Study to determine the factors that affect adherence to treatment in adults with hypertension in Kanye Sub – District Botswana

By

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DECLARATION

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

Signature: ..... Date: .....

Dedication

This work is dedicated to God Almighty who made all things possible.

To my lovely wife, Chiamaka who was a strong pillar of support and also to my children, Christabel and Morgan.

ABSTRACT

BACKGROUND

Adherence is the ability to take the prescribed treatment within the period of persistence with the treatment. In the context of medical treatment, one may not be able to predict treatment non adherence in chronic conditions like hypertension. The researcher realized that a vast number of hypertensive patient in Kanye, Botswana live with poorly controlled blood pressure; Adherence was identified as one of the factors that impact on treatment outcome. Aim of the study was to determine the factors that affect adherence to treatment in adults with hypertension.

METHOD

The study was a cross-sectional study; of 200 adult persons with hypertension who attended the clinics in Kanye. A structured questionnaire was used to collect data.

RESULTS

The result showed that there was a significant association between the outcome (adherence level) and the counseling on the risks of uncontrolled hypertension (P-value= <0.0001. Chi2=116.667), patients' experience with pill burden (P-value= <0.0001, Chi2= 40.9091), patients understanding of treatment regimen (P-value=<0.0001, Chi2 = 150.0000), patients perception of treatment benefits (P-value = <0.0001, Chi2 = 150.0000), emotional wellbeing (P-value = <0.0001, Chi2 = 141.1765), patients' perception of drug adverse effects (P-value = <0.0001, Chi2 = 108.1434) and cost of medication (P-value = 0.0108, Chi2 = 4.1455).

CONCLUSION

The study showed that patients who were counseled on the risk of hypertension and understood the treatment regimen adhered better to treatment. The perception of treatment benefits, reduced number of pills taken in a day, good family support and availability of medications are the other factors that affected adherence.

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BACKGROUND AND INTRODUCTION

Hypertension is the sustained elevation of blood pressure above that defined for age, sex and race. The goal blood pressure is 140/90mmHg or 130/80mmHg for adults with diabetes or renal disease.[1]

Hypertension is strongly associated with the development of cardiovascular disease in sub Saharan African populations.[2] Cardiovascular disease is the second most common cause of death in the region (after HIV/AIDS and communicable diseases), but is the most common cause of death of those above the age of 30 years.[3] The treatment of hypertension reduces the risk of developing complications such as stroke, cardiac failure and peripheral vascular disease. Some regional data suggest that 30-50% of stroke mortality occurs in the context of uncontrolled hypertension.[4]

Adherence is the ability to take the prescribed treatment within the period of persistence with the treatment. It is an important factor in determining treatment outcome especially in chronic medical condition where medication adherence is a challenge to patients.[5] Many patients are

likely to adhere to treatment if they understand that the benefits of treatment outweigh the deleterious effects of treatment.[6]

The data from the district hospital in Kanye showed that on the average, 10 patients were admitted and managed for hypertensive complications in a month. Between 01/01/10 – 31/12/10, 92 patients were admitted and managed for stroke and heart failure arising from hypertension, over this period, 10 deaths was recorded.

Medical Officers in Kanye see an average of 60-80 hypertensive patients weekly. Quite a large percentage had persistent uncontrolled blood pressure. This evoked the question "why do some of these patients persist with uncontrolled blood pressure despite adequate treatment" By adequate treatment; a patient must have been on maximum doses of two blood pressure lowering drugs for 6 months and above. With a step further, the researcher then asked a question "What are the factors that affect adherence to treatment in adult patients with hypertension in Kanye?"

The WHO report says there is a 28% prevalence of hypertension among the 25 – 64 year old.[7]

Kanye has a District Health Management Team (D-H-M-T) that oversees the operations of the seven primary health care clinics and the district hospital. The findings of this research will assist the D-H-M-T in defining the administrative and treatment protocols that will help in patients' care.

LITERATURE REVIEW

Relevant articles were retrieved through systematic searches of Medline and Cochrane data bases using keywords 'hypertension' and 'adherence' to enable an appropriate assessment of the major issues in adherence as it relates to barriers to adherence and ways of improving them. The search identified all articles and abstracts published in medical journals from 1995 to date. The literature review evaluated the factors that affect adherence to medical treatment in adult patients with hypertension.[8]

The disease burden

In the United States of America, 24% of American adults had hypertension.[9] Overall, two thirds of the population with hypertension was aware of their diagnosis (69%) and a majority (53%)

was taking prescribed medications.[4] Furthermore, the prevalence of hypertension is higher in the older individuals, non-Hispanic blacks and women. Patients' failure to adhere to medication regimen may cost as much as $300 billion to the healthcare systems in the United States.[10]

In a study of hypertension prevalence and blood pressure levels in six European countries, Canada and the Unites States, the study indicates that the age- and sex- adjusted prevalence of hypertension was 28% in the North American countries and 44% in the European countries at the 140/90mm Hg threshold.[11]

Hypertension in South Africa is referred to as a-'silent epidemic'.[12] A cross sectional cardiovascular disease (CVD) risk factor survey was conducted by Connor et al and found hypertension to be the commonest of the CVD risk factors amongst the study population. The prevalence rate was 55%, with 59% in black African people, 55% in both Indian and colored people and 50% in white people.[13]

In Botswana, the prevalence rate of hypertension among the adult population is 28%[7]

Adherence to management

Adherence is said to be the extent to which a person sticks to the prescribed management protocol. Persistence with a particular drug varies especially with the presence of an adverse effect.[14] Generally, adherence is poor in chronic conditions especially if the treatment benefits are not readily appreciated.[15] Randomized trials have demonstrated that reduction of high blood pressure by 5mmHg with medication can substantially reduce the risk of stroke by 34% and of ischemic heart disease by 21 percent.[16] Adherence in patients with treated hypertension is estimated between 50% and 70%, and the importance of improving adherence to long-term therapies has recently been addressed by the World Health Organization in a 2003 report.[17]

Measurement of adherence

There are a number of ways of measuring patients' adherence to taking medications. The direct measurement involves the detection of a metabolite in the body fluid. Though very accurate, it is

costly, difficult to perform and therefore not feasible in this context.[18] The indirect methods of measuring adherence are most commonly used. These involve interviewing, tablet counts, diaries, and prescription refilling dates.[11] These measures though commonly used are less reliable.

Factors affecting adherence

Adherence to treatment regimen varies as a result of a complex interaction between the patient, provider and the health system.[19] Patients' non adherence with prescribed treatment is a central reason for the failure to control hypertension in those receiving therapy.[20] Investigations have identified physician related factors, perception of treatment benefits, perceived adverse effects, cost of medication, emotional well-being, pill burden, duration of treatment, age of the patient, accessibility to health care and understanding of treatment regimens as factors that affect adherence to treatment.[21-22]

Many researches have supported the claim that improvement of the doctor-patient relationship improves adherence.[5] The frequency of interaction between the patient and the doctor, the duration and the quality correlates with adherence.[23]

Patients' perception of the threat posed by hypertension, the effectiveness of treatments and the importance of complying with therapy are variables that are also receiving attention.[24]

Drugs with fewer side effects improve adherence.[25] In a study by Youssef et al, 10% of the study population did not adhere with treatment simply because they wanted to avoid drug side effect.[26]

Depression is a risk factor for poor adherence. It has been associated with greater sensitivity to unpleasant side effects of drugs.[27] In a study by Carney et al, adherence with aspirin among elderly patients with coronary artery disease was studied; it was found that depressed patients adhered to their medication in a significantly lower proportion of days (45%) than those without depression (69%) [28]

Adherence to concomitant lipid-lowering and hypertensive medications falls by an average of 9% with each additional background prescription drug a patient is on.[29]

Adherence to medication tends to be better in short treatment courses and tends to reduce in patients who are to medication for a long period.

An assessment of the factors that affect adherence in an audit on the treatment of hypertension in general practice revealed that patients below the age of 55 years and those above 65 years adhered poorly to treatment medications compared to those between ages 55-65 years.[30]

The complexity of the prescription affect treatment adherence. In a study published in 1997, of 527 patients with arthritis who were prescribed non-steroidal anti-inflammatory drugs, an inverse linear relationship was found between the numbers of doses a day and adherence. Adherence was 78% for once a day dosing, 72% for twice a day dosing, 64% for thrice and 60% for four times a day dosing.[31]

Some other factors mentioned that affect adherence include forgetfulness, alcohol use, lack of knowledge about blood pressure and psychiatric disorders; the more symptoms reported, the lower the adherence.[32]

How to improve adherence to blood pressure lowering medication

At most 50% of people with chronic disease comply with their doctor's recommendations, irrespective of disease, treatment or age.[33]The current methods of improving medication adherence are complex, labor-intensive, and not predictably effective.[34] Simplified treatment regimen, accessibility of the heath facility, discussing adverse effects and encouragement of family support could positively affect adherence.[11]

Simplified treatment regime

Simpler medication regimens improve adherence in patients with hypertension. Research studies in this aspect showed that once daily medication gave a better adherence rate than multiple dosing and should be tried as a first line method of improving adherence.[27-28]In another study conducted in New York; fixed dose combination resulted in a 26% decrease in the risk of non-adherence compared with the free-drug component regimen.[29]

RESEARCH QUESTION

What are the factors that affect adherence to treatment among adult patients with hypertension in Kanye, Southern District council, Botswana?

AIM

To determine the factors that affect adherence to treatment in known adult hypertensive patients in Kanye sub district.

OBJECTIVES

1. The study tested the effect of the following factors on adherence to treatment.

- Patient's knowledge of the disease condition
- Accessibility to health care facility
- Duration of treatment
- Pill burden
- Availability of prescribed drugs
- Perceived adverse effect of medication

METHOD

Study Design: The design was a cross-sectional analytical study.

The setting of the study was the outpatient departments of the clinics in Kanye.

Study Population: The study population was the adult hypertensive patients that attended the seven clinics (Kanye Main Clinic, Mmamokhasi, Dilolwe, Sebego, Mafhikana, Dada and Kgwatlheng clinics) in Kanye.

Sample size:

The study sample size was 200 hypertensive patients. It was derived from an automated calculator using a 28% prevalence rate among a population of 40,628 persons in consultation with the Center for Statistical Consultation, University of Stellenbosch.

Adherence rates

The patient's self- reporting of adherence was used in this study to assess adherence levels. It resulted to 2 possible outcome variables

i. Adherent

ii. Non adherent

Adherent meant that patient took prescribed drugs fully or took more than 80% of the drugs whereas non adherent is taking less than 80% of the prescribed drugs. Patients who were adherent were those who missed taking medications for six days or less.

Inclusion Criteria

The study included only adults with hypertension from 18 years and above who lived in Kanye. Patients living with other chronic conditions who have hypertension were included. The patient must have been on hypertensive treatment for a period not less than 6 months.

Method of Data Collection

A systematic sampling method was used to select the study sample. Every second patient who came for review was sampled and the selected patients were coded. The questionnaire (Appendix 1) was self- administered but the researcher and two other trained health workers assisted the subjects who could not read or write. Data was collected over a period of thirty days. The setting for data collection was a designated room with minimal interruption during interviewing.

Validity of the data collecting tool

The data collecting tool was validated after a thorough Medline search and review of Cochrane data bases

Pilot study

A pilot study was to test run the questionnaire for problems. The pilot gave a general overview of how the study will go and allowed for the fine tuning on the practical procedures.

The pilot study was carried out at Kanye Main Clinic located at the central part of the village. The pilot was carried out on patients with similar characteristics as those that participated in the study but were not included in the study themselves A small population of about 10 patients was selected. Each of the patients signed consent after adequate information about the study was given.

Data Analysis

The statistical package STATA version 10 was used for data entry and analysis. The assistance of the university statistician was employed for this task. Mean, standard deviation, odds ratio and corresponding 95% confidence interval was computed. Pearson's chi-square test of association was used to test the strength of association between independent and dependent variables. Logistic regression analysis was used to model patients' adherence to medication as a function of demographic characteristics, medication cost, the perception of adverse effect, perception of treatment benefits, emotional wellbeing, physicians' factor, and availability of prescribed medication.

Ethical Consideration

The research proposal was approved by the University of Stellenbosch Human Research Ethics Committee (Reference Number=N11/04/105) Permission was also obtained from the Botswana Ethics Committee, Health Research Unit of the Ministry of Health. In the course of the study, the researcher referred all subjects found to have uncontrolled blood pressure to a physician for management.

RESULTS

The study was carried out over a thirty day period on two hundred participants.

Table1. Tabulation of demographic features of study population (N=200)
The table below shows the age distribution of the study population, age and marital status

Variables	Frequency	Percent
Age category in years		
30 – 39	14	7.00
40 – 49	39	19.50
50 – 59	61	30.50
60 – 69	54	27.00
70 - 79	26	13.00
> 80	6	3.00
Gender		
Male	63	31.50
Female	137	68.50
Marital status		
Married	82	41.00
Single	44	22.00
Divorced	12	6.00
Widowed	44	22.00
Co-habiting	8	4.00
Engaged	10	5.00

In the community where the research was carried out, more females have high blood pressure and a majority of them fall within the middle age. The demographic date above appears to be a true representation of the hypertensive population attending these clinics.

Table 2: Tabulation of study population's accessibility to the health facility (N=200)
The result shows mode of transportation used by the study population to get to the health facility. It also shows if the cost of transportation is cheap, affordable or expensive.

Variable	Frequency	Percent
Mode of transport		
Walking	156	78.00
Public Transport	23	11.50
Private car	21	10.50
Cost of transport		
Cheap	175	87.50
Affordable	10	5.00
Expensive	15	7.50
Distance from Facility		
< 5 km	179	89.50
5 – 8 km	18	9.00
>8 km	3	1.50

Table 2 shows that 89.5% of the population studied lived within 5km of the nearest clinic and considered that accessing the clinic was cheap.

Table 3: Tabulation of knowledge on hypertension of the study population (N=200)
The result shows patients understanding of the meaning of hypertension and the reason why they take drugs.

Variable	Frequency	Percent
Meaning of hypertension		
Increased blood volume	39	19.50
Increased blood pressure	61	30.50
Abnormal blood	23	11.50
I do not know	77	38.50
Counseled on risk		
Yes	140	70.00
No	60	30.00
Why do you take drugs		
To cure	20	10.00
To control	65	32.50
To stay alive	27	13.50
Avoid complication	38	19.00
Do not know	50	25.00

The findings on the study population's knowledge of hypertension varied. 19.5% understood hypertension to be increase in blood volume, 30.5% knew hypertension was increase in blood pressure and 11.5% understood it to be abnormal blood in the body. On the other hand, 38.5% had no meaning for hypertension. Overall, 31% of the population had a different understanding of blood pressure other than 'increased pressure'. More than half of the population (70%) had been counseled on the risk of uncontrolled hypertension.

Table 4: Tabulation of the Treatment History of the Study Population (N=200)

The table shows the study population's knowledge of their drugs, the number of classes of drugs taken and the dosing frequency

Variable	Frequency	Percent
Duration on Treatment		
6 – 12 months	18	9.00
> 12 months	163	81.50
Unknown	19	9.50
Do You Know Your Drugs (names)		
Yes	150	75.00
No	50	25.00
Classes of Drugs Taken in a Day		
1 class	75	37.50
2 classes	114	57.00
3 classes	11	5.50
Dosing Frequency per day		
Once Daily	91	45.50
Twice Daily	88	44.00
Thrice Daily	21	10.50

The treatment history of the study population shows. 75% of the population know the names of their medications.

37.5% of the study population used a class of blood pressure lowering drug while more than half of the study population (57%) used two classes and 5.5% used three classes of blood pressure lowering drugs. Overall, it showed that 89.5% had a dosing frequency of two times or less a day which is considered to be a simplified dosing frequency.

Table 5: Tabulation of Comprehension of Adherence (N=200)

The result below assessed if the patients were counseled on the dangers of poor adherence. For the study, adherence is poor if a patient missed taking medication for more than six days over a thirty day period that adherence was measured.

Variable	Frequency	Percent
Counseled on Dangers of Poor Adherence		
Yes	150	75.00
No	50	25.00
How Often do You see Your Doctor		
Every check-up	35	17.50
Once a month	135	67.50
Once in 3 months	22	11.00
Once in 6 months	4	2.00
Once a Year	1	0.50
Occasionally	3	1.50

Table 6: Tabulation of Comprehension of Adherence (N=200)

The table shows the population's understanding of the dangers of poor treatment of hypertension and how adherence can be improved.

Variable	Frequency	Percent
Dangers of poor treatment		
No danger	9	4.50
Poor control of BP	72	36.00
Poor quality of life	49	24.50
Complications	52	26.00
Do not know	18	9.00
How can we improve adherence?		
Counseling	69	34.50
Home visit	42	21.00
Regular check - ups	54	27.00
Decrease number of pills	35	17.50

The result of comprehension of the importance of medication adherence showed that 4.5% reported that there is no danger associated with poor adherence and 9% said they did not know. It also indicated that 86.5% knew that poorly treated hypertension posed a threat to their lives

34.5% agreed that counseling them regularly may improve their adherence, 21% think that home visits may improve adherence, 27% think they may improve when they get regular check-ups and17.5% reported that decreased number of pills may make them adhere better.

Table 7: Tabulation of Self Adherence Report of the Study Population (N=200)

The table shows the result of patients self-report of adherence. It shows if a patient missed taking medication in the previous thirty days that adherence was measured.

Variable	Frequency	Percent
Do you miss Appointments		
Yes	20	10.00
No	180	90.00
Days of missed medication		
None	50	25.00
6 days or less	90	45.00
> 6 days	60	30.00

The majority of the study population (90%) said they did not miss their appointments with the health worker. 70% reported good adherence level in the preceding 30days and 30% said they missed taking medication for more than 6 days in the last 30 days.

Table 8: Tabulation of Medication Availability in the clinics (N=200)

The result shows whether hypertensive medications are always available in the health facilities

Variable	Frequency	Percent
Medications availability		
Yes	23	11.50
No	177	88.50
If No, why		
Not applicable	23	11.50
Medication not available	177	88.50

88.5% reported that their medications were not always available and it made them miss taking medication properly.

Table 9: Tabulation of Emotional wellbeing of the Study Population (N=200)

Family support was defined as the ability of family members to support their relative who has hypertension and who remind them to take medications and go for check-ups.

Variable	Frequency	Percent
Family support		
Yes	170	85.00
No	30	15.00
Family support improves adherence		
Yes	197	98.50
No	3	1.50

85% admitted that they have family support in the management of their medical condition. However, 98.5% said that family support may improve their management.

Table 10: Tabulation of drug side effects in study population (N=200)

The result shows if drug side effects are experienced by the patients, if they are checked for side effects and the actions taken when side effect is experienced.

Variable	Frequency	Percent
Side effects experienced		
Yes	59	29.50
No	141	70.50
Side effects checked for by the doctor		
Yes	115	57.50
No	85	42.50
Actions taken by the patient		
No remedy	106	53.00
Stop Medication	34	17.00
Report to facility	60	30.00

29.5% of the study population had experienced an adverse drug event. Patients thought that the clinician checked patients for drug side effect in 57.5%. Fifty three percent of the study population did not take any action when they experienced drug adverse reaction, 17% stopped the medication when adverse event was experienced and 30% reported immediately to the health facility.

Table 11: Tabulation of disease co-morbidities acknowledged by the patients in the study population (N=200)

The result shows the number of the population who have other chronic diseases other than hypertension, those who were diagnosed with depression.

Variable	frequency	Percent
Chronic disease Present other than hypertension		
Yes	99	49.50
No	101	50.50
Depression diagnosed		
Yes	25	12.50
No	175	87.50
Drug for other chronic diseases like arthritis, diabetes, HIV/AIDS		
Yes	99	49.50
No	101	50.50

49.5% of the study population had an additional chronic medical condition like asthma, HIV/AIDS, Diabetes mellitus and osteoarthritis, with 55% on medications for chronic illnesses

in addition to blood pressure lowering drugs. A small percentage of the study population (12.5%) had been diagnosed with depression.

Table 12: Tabulation of adherence level of the study population (N=200)

Variable	Frequency	Percent
Adherent	140	70.00
Non adherent	60	30.00

The 70% adherence level observed in this study is below the 80% adherence level set for this study.

The result shows significant association (tested for by Pearson's chi-square test of association) for seven of the independent variables and adherence.

Table 13: Relationship of measured variables with adherence

Tabulation of variables	Chi^2 Values	P - Values
Adherence by counseling on risk of uncontrolled BP (Physician related factor)	116.6667	<0.0001
Adherence by increased number of pills taken by patients (Chronic treatment)	40.9091	<0.0001
Adherence by Understanding of treatment regimen (Know names/identify drugs)	150.0000	<0.0001
Adherence by Perception of treatment benefits (why drugs)	150.0000	<0.0001
Adherence by Family support	141.1765	<0.0001
Adherence by Patient Perception of adverse effects	103.1434	<0.0001
Adherence by medication not available	6.4972	0.0108

There was a significant association between adherence level and the counseling on the risks of uncontrolled hypertension, patients' experience with pill burden, patients understanding of treatment regimen, patients perception of treatment benefits, emotional wellbeing, patients' perception of drug adverse effects and cost of medication.

There were no associated variables that remained associated at the end of the logistic regression analysis.

DISCUSSION

Long-term adherence with antihypertensive medication regimens has been poor. In one study, only 49% of patients took more than 80% of their prescribed dosages during the first year of treatment.[35]Other studies indicate that 16% to 50% of hypertensive patients quit taking their medications within the first year of treatment.[36]

Improved adherence to treatment in hypertension has been associated with reduced morbidity and mortality.[37] Studies in the past showed that adherence to treatment in hypertension can vary from a low 50% to a high 80%. This has been attributed to varying methodological approach used in setting the adherence levels.[26]

The 70% adherence level observed in this study falls within the adherence levels observed in other studies. Adherence level was based on patient self-reporting which can be exaggerated. It is generally accepted that patients' reporting of non-adherence is reliable but the denial of non-adherence is not entirely correct; however, patient self-reporting of adherence is recommended in clinical practice because it is simple and has been proven to be fairly accurate.[26] There was a high adherence level despite the fact that 25% of the studied population did not know the reason why they were on treatment. This could be due to the strong family support the study population had from family members.

The high adherence level observed in this study could be because treatment is provided to the citizens of Botswana at no cost. Another reason for the high adherence level observed in this study could be attributed to the fact that adherence was checked for the last thirty days of taking treatment.

This study demonstrated that there is an association between physician's related factors and patients' adherence outcome levels. The study showed that 25% of the population did not know

the reason why they were on hypertension treatment. It gave a P-value <0.0001 which means that there is a significant statistical association between understanding the reason for treatment and medication adherence. This reason could be that some of the clinics where the study was carried out did not get doctor's visit on a daily basis, which could result in some patients not being counseled before they were started on treatment. Patients who were educated on hypertension by their health care providers are likely to adhere to treatment more than those who were not educated by their physicians. This has a similar trend in a study done by Yiannakopoulou et al; it demonstrated that adherence is associated with more effective BP control. Physicians can enhance patient adherence and hypertension control by devoting more time to counseling, avoiding unnecessary changes in drug regimens and restricting the tablets numbers.[38]

Adequate counseling on the risks of uncontrolled hypertension can also affect patient's adherence level. The study revealed that 30% of the population studied admitted that they were not counseled by their health care provider and this group, n=60, reported being non adherent. This finding is similar to what was demonstrated in 2005 by Yiannakopoulou et al.[38]

This study indicated a significant association between patient's perception of treatment benefit and adherence level, patients who believe that they are vulnerable or susceptible to the consequences of the disease tend to adhere to prescribed treatment more than those who do not understand the reason for treatment.[27] On the other hand, 25% did not know the benefits of treating hypertension. Patients who did not know the health benefits of treating hypertension could be that they were not adequately educated on hypertension by the heath care provider.

Drug adverse effect is a primary reason why patients on antihypertensive therapy adhere poorly to treatment.[25] In one study done in 1999, it showed that 34% of the patients reported unacceptable adverse drug events which made them discontinue their therapy.[39] The finding in this study showed that 29.5% experienced adverse drug events and 17% out of this population stopped taking their medication. The analysis showed a statistically significant finding when patients' experience of drug adverse event was analyzed against adherence. It therefore means that drug adverse event experienced by patient impacts on his medication adherence.

In our study, it was demonstrated that the higher the number of pills a patient is taking, the less the adherence and 55% of the population studied were also on medications for another chronic

disease. The analysis shows that the higher the number of medications a patient is taking for different diseases, the lower the adherence. Pill burden is a challenge among some of the patients in the study population. The most important reason is that combination tablets and sustained release tablets are rarely available in the public sector in Botswana; therefore patients are prescribed multiple medications with increased dosing frequency when a chronic medical condition is present. A similar finding by Iancin in 2006 showed that adherence to medications fall by an average of 9% with each additional prescription drug a patient is on.[29]

Among the population studied, 15% reported that they had no family support. This could result from patients having lost close family members to illnesses like HIV/AIDS. There was a significant association between adherence and whether the patient had a stable family support. In a study that looked at psychosocial risk factors and adherence, a similar trend was reported.[40]

The ability of the patient to know the medications he is on and how to take them improves adherence. 25% of the patients in this study did not know their medication(s) either by name or ability to identify them. This was significant in the chi square test of association. This means that patients who do not know their drugs and how to use them had a lower adherence to treatment when compared to their counterparts who knew their drugs and how to use them. In a study by Atreja et al, they showed that simplifying the treatment regimen to the patient's understanding enhances adherence.[41]

Medications are provided to the citizens of Botswana for free and cost of medication is not expected to be a barrier to adherence; nonetheless, 88.5% reported that drugs were not always available at their health facilities. This could result in patients being forced to buy medications from the private pharmacy shops. The cost of medication is shown to be a barrier to adherence. The Chi square test of association showed that medication non-availability may have impacted on medication adherence.

The study of the patient's age showed that 16% of the study population was above seventy years. In one study, was reported that patients above sixty-five years of age adhere poorly to treatment.[34]

In this study, accessibility to health care facility did not impact on medication adherence; the reason may be because 98.5% of the population lived within eight kilometers from the health

facility, which enhanced accessibility. The patients studied reported that accessing the facility is cheap because majority of them walk to their health facility. This is similar to the report by WHO (2003) which states that long distance from the treatment center is one of the socioeconomic factors that affect adherence to long term therapies.[6]

Limitations of the study

Adherence level was measured over only the preceding 30 days and could have resulted in the high adherence level observed. This was a cross sectional study. A systematic sampling method was used to select the study population and data was collected by interviewing patients, the data collected were prone to some measurement bias from the study subjects and the interviewer, examples were errors in the estimation of the number of the study population, recall bias, errors in estimating the level of adherence to treatment from the patient etc. Cross sectional studies demonstrate associations and are reported as observations; therefore it has a reduced weight of proof as compared to a research with cause and effect relationship.

RECOMMENDATIONS

Based on the findings in this study, the following recommendations were proposed.

- Physicians are encouraged to educate patients adequately through patient centered approach and help patients understand the meaning of their medical condition; counsel them on the associated risks and dangers of poor adherence. The physician should endeavor to confirm their patients' understanding by giving them the opportunity to clarify their understanding.
- Health care workers are encouraged to check patients for drug adverse effect at all times to enable prompt identification of side effects and its management.
- The health care workers are advised to adhere to rational prescribing by using available guidelines on hypertension treatment.
- The Kanye District Health Management Team is advised to see ways of improving the medication availability in the district.

CONCLUSION:

The findings in this research have shown that physician's related factors have a great influence on the patients' adherence level to treatment. Patients who were adequately counseled by their physician were more likely to adhere to treatment compared to those who were not counseled. It has also been established that patients' understanding of the treatment regimen and patients' perception of the treatment benefits are some other factors that enhance adherence in a patient with a chronic medical condition like hypertension. Those who did not understand the regimen are more likely to adhere poorly compared to those who understood the regimen. The drug adverse effect is another important factor seen to affect adherence as shown in this study. Patients who experienced side effects are more likely to be non-adherent compared to their counterparts who did not experience any drug side effects. The number of pills a patient takes in a day also impacts on adherence. Patients who take many tablets and for increased number of times in a day are more likely to adhere poorly compared to those who take one tablet once a day. Finally, the patients' emotional state is a very important factor that improves adherence. Patients who had family support adhered better than those who did not have family support.

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APPENDIX 1

Instruction: This questionnaire is for the purpose of research. Your personal details are not require and no information given will be disclosed in any form

Tick (X) where appropriate

Date..... Instrument Number.....

SECTION A General Information

1. Age in years**.....**

2. Gender Male ☐ Female ☐

3. Marital status Married ☐ Single ☐ Divorced/Separated ☐

Widowed ☐ Co-habiting ☐ Engaged ☐

4. Educational Level Completed None ☐ Primary ☐ Secondary ☐
Tertiary (Specify) ☐ Vocational ☐

5. Employment status Employed ☐ Unemployed ☐ Student ☐
Volunteer ☐ Self-employed(specify) ☐

☐ ☐

6. How much do you earn per month in Pula? No income 0-999 1000-1999 ☐ 2000-2999 ☐ 3000 and above ☐

7. How do you get to the health facility? Walking ☐ Public transport ☐ private car ☐ others (Specify).....

8. How do you grade the cost of transport? Cheap ☐ Affordable ☐ Expensive ☐

9. Do you incur any other cost other than transport in getting to the health facility? Yes ☐ No ☐

10. How far is the health facility away from your home? Less than 5 km ☐ 5 – 8Km ☐ More than 8Km ☐

SECTION B CLINICAL INFORMATION

11. What does hypertension mean to you? Increased blood volume ☐ Increased blood pressure ☐ abnormal blood in the body ☐ others (Specify).....
12. Have you been counseled on the risks of uncontrolled hypertension? Yes ☐ No ☐

13. Is hypertension curable? Yes ☐ No ☐

14. Why do you take blood pressure lowering drugs? To cure ☐ To Control ☐ To stay Alive ☐ To avoid complications like stroke, heart failure ☐ No benefit ☐ others (Specify).....
15. How long have you been on blood pressure lowering drugs? Less than 6 months 6 – 12 months ☐ more than 12 months ☐ Unknown ☐ ☐

16. Do you know your hypertension drugs and how to use them? Yes ☐ No ☐

17. Current hypertension treatment

Antihypertensive	
Diuretic (Amiloretic/B.thiazide/hydrochlorothiazide	
ACEI (Enalapril/ Captopril)	
Calcium Blockers (Nifedipine/ Amlodipine)	
B-blockers (Atenolol/ Propranolol/ Bisoprolol)	
a-methyldopa (methyldopa)	

Others (specify)	

18. How many hypertension tablets do you take in a day? 1 tablet ☐ 2 tablets ☐
3 tablets ☐ 4 tablets ☐ 5 tablets ☐

19. How many times a day do you take hypertension tablet? Once daily ☐
Twice daily ☐ Thrice daily ☐ > 3 times ☐

20. Has the regimen ever been changed? Yes ☐ No ☐

21. If yes, how many times? Once ☐ Twice ☐ Three times or more ☐
Cannot remember ☐

22. Reasons for changing regime? Adverse/side effect ☐ Unavailability ☐
Too sick to go for refill ☐ Poor blood pressure control ☐
Unknown ☐

SECTION C ADHERENCE COUNSELLING

23. Have you been counseled on the dangers of not taking hypertension treatment properly?
Yes ☐ No ☐

24. If yes, who counseled you on adherence? Doctor ☐ Nurse ☐
Pharmacist/Pharmacy technician ☐ others (Specify).....

25. How many times did you receive adherence counseling after you started treatment? Once ☐
Twice ☐ Three times ☐ Four times ☐ More than five times ☐

26. How often do you see your doctor about your hypertension treatment?
At every check-up ☐ Once a month ☐ Once in three months ☐ Once in
6 months ☐ Once a Year ☐ Occasionally ☐ Others
(Specify).....

27. What are the dangers of not taking your drugs regularly? No Danger ☐
Poor control of blood pressure ☐ Poor quality of life ☐ Onset
of hypertension related complications ☐ ers (Specify).....

28. How can we make you take your drugs regularly? Counseling ☐ Home visits ☐
Regular check-ups ☐ Decreased number of drugs ☐ others (Specify).....

SECTION D SELF ADHERENCE REPORT

29. Do you miss appointments to the clinic? Yes ☐ No ☐

30. If yes, which ones among these make you miss appointments to the health facility?

Felt better/stable		Alcohol use		Traditional medication	
Clinic was not accessible		I forgot			
Depressed/ lack of interest in treatment		Lack of transport to the clinic		Did not understand instructions	
Too many pills		Ran out of pills		Others specify	
Hospitalized		Due to side effects of drugs			

31. Are your medications always available at your health facility? Yes ☐ No ☐

32. If, no, what is the reason(s)? Medications not available ☐ Facility is closed ☐
others (specify).....

33. How many days in the past 30 days have you missed taking blood pressure lowering drugs?
None ☐ < 6 days ☐ > 6 days ☐

34. Do your family members give you the support you need in the course of management of your hypertension? Yes ☐ No ☐

35. Will family support make you adhere better to treatment? Yes ☐ No ☐

SECTION E SIDE EFFECTS/ADVERSE REACTION

36. Have you experienced any of these side effects after taking you hypertension treatment?
You can choose more than one option

Side effects/adverse reaction	Yes	No
Nausea/ feeling like vomiting (Methyldopa)		
Vomiting (Methyldopa)		
Headache (Nifedipine/Amlodipine)		
Dizziness (Thiazide/Hydrochlorothiazide)		
Diarrhea (Nifedipine/Amlodipine)		
Poor night sleep (Propranolol/Atenolol)		
Prolonged dry cough (Captopril/Enalapril)		
Dry mouth/ increased thirst		
Loss of libido/low sex drive (Propranolol/Atenolol)		
Depression /low mood (Methyldopa)		

Leg swelling (Nifedipine/Amlodipine) Rash (Methyldopa) Others (please specify)		

37. Are you checked for the above side effects by your heal care provider? Yes ☐ No ☐

38. What remedies or action do you take when you experience side effects or adverse reaction?
No remedy ☐ Stop medication ☐ Report to the health facility ☐ thers (specify).....

SECTION F TRADITIONAL MEDICATION

39. Since you started hypertension treatment, have you consulted the traditional healer?
Yes ☐ No ☐

40. If yes, why? No improvement ☐ Not satisfied with health worker/facility ☐
To speed up healing ☐ others (specify).....

41. What advice did the traditional healer give you about hypertension and its treatment?
Stop modern medicine ☐ Adding traditional medicine helps in treatment ☐
refer back to health facility ☐ others (specify).....

42. Are you taking any traditional treatment at the moment with the hypertension treatment?
Yes ☐ No ☐

SECTION G OTHER CO-MORBIDITIES

43. Do you have any other chronic illness like Diabetes mellitus, HIV, Epilepsy, arthritis/ joint pains, asthma? Yes ☐ No ☐ Others (Specify).....

44. Have you ever been diagnosed of depression or low mood? Yes ☐ No ☐

45. Are you on any other drug for chronic illness or medical conditions mentioned above?
    Yes ☐ No ☐

46. Do you smoke? Yes ☐ No ☐

47. Do you think that your smoking affects your hypertension treatment?
    Yes ☐ No ☐

48. If yes, how? No effect on blood pressure ☐ Increases blood pressure ☐
    Reduces blood pressure ☐ others (specify).....

49. Do you drink alcohol/beverage/spirit/chibuku? Yes ☐ No ☐

50. Do you think that your alcohol/chibuku consumption affect your hypertension treatment?
    Yes ☐ No ☐

51. If yes, how? If yes, how? No effect on blood pressure ☐ Increases blood pressure ☐ Reduces blood pressure ☐ others (specify).....

THANK YOU