Compliance and Non-Compliance to Antihypertensive Treatment Regimen and the Prevalence of Complication among Hypertensive Patients Attending the Mifi District Hospital

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Abstract

Hypertension remains one of the most plaguing diseases in the world. The World Health Organization (WHO) approximate the occurrence of hypertension in high-income countries as 35% for both genders, while in low, lower- middle and upper middle-income countries the prevalence is around 40%. Its prevalence is on the rise in middle income countries due to a gradual change in the lifestyle of people. Treatment and management measures remain a huge burden to patients, leading to noncompliance which may contribute to the development of hypertension complications. Treatment regimen problems are widespread, and seriously compromise the effectiveness of antihypertensive treatment. Factors such as patients' health beliefs, morals, communication skills, local language, lifestyle, social construction and support, and socioeconomic position have been proven to have an effect on medication adherence. Although the benefits of antihypertensive medications in controlling hypertension is reported, most patients fail to keep it under control because of poor adherence to treatment regimen. The aim of this study was to determine the level of compliance to antihypertensive treatment regimen, to determine the factors associated to non-compliance to antihypertensive treatment regimen and to determine the prevalence of hypertension complication among hypertensive patients attending the Mifi District Hospital. This study has utilized a descriptive hospital based cross-sectional study design, involving all consented conveniently sampled hypertensive patients that came for follow up during the time of study. Out of a total sample size of 200 hypertensive patients, majority were females accounting for a percentage of 55% (n =110) and the rest were male with a percentage of 45% (n = 90). 36 respondents (18%) had excellent compliance to antihypertensive treatment regimen, 50 respondent (25%) had good compliance, 37(18.5%) had fair Compliance and 77(38.5%) respondents had poor compliance to antihypertensive treatment regimen. There was an observed statistically significant association between patient's related factors to non-compliance and all the sociodemographic factors: gender (p= 0.013), age (p=0.000), level of education (p=0.01), marital status (p=0.038), profession (p=0.00), living with hypertension (p=0.00), duration on treatment (p=0.00) and Blood Pressure (BP) check (p=0.026). As complications, 63(31.5%) experienced blindness, 30(15%) experienced collapse, 26(13%) developed diabetes, 13(6.5) experienced stroke, 9(4.5%) developed kidney disease, 1(0.5%) developed heart problem. Only 58(29%) had no complications. There was a positive correlation between non adherence to treatment regimen and development of hypertension complications (r=0.36, p=0.001). This study therefore conclude that medication non-adherence remains a crucial problem for both the patients and the society. It is therefore recommended that there be accessibility to antihypertensive drugs at affordable prices and to organize campaigns to educate the population on the importance of taking medication properly.

Keywords: Compliance; Treatment Regimen; Factors; Hypertension; Treatment

Abbreviations

WHO: World Health Organization; X^2: Chi Square; CHF: Congestive Heart Failure; LVH: Left Ventricular Hypertrophy.

Background

Hypertension over the years has remained a universal public health issue due to its continuous high occurrence and related risks of cardiovascular and kidney diseases [1]. A sum of one billion cases of hypertension was reported in the year 2000; with a future rise of about 30% by the year 2025. It is the number one cause of death; resulting in about 17 million deaths per year worldwide [2]. Presently, 1.6 billion people are affected with high blood pressure worldwide [3]. Globally the overall occurrence of hypertension in adults aged 25 and over was around 40% in 2008 [4]. Hypertension is expected to cause 7.5 million deaths worldwide yearly, about 12.8% of the total deaths from all causes [5].

The current prevalence of hypertension in many developing countries is reported to be already as high as is seen in developed countries [6]. Hypertension is one of the top causes of disabilities and mortality in Africa; with growing occurrence and mortality rates among adults. Additionally, it is one of the highest health problems after HIV/AIDS in the continent. According to Adeloye and Basquil [7], in spite of reports of a higher frequency of hypertension in Africa compared to other regions, some professionals in Public Health are of the view that the real problem is still not known.

A person with hypertension is described as one with≥140 mmHg as systolic blood pressure, or ≥ 90 mmHg diastolic blood pressure [8]. Information of hypertension, medication adherence and self-efficacy skills are some of the factors that might contribute to active care of hypertension [9]. Hypertension has a lot of complications. It leads to microvascular damage in the cerebral and retinal circulations [4]. Since retinal and cerebral vessels share similar embryological and anatomical features, they may exhibit comparable patterns of damage caused by conditions like hypertension. Hypertension results in both acute and chronic abnormalities in the eye. These changes impact various parts of the eye and can be classified into three types of hypertensive ocular conditions: choroidopathy, retinopathy, and optic neuropathy and can even lead to stroke [1].

Medication adherence means patients' ability to follow a provider's recommendation with respect to dosage, timing, and frequency of taking their prescribed medications [10]. Treatment regimen problems are widespread, and seriously compromise the effectiveness of antihypertensive treatment. Although the benefits of antihypertensive medications in controlling hypertension is reported, most patients fail to keep it under control as a result of poor adherence to treatment regime [11-13]. An earlier study by Haynes, et al. [14] came out that sufficient control of hypertension was connected with intake of at least 80% of a prescribed treatment. The patients' capacity to notice a benefit from the intake of antihypertensive treatment is important in warranting adherence to therapy. Africans have low adherence to either life dynamics or prescribed treatment due to little education level. In some instances, informal education, poor relationship with health care deliverers, information about treatments and their side effects, social and socio-economic support, proximity to health care facility, psychological factors, lack of national health insurance, prolonged and unending treatment, and mainly a lack of individual responsibility for his/her health are the most reported factors responsible for non-adherence to treatment regimen [12].

Non-compliance to treatment in hypertension has been reported to amount to increase in hypertension complications. Research has shown that medication non-compliance is the most important reason for poorly controlled hypertension. About one quarter of the deaths in Cameroon over the 1975 -1980 periods was reported to be because of cardiovascular diseases of which hypertension is part [15].

Non-compliance to antihypertensive medication has led to a significant increase in the incidences of stroke, ischemic heart disease, congestive heart failure, chronic renal disease and sudden death irrespective of age, gender and settlement area [16]. Hypertension is a challenging public health problem with a huge burden in the developing countries especially in Cameroon. Despite the Cameroon's government action to reduce the risk of hypertension within hypertensive patients by organizing seminars to create awareness on the risk of hypertension and the importance of antihypertensive drugs, Reducing the price of antihypertensive medication and creation of centers that permanently dispose of hypertensive medication, we still observe an increase in hypertensive complication resulting from treatment noncompliance [16]. This study therefore aimed to assess the level of compliance to treatment regimen and factors associated with non-compliance and the prevalence of complications amongst hypertensive patients attending the Mifi District Hospital.

Methodology

This study was carried out in the Mifi District Hospital utilizing a descriptive hospital based cross-sectional study design. The study included 200 freely consented, known conveniently sampled hypertensive patients that came to the above health structure for their hypertension control. The study excluded hypertensive patients who had complications related to hypertension before developing hypertension. The

study utilized a well formulated closed ended questionnaire to collect data from the study participants. Data analysis was done using SPSS version 21. The Chi square (X^2) and correlation tests were used for inferential statistics. The test was carried out at the sole probability of 0.05 and statistical significance was considered if p value was less than or equal to 0.05. For compliance quantification from respondents, for sections relating to compliance, excellent compliance was considered if patients answered 80% and more correct questions in that particular section that indicated good follow up and taking of prescribed medications.

Good compliance was considered when the correct answer ticked by the patients constituted 60–70.9% of all answers in that section. Fair compliance was considered when patients answered 50–59.9% of the answers in that section correctly. Poor compliance was considered when less than 50% of the answers chosen by the patients was correct indicating poor follow up and taking of prescribed medications. Ethical clearance was obtained from the West Ethical review committee in Cameroon.

Results

Out of a total sample size of 200, majority of the hypertensive patients were females accounting for a percentage of 55% (n =110) and the rest were males with a percentage of 45% (n = 90). With respect to the age range, the majority reported to be between the age of 18-30 years giving a percentage of 36.5% (n = 73) and 15.5% (n = 31) reported to be 60> years. 30% (n = 60) reported to have completed Bachelor degree while 5.5% (n = 11) reported to have reached the PhD level. Concerning the marital status, a majority of 70.5% (n = 141) declared to be married while 29.5% (n = 59) reported not to be married. 26% (n = 52) reported to be entrepreneurs. Up to 40.5% (n =81) reported to check their BP once a week. 46.5% (n = 93) reported to have been living with Hypertension between 1-4year and 4% (n = 8) reported to have been living with it for 10 year and above. Majority of respondent 39.5% (n = 79) reported to be under treatment for a year or less, compared to 2.5% (n= 5) that reported to be had been living with hypertension already for 15 year and more. This is presented in table 1 below:

Variable	Characteristic	Frequency	Percentage (%)
Gender	Male	90	45
	Female	110	55
Total		200	100
Age range	18-30years	73	36.5
	31-45years	42	21
	46-60 years	54	27
	60+	31	15.5
Total		200	100
Are you married?	Yes	141	70.5
	No	59	29.5
Total		200	100
Educational level	High school	57	28.5
	Bachelor' degree	60	30
	Master's	33	16.5
	PhD	11	5.5
	Trade school	39	19.5
Total		200	100
Since when have you been living with Hypertension	<1 year	59	29.5
	1-4 years	93	46.5
	5-10 years	40	20
	10>	8	4

Total		200	100
Profession	Entrepreneur	52	26
	Business man	33	16.5
	Farmer	19	9.5
	House wife	40	20
	Teacher	18	9
	Others	38	19
Total		200	100
Duration of treatment	<1 year	79	39.5
	1-5years	56	28
	6-10 years	40	20
	11-15 years	20	10
	15>	5	2.5
Total		200	100
How often do you check your BP.	At least twice a day	35	17.5
	At least twice a week	71	35.5
	Once a week	81	40.5
	Once a month during refill	13	6.5
Total		200	100

Table 1: Descriptive characteristics of respondents.

Level of Compliance to Antihypertensive Treatment Regimen

Figure 1 below shows patient's level of compliance to Antihypertensive regimen. Out of a sample size of 200, 36 respondents (18%) had excellent compliance to Antihypertensive treatment regimen, 50 respondent (25%) had good compliance, 37(18.5%) had fair Compliance and 77(38.5%) respondents had poor compliance to Antihypertensive treatment regimen.

Figure 1: Summary of patient's level of compliance to Antihypertensive treatment regimen.

Factors Associated to Non-Compliance to Antihypertensive Treatment Regimen

Patient's related factors to Non-compliance to antihypertensive treatment regimen Figure 2 below presents the factors associated with non-compliance to antihypertensive medications in this study. The highest factor identified to non-compliance was the high cost of medications accounting for 54.5% (n=109). This was seconded by poor communication with health providers accounting for a percentage score of 22.5% (n=45).
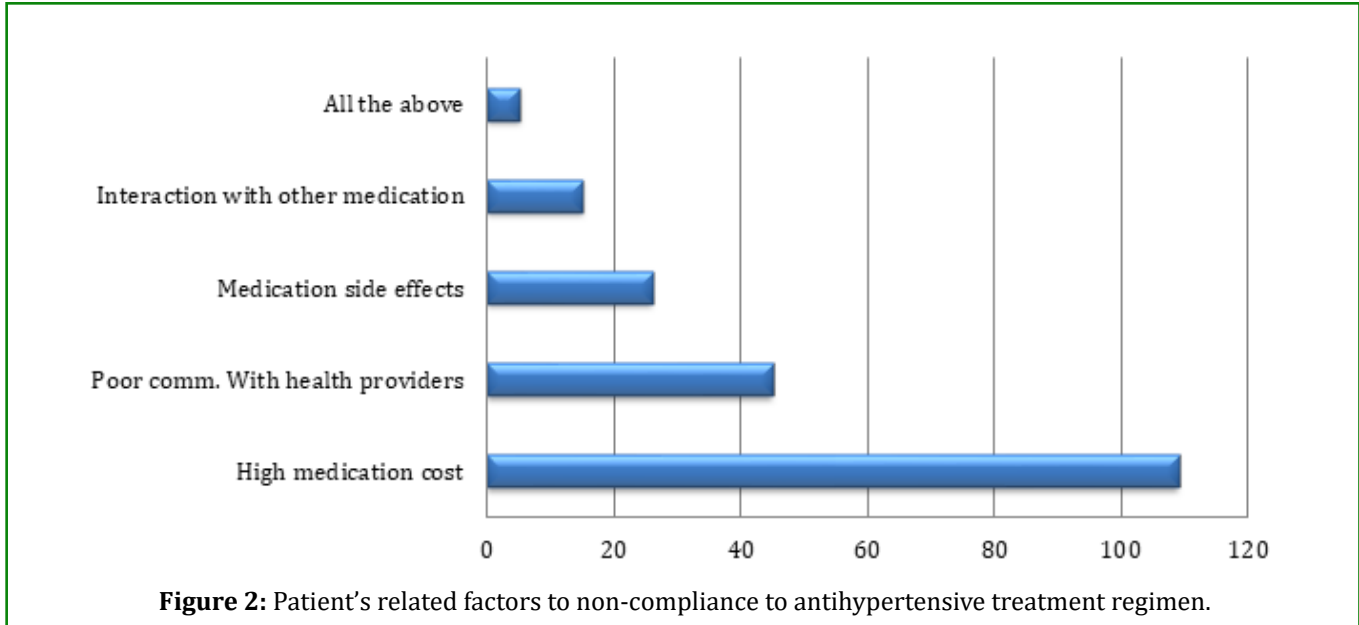

Figure 2: Patient's related factors to non-compliance to antihypertensive treatment regimen.

Association of patient's related factors to Non-compliance with socio-demographic factors.

There was an observed statistically significant association between patient's related factors to non-compliance and all the sociodemographic factors: gender (p= 0.013), age (p=0.000), level of education (p=0.01), marital status (p=0.038), profession (p=0.00), living with hypertension (p=0.00), duration on treatment (p=0.00) and BP check(p=0.026) as seen in table 2 below.

Variable		Reasons for not taking medication as prescribed					X2 (P value)
		High medication Cost n (%)	Poor comm. With health providers n (%)	Medication Side effect	Interaction with other medication n (%)	All the above n(%)	
Gender	Male	59 (29.5)	11(5.5)	12 (6.0)	05(2.5)	03(1.5)	12.646
	Female	50(25.0)	34(17.0)	14 (7.0)	10 (5.0)	02(1.0)	(0.013)*
Age range (years)	18-30 years	23(11.5)	25 (12.5)	16 (8.0)	09(4.5)	0.0 (0.0)	
	31-45 years	24 (12.0)	06 (3.0)	04(2.0)	03 (1.5)	05(2.5)	57.356
	46-60 years	44 (22.0)	06 (3.0)	01(0.5)	03 (1.5)	0.0 (0.0)	(0.001)*
	60+	18 (9.0)	08 (4.0)	05(2.5)	0.0 (0.0)	0.0 (0.0)	
Educational level	High school	37 (18.5)	09 (4.5)	08 (4.0)	03(1.5)	0.0 (0.0)	
	Bachelor degree	33 (16.5)	13 (6.5)	06 (3.0)	04(2.0)	04(2.0)	39.149
	Master's degree	22 (11.0)	05 (2.5)	03 (1.5)	03(1.5)	0.0 (0.0)	(0.01)*
	PhD	02 (1.0)	05(2.5)	00 (0.0)	04(2.0)	0.0 (0.0)	
	Trade school	15(7.5)	13(6.5)	09(4.5)	01(0.5)	01(0.5)	

Marital status	Yes	80(40.0)	35(17.5)	17 (8.5)	08 (4.0)	01(0.5)	10.159
	No	29 (14.5)	10(5.0)	09 (4.5)	07(3.5)	04(2.0)	(0.038)*
Profession	Entrepreneur	49 (24.5)	06(3.0)	03 (1.5)	01 (0.5)	0.0 (0.0)	
	Business man	22 (11.0)	05(2.5)	01(0.5)	03(1.5)	02(1.0)	
	Farmer	03 (1.5)	09 (4.5)	02(1.0)	04(2.0)	01(0.5)	62.035
	Housewife	16(8.0)	15(7.5)	08(4.0)	01(0.5)	0.0 (0.0)	(0.001)*
	Teacher	09(4.5)	00(0.0)	05(2.5)	02(1.0)	0.2 (1.0)	
	others	17 (8.5)	10(5.0)	07(3.5)	04(2.0)	0.0 (0.0)	
Duration of HTN	<1year	24(12.0)	20(10.0)	10(0.5)	01(0.5)	04(2.0)	62.837
	1-4 year	64(32.0)	10(5.0)	09(4.5)	10(5.0)	00(0.0)	(0.001)*
	5-10 years	20(10.0)	15(7.5)	01(0.5)	03(1.5)	01(0.5)	
	10>	01(0.5)	00(0.0)	06(3.0)	01(.05)	00(0.0)	
Duration of Treatment	<1 year	33(16.5)	21(10.5)	15(7.5)	06(3.0)	04(2.0)	
	1-5 year	37(18.5)	09(4.5)	05(2.5)	05(2.5)	00(0.0)	
	6-10 year	27(13.5)	15(7.5)	00(0.0)	04(2.0)	00(0.0)	67.994
	11-15 year	18(9.0)	00(0.0)	01(0.5)	00(0.0)	01(0.5)	(0.001)*
	15>	00(0.0)	00(0.0)	05(2.5)	00(0.0)	00(0.5)	
How often do you Check your BP	At least 2/day	16(8.0)	09(4.5)	05(2.5)	05(2.5)	00(0.0)	
	At least 2/week	35(17.5)	20(10.0)	08(4.0)	05(2.5)	03(1.5)	23.163
	Once a week	48(24.0)	16(8.0)	12(6.0)	05(2.5)	05(3.0)	(0.026)*
	Once a month	10(5.0)	00(0.0)	01(0.5)	00(0.0)	02(1.0)	

*-Statistically significant at 0.05 significance level, HTN-Hypertension

Table 2: Association analysis of patient's related factors of Noncompliance with socio-demographic factors.

There was a statistically significant association between level of education and the reasons why patients where not taking their medication as prescribed in this study (p = 0.01). Majority of respondents 37(18.5%) with higher-level, majority of those having bachelor degree 33(16.5%), those with master degree 22(11%) and those in trade school 15(7.5%) reported of not taking their medication due to high medication cost while majority of respondent with PhD 5(2.5%) reported of not taking their medication due to poor communication between health staff and patients (Figure 3).
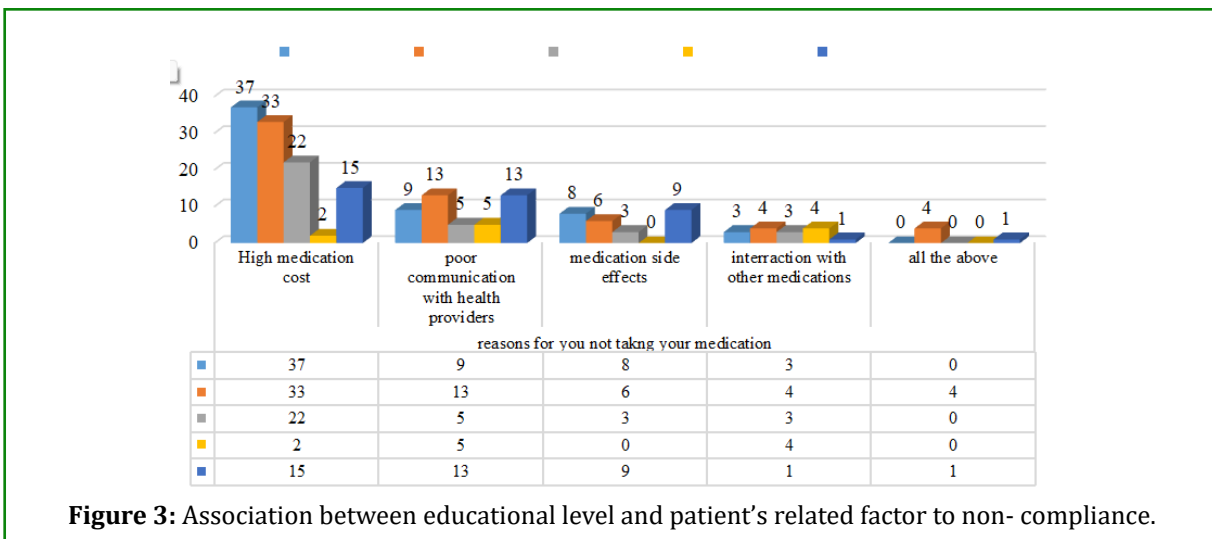

Figure 3: Association between educational level and patient's related factor to non-compliance.

Health Care Service-Related Factors to Non-Compliance to Antihypertensive Treatment Regimen

The highest healthcare service-related factor to non-compliance to antihypertensive treatment regimen in this study was observed to be insufficient or lack of qualified care providers, accounting for 31% (n=62). This was seconded by shortage of drugs, accounting for 26.5% (n=53) as presented in Figure 4 below.
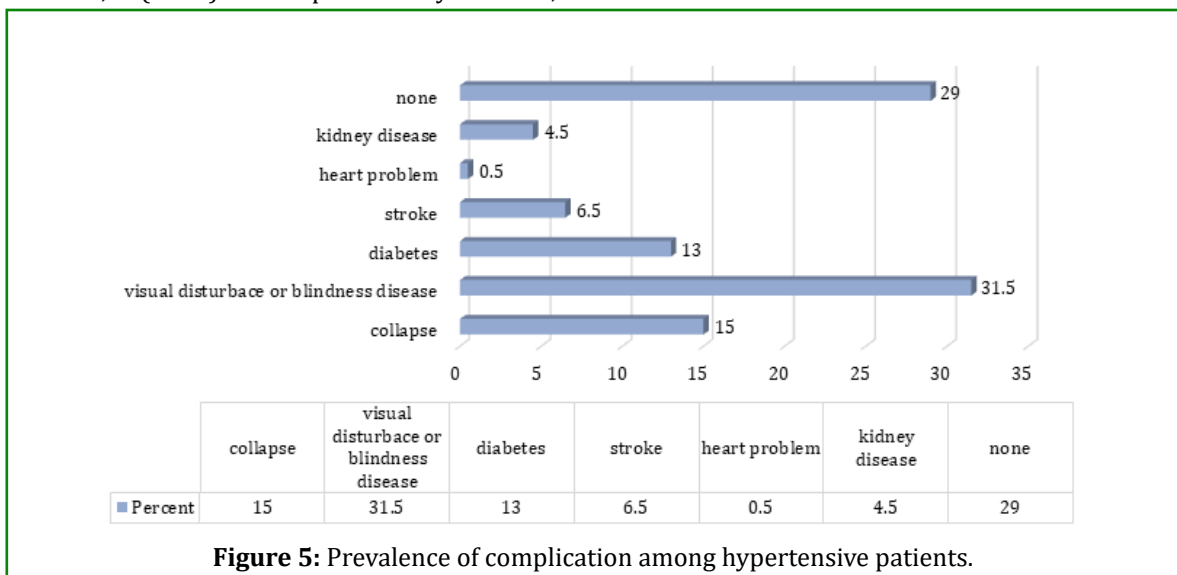

Figure 4: Health care related factors to non-compliance to antihypertensive treatment regimen.
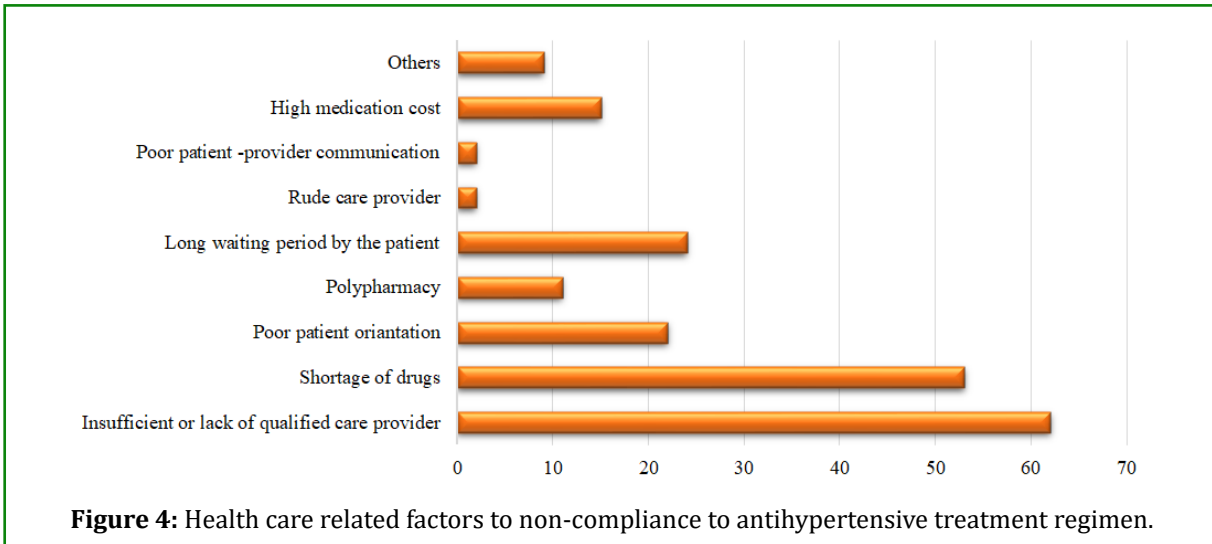
Prevalence of complication among Hypertensive Patients

Figure 5 below shows the prevalence of complication among hypertensive patients. Out of a sample size of 200, 63(31.5%) experienced blindness as a complication, 30(15%) experienced collapse, 26(13%) developed diabetes, 13(6.5) experienced stroke, 9(4.5%) developed kidney disease, 1(0.5%) experienced heart problem and 58(29%) had no complication.

There was a positive correlation observed between non compliance to treatment regimen in hypertension and the development of hypertension complications in this study (r=0.36, p=0.001).

	collapse	visual disturbace or blindness disease	diabetes	stroke	heart problem	kidney disease	none
■ Percent	15	31.5	13	6.5	0.5	4.5	29

Figure 5: Prevalence of complication among hypertensive patients.

Discussion

Out of a sample size of 200, 36 respondents (18%) had excellent compliance to Antihypertensive treatment regimen, 50 respondents (25%) had good compliance, 37(18.5%) had fair Compliance and 77(38.5%) respondents had poor compliance to Antihypertensive treatment regimen. From this study compliance to anti-hypertensive

treatment regimen was 61.5%. this was lower compared to the study conducted in Ghana [16] where adherence was 89.2%. this was also lower than a study conducted in Scotland where Adherence was 91.0% [17]. Additionally, adherence to antihypertensive medication observed in this study was relatively high compared to other study reported in Ghana; teaching hospital (47.7%) and a multi-center study in Ghana and Nigeria (33.3%) [13,16]. Although adherence in this study was a little bit high compared to other study and low compare to others, differences in methods used to assess medication adherence may have accounted for this. Assessment of adherence may differ base on the population, study design and method of measurement. The Cameroons government action plan on the organization of education campaigns on hypertension could reduce specific barriers such as lack of communication to reach out to as many persons as possible with respect to reducing hypertension effects in the communication. Campaigns serve as a powerful communication tool, enabling individuals, organizations, or governments to convey messages, influence opinions, and drive actions. They are structured efforts designed to reach specific audiences through strategic messaging, often using multiple channels such as social media, advertisements, public events, and print materials. Campaigns are effective in raising awareness, promoting causes, or marketing products by engaging audiences and encouraging interaction or response.

In this study, 77(38.5%) participants where not compliant and the highest factor identified to non-compliance was the high cost of medications accounting for 54.5% (n=109). This was seconded by poor communication with health providers accounting for a percentage score of 22.5% (n=45). This result ties with a study conducted by Bilal Arshia, et al. [18] as 77 (68.14%) were found to be non-compliant as were in habit of taking <80% of the prescribed dose of anti-hypertensive medicine per month though there is a difference in percentage as it may be due to difference in sample size.

We also found that there was an observed statistically significant association between patient's related factors to non-compliance and all the sociodemographic factors of this study: gender (p= 0.013), age (p=0.000), level of education (p=0.01), marital status (p=0.038), profession (p=0.00), living with hypertension (p=0.00), duration on treatment (p=0.00) and BP check(p=0.026). this was not the same with the finding in the study of Tanzania [19] as non-compliance was found to be significantly associated with gender (p=0.008); being more prevalent among male. The disparity in compliance with hypertension treatment regimens between males and females can arise from various factors, including biological, psychological, social, and cultural influences. Women generally engage more in preventive health practices and are more likely to adhere to medical advice, whereas

men often delay seeking medical care, which can affect long-term compliance. Men, particularly in lower-income settings, may face greater financial burdens to accessing treatment as they are charged with family responsibilities, which can limit their ability to prioritize their health. The study conducted by Bilal Arshia [18] also showed that non-compliance was equally distributed among married and those who had no partners in contrast to the finding of study conducted by Angelina [17] where the non-compliance was higher among Widowed.

Also, a study conducted by Amir, et al. [20] stated that the two main factors of non-compliance were carelessness (22.12%) and un-affordability (20%) during the research. They also asked the patients about the circumstances of taking medicine through which they came to know that 51/113 (45.13%) were taking medicines for symptomatic reasons. Among the patients who thought that by taking the drugs their B.P. got controlled, 55/85 (64.71%) were noncompliant while in vice versa case, 22/28 (78.57%) were non-compliant. Non-compliant patients were not taking medicines on regular basis and on prescribed time and dose (p=0.000). In their study Non-compliance is reported greatest, i.e. 65(86%) among patients who paid themselves for their medicines (p=0.06) than those whose medicine paid by family or others.

In our study, the highest healthcare service-related factor to con compliance to antihypertensive treatment regimen in this study was observed to be insufficient or lack of qualified care providers, accounting for 31% (n=62). This was seconded by shortage of drugs, accounting for 26.5% (n=53). This result did not tie with a study conducted in Nigeria as it reported the factors of non-compliance as forgetfulness (8.4%), adverse drugs reactions (6.1%), poverty to purchase drugs (6.8%), having a so many works to get a time to take drugs (3.6%), felt better therefore no need to take drugs (11%), regularly missing to rarely taking medications (41.5%) etc. [21]

One study in Pakistan also found overall 51.7% non-compliant patients who had missed a dose or more of their antihypertensive drugs during the last three month due to any reason [22]. After associating this health factors to the sociodemographic all the variables where statistically significant; gender (p= 0001), age (p=0.001), educational level (p=0.001), marital status (p=0.01), profession (p=0.001), living with hypertension (p=0.001), duration of treatment (p=0.00), BP check (p=0.00). This was not consistent with the study carried by Bilal A, et al. [18] as medicine related factors of non-compliance was higher among those who were taking medicine for less than five years (p=0.03) comparable to the study conducted in Shiraz [23], on mono therapy and di therapy comparing to patients using 3 or >3 drugs (p=0.02). Recent diagnosis & a smaller

number of drugs prescribed may be associated with mild hypertension, less significant symptoms and complications might result in non-serious attitudes of the participants. In other studies Non-compliance is reported greatest, i.e. 86% among patients who paid themselves for their medicines (p=0.06) than those whose medicine paid by family or others same as research done by A.G Elzubier in Kassala [24]. In physician related factors around 50% were non-compliant due to lack of counselling by physician not only for medication but also for life style, this was reported 4.6% by Almas et al, difference in setting of two studies, i.e., government and private sectors might be the possible cause of it. Counselling was recommended by many studies in order to improve compliance among hypertensives [25,26].

From a study conducted by WHO [3], in addition to coronary heart diseases and stroke, complications of hypertension include heart failure, peripheral vascular disease, renal impairment, retinal hemorrhage and visual impairment. Treating systolic blood pressure and diastolic blood pressure until they are less than 140/90 mmHg is associated with a reduction in cardiovascular complication. Also, long-standing hypertension causes accelerated atherosclerosis, which in turns leads to all of the biological fallout of this disease. This could probably be why non compliance to treatment regimen by hypertensive patients will lead to complication development as observed in this study (r=0.36). Some consequences include: stroke, coronary artery disease, myocardial infarction, aneurysmal and occlusive aortic disease. Long-standing hypertension also causes the heart to remodel and undergo a process of hypertrophy (left ventricular hypertrophy or LVH). Hypertrophy can lead to diastolic dysfunction, which can lead to congestive heart failure (CHF) since the heart is too stiff to relax properly. The stiffened heart requires elevated filling pressures, and this can worsen the dysfunction. Long-standing hypertension can also cause the heart to dilate and lose its ability to pump during systole (systolic congestive heart failure). Lastly, the kidneys are injured by long-standing hypertension and this is a significant cause of renal failure [27].

Conclusion

This study concludes that with respect to the level of compliance to treatment regimen by hypertensive patients, out of a sample size of 200, 36 respondents (18%) had excellent compliance to antihypertensive treatment regimen, 50 respondent (25%) had good compliance, 37(18.5%) had fair Compliance and 77(38.5%) respondents had poor compliance to Antihypertensive treatment regimen.

Concerning the factors associated with non-compliance to treatment, the patient's related factors showed that the highest factor identified to non-compliance was the

high cost of medications accounting for 54.5% (n=109). And with respect to health care service-related factor, the highest healthcare service-related factor to non-compliance to antihypertensive treatment regimen was observed to be insufficient or lack of qualified care providers, accounting for 31% (n=62).

Th highest complication observed by patients in this study was blindness, accounting for 15% of all observed complications. Since there was a positive correlation between noncompliance to treatment regimen and development of complications, it can be concluded that one of the reasons why hypertensive patients develop complications is due to the fact that they don't take their medications as prescribed.

Limitations

The data collected and analyzed is based on self-reported data which may be subjective.

Acknowledgments

Conflict of Interests

The authors declare that they have no competing interests

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