension at community health centre in the Cape Town Metropole.SA Fam Pract 2009;51(2):143-147
15. Omwukwe SC, Omole OB. Drug therapy, life style modification and blood pressure control in a primary care facility, South of Johannesburg, South Africa: an audit of hypertension management. SA Fam Pract 2012;54(2):156-161
16. Borzecki A; Wong AT; Hickey E; Ash A S; Berlowitz D R. Hypertension control. How well are we doing? Archives of Internal Medicine 2003;163:2705-2711.
17. Dennison CR; Peer N; Steyn K; Levitt NS; Hill M N. Determinants of hypertension care and control among black peri-urban black South Africans: The Hihi Study. Ethnicity and disease 2007;17:484-491
18. Beevers G, Lip G Y H and O'Brien E. ABC of hypertension: blood pressure measurement. Part II conventional sphygmomanometry: technique of auscultatory blood pressure measurement. BMJ 2001; 322(7293):1043-1047.
19. O'Brien E; Asmar R; Beilin L; Imai Y; Mallion JM; Mancia G et al. On behalf of the hypertension working group on blood pressure monitoring. European society of hypertension recommendations for conventional, ambulatory and home blood pressure measurement. Journal of Hypertension 2003;2195:821-848
20. McAlister FA; Straus SE. Evidence based treatment of hypertension: measurement of blood pressure. BMJ 2001;322(7291):908
21. Pickering T G. Blood pressure measurement and detection of hypertension. The Lancet 1994;344(8914):31
22. Berlowitz DR; Ash A S; Hickey EC; Friedman R H. Inadequate management of blood pressure in a hypertensive population. The New England Journal of Medicine.1998;339(27):1957
23. Mhlongo SWP. Hypertension and its management: What a family physician needs to know. CME 2006;24(5):244-248