

# QUALITY OF PRESCRIPTIONS RECEIVED BY PATIENTS WITH HYPERTENSION ATTENDING A SECONDARY HEALTH FACILITY IN IBADAN, OYO STATE

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## ABSTRACT

**Background:** High-quality prescription (HQP) which is a key player in optimal blood pressure control reflects good prescribing process and thus quality health care.

**Aims:** To determine quality of prescription and its correlates in patients with hypertension attending a secondary health facility in Ibadan, Nigeria

**Methodology:** A cross-sectional hospital-based study among 347 known hypertensive patients attending the Medical Outpatient clinic of Jericho Specialist hospital, Ibadan. Quality of prescription was determined using prescription quality index (PQI) tool and it was categorized into high, medium and low-quality prescriptions. The respondents were recruited using a simple random sampling technique (computer generated random number). Data was analyzed using SPSS version 2020. Mean, standard deviation, Chi-square and Spearman correlation were used for data analysis and level of significant was set at <0.05.

**Results:** The mean (PQI) was  $31.4 \pm 5.6$ ; less than half of the patients 163 (47.3%) had low PQI, while medium and high PQI was found in 41(11.8%) and 143 (41.2%) patients respectively. There was a significant difference in the quality of prescriptions between male and female hypertensive patients ( $t^2=15.85$ ,  $p$ -value<0.0001). Two-thirds of the patients, 229(66.0%) experienced associated health problems and this was significantly inversely correlated with prescription quality ( $r=-0.33$ ,  $p<0.001$ ).

**Conclusion:** The study revealed marginally low quality of prescription, statistically significant poor-quality prescription among the male patients and higher number of comorbidities significantly correlated negatively with prescribing quality. Thus, to comply with high quality prescriptions, combined medications among hypertensive patients with comorbidities should be used cautiously.

**Keywords:** Quality of prescriptions, Hypertension, Secondary health facility, Ibadan.

## INTRODUCTION

Optimal blood pressure control is critical in the management of hypertension prevent microvascular complications and life-threatening sequelae. However, the ability to achieve blood pressure control is based on several factors among which are quality prescribing through adherence to treatment protocol.<sup>1,2</sup> Studies on quality prescription and its correlates are inconsistent and scarce, this is because while some reported poor-quality prescriptions, others documented the reverse. World Health Organization (WHO) and other related bodies on prevention, diagnosis and treatment of hypertension have put up certain guidelines for effective and efficient control of hypertension in order to ensure uniformity in prescription quality.<sup>1,2</sup>

Quality treatment of hypertension entails using multitherapy (>1 drug combination) in the right dosage and combining the right class of antihypertensive medications, using their generic names.<sup>1,2</sup>

Unfortunately, despite the availability of the guidelines and the well documented benefits of rational prescription, many health care facilities are still far from implementing this preferred practice.<sup>3-5</sup> This may either be due to lack of awareness or poor understanding of the inherent benefit in this rational prescription and thus leading to uncontrolled hypertension and long-term complications.

It was on this background that this study was conceived and conducted to assess the quality of prescriptions among patients with hypertension in a secondary health-care facility. It is anticipated that the result of this study will reveal some useful information that may be used to assess care of patients with hypertension in our local domain. Also, the result will be used as a template for assessing trends in prescription practice in the study center in future.

## PATIENTS AND METHODS

A cross-sectional hospital-based study was carried out at the medical out-patient clinic of JSH between October to December 2015. The sample size was calculated using a single proportion formula with a proportion of 71.6% gotten in a study done by Suthar and Varsa.<sup>3</sup> Three hundred and forty-seven (347) eligible and consenting hypertensive patients aged 18 years and above were selected daily using a simple random method (computer generated random number) from a list of attendees at the clinic over a 3-month period. Fifteen out of 40 patients holden a tally that corresponded to the computed generated random number were recruited on each clinic day. Critically ill patients were excluded from the study. Information such as sociodemographic characteristics, hypertension-related history and medication history were obtained from the patients using a pre-tested semi-structured interviewer-administered questionnaire.

Drug prescription details were obtained from the case notes. Prescription written at follow-up not less than six weeks from the time of last visit was reviewed (i.e. past prescription not less than six weeks from last clinic visit).<sup>3</sup> The drug was categorized based on the standard guidelines for anti-hypertensive drug classification.<sup>1,2,6</sup> The proportions of patients in each drug class (antihypertensive and other adjuvant drugs) were also determined.

Furthermore, the quality of the prescription was described using the prescription quality index (PQI) tool. The PQI is a new instrument that captures multidimensional criteria of quality prescription. It incorporated the concept of evidence-based, rational drug therapy approach, and other criteria that are required for prescription quality.<sup>3,4</sup> It has 22 criteria. Each criterion is scored based on its importance. Two criteria, drug indication and dosage were rated as very important and given the highest weighted scale of '0' to '4'. Fifteen criteria: evidence-based, effectiveness, correct directions, practical directions, drug-drug interactions, drug-disease interactions, adverse drug reaction, duration, compliance, legibility, prescriber's information, patient's information, medication's name, diagnosis, and patient's improvement were considered

as important and assigned the medium score of '0' to '2'. Five criteria: unnecessary duplication, cost, generic prescribing, formulary or essential drug list, and requirement for drug therapy were rated as least important and assigned the lowest score of '0' to '1'. If the prescription consisted of more than one drug, each drug was rated individually. If a drug was not indicated, criterion 1 (drug indication) was scored as '0'. Subsequently, criterion 2 (dosage), criterion 11 (duration) and criterion 12 (cost minimization) were all also scored as '0'. Where it was not possible to obtain certain data in the case notes, the criterion was rated as having no information and a score of '9' or 'X' was recorded, and this was not included in the total summation. The PQI total score was obtained by summing up all the minimum scores for the 22 criteria for all drugs in a prescription. The PQI score ranged from 0 to 43, the maximum possible score is '43'. The cut-off point for prescription quality assessment was based on the mean value, percentile and quartile analyses. Total score of  $\leq 31$  corresponds to 50% percentile of the total PQI scores (low quality), scores of 32 to 33 is 75% percentile (medium quality) and 100% percentile is a score of 34 and above (high quality).<sup>3,4</sup> For further statistical analysis, prescription quality was dichotomized into poor and good quality based on the mean PQI of  $31.4 \pm 5.6$  as cut-off point where  $PQI \leq 31$  is rated poor and  $> 31$  is Good quality.

Analysis was done with Statistical Package for Social Science (SPSS) software version 20. Association between two categorical variables was determined using Chi-square test. Blood pressure was categorized based on WHO standard of classification into  $< 140/90$  as controlled diastolic or systolic and isolated systolic where only systolic blood pressure is  $\geq 140$  and diastolic blood pressure is  $< 90$  or isolated diastolic is where only diastolic blood pressure is  $\geq 90$  hypertension and systolic blood pressure is normal in hypertensive patients or on any patients already on antihypertensives.<sup>1</sup> The relationship between quality prescription and patients characteristics was assessed using Spearman correlation coefficient and the level of statistical significance was set at  $< 5\%$ . The result was summarized using frequency tables and figures.

Ethical approval to conduct the study was obtained from the Oyo State Hospital Management Board and written informed consent was obtained from individual participants after explaining the purpose of the study.

## RESULTS

### Sociodemographic Characteristics of Patients

A total of 347 patients participated in the study comprising 221 (63.7%) males with male to female

ratio of 1.8:1. The mean age of the patients was 59.0 ±10.9 years, with the youngest being 40 years and the oldest, 95 years old. Other details of the demographic characteristics are as shown in Table 1.

**Table 1:** Sociodemographic characteristics of patients (N=347)

Characteristics	Frequency	Percent (%)
<b>Age (years)</b>		
40-49	75	21.6
50-59	98	28.2
≥ 60	174	50.2
<b>Sex</b>		
Male	221	63.7
Female	126	36.3
<b>Marital Status</b>		
Married	239	68.9
Widow/widower	98	28.2
Separated	5	1.4
Divorced	4	1.2
Single	1	0.3
<b>Educational Status</b>		
No formal education	101	29.1
Primary	113	32.6
Secondary	89	25.6
Tertiary	33	9.5
*Others	11	3.2
<b>Employment</b>		
unskilled	226	65.1
Retired	54	15.6
Skilled	34	9.8
Unemployed	20	5.8
Semi-skilled	13	3.7
<b>Income(#Naira)</b>		
<20,000	242	66.5
20,000-39,000	35	11.2
40,000-59,000	30	9.6
>60,000	40	12.8

### The Co-morbidities Reported by the Hypertensive Patients

A higher proportion 229(66.0%) of the patients reported that they experienced associated illness. The commonest co-existing illness was diabetes, 128 (36.9%) while the least was nephropathy 1(0.3%).

**Table 2a:** Class of antihypertensive drugs prescribed for the patients

Antihypertensive Drugs	Frequency	Percent (%)
Diuretics (D)	185	53.3
Angiotensin Converting Enzyme Inhibitor (ACEI)	167	48.0
Calcium Channel Blockers (CCB)	165	47.6
Angiotensin Receptor Blockers (ARB)	62	17.9
Centrally Acting Antihypertensive (CAA)	19	5.5
Beta Blockers (BB)	12	3.5

### Numbers of drugs prescribed to the hypertensive patients

A larger proportion of the patients 344 (99.1%) were placed on multiple medications (≥ two drugs) as opposed to only 3 (0.3%) of the patients who had a single medication in their prescription.

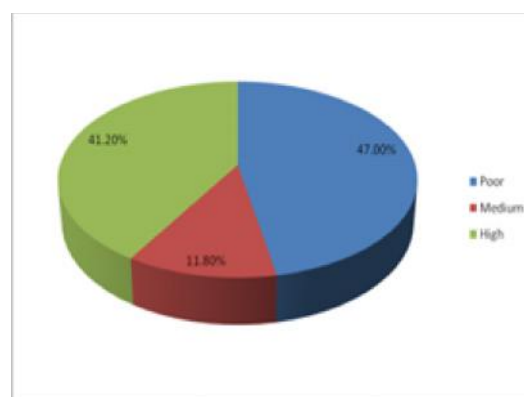
### Class of antihypertensive drugs and adjuvant prescribed to the patients

Just above half 185 (53.3%) of the patients were prescribed diuretics therapy while the least 12 (3.5%) were on beta blockers. Details of the class of the antihypertensive drugs and adjuvants used by the patients are as highlighted in the Tables 2a and b respectively.

**Table 2b:** Other drug class prescribed to the hypertensive patients

Adjuvants	Frequency	Percent (%)
Antiplatelets	293	84.4
Antidiabetics	128	36.9
Anti- malaria/Analgesics /Antibiotics	85	24.0
Statins	15	4.0

The mean prescription quality index (PQI) was 31.4±5.6, highest proportion had low quality prescription:163 (47.0%) compared to 41(11.8%) and 143(41.2%) who had medium and high-quality prescriptions respectively. This is depicted in the pie chart below:



**Figure 1:** Quality of prescription received by the patients

### Prescription Quality by Gender

Table 3 shows the prescription quality by gender. There was significant difference in the quality of prescriptions received by male and female. The largest proportion of male patients was in the poor prescription quality category and this was statistically significant ( $\chi^2=15.85$ , p-value<0.0001).

**Table 3:** Prescription quality (PQ) between male and female patients variable

	Gender		Chi square	p-value
	Male n (%) 221	Female n (%) =126		
<b>PQ</b>				
Poor Quality	120(54.3)	43(34.2)	15.9	<0.0001
Medium Quality	27(12.2)	14(11.1)		
High quality	74(33.5)	69(54.7)		
Total	221(100%)	126(100%)		

**Relationship between prescription quality and selected characteristics of the participants**

Quality prescription was dichotomized into good and poor quality using mean PQI;  $\leq 31$  (poor quality) and  $> 31$  (good quality). Higher proportion of the participants 101(29.0%), ages  $\leq 60$  had poor prescription quality. Other details of the relationship between prescription quality and selected patients' characteristics are as shown in Table 4.

**DISCUSSION**

This study observed that highest proportion of the patients (47%) received poor prescription quality when compared with low and medium quality prescriptions. This poor prescription quality is in accordance with previous studies in South-West Nigeria and Lagos on prescription qualities where researchers independently revealed poor prescription quality among the patients they studied.<sup>4,5,8</sup> Additionally, in our study almost all

**Table 4:** Relationship between prescription quality and selected patients' characteristics

Variable	Prescription quality		Chi square	p-value
	Poor (%)	Good (%)		
<b>Age (yrs)</b>				
$\leq 60$	101(29.0)	98(28.0)	0.74	0.39
$> 60$	82(24.0)	66(19.0)		
<b>Income</b>				
$< \text{N}20,000$	123(35.4)	118(34.0)	0.92	0.34
$\geq \text{N}20,000$	60(17.3)	46(13.3)		
<b>Educational Status</b>				
No Formal education	52(15.0)	49(14.1)	0.09	0.77
Had Formal education	131(37.8)	115(33.1)		
<b>Number of drugs in the prescriptions</b>				
1-2	12(3.5)	01(0.3)	2.80	0.17
$> 2$	223(64.2)	111(32.0)		
<b>Blood pressure</b>				
SBP & DBP controlled	62(17.9)	73(21.0)	6.4	0.10
SBP & DBP Uncontrolled	58(16.7)	45(13.0)		
DBP controlled only	60(17.3)	46(13.2)		
SBP controlled only	03(0.9)	00 (0)		

Table 5 shows correlation between age, number of prescribed drugs and quality of prescription among the patients. There was a significant inverse correlation between quality of prescription and the number of illnesses ( $r = -0.33$ ,  $p < 0.001$ ). The higher the number of the illnesses, the lower the prescription quality.

**Table 5:** Correlation between age, number of illnesses, and number of prescribed drugs.

Variables	Spearman correlation	p-value
Age	-0.03	0.64
Number of associated illnesses	-0.33	<0.001
Number of prescribed drugs	-0.11	0.22

the prescriptions (99.1%), were multitherapy this finding was similar to the reports of Osibogun and Okwor in 2014 where almost all prescriptions (95.9%) received by patients with hypertension were multitherapy.<sup>9</sup> This finding is encouraging and preferred by WHO who recommended that small doses of different class of antihypertensive drug is more beneficial and should be prescribed or it could be that this observation is due to the fact that over two thirds of the studied population have some levels of uncontrolled hypertension, hence it is imperative to control blood pressure using more than one medications (multitherapy).<sup>5,7</sup> In addition, the poor-quality prescription in this study might be due to the

high prevalence of comorbidities with hypertension which usually require additional medications making the number of drugs prescribed to increase.<sup>1,2,5,7</sup>

In this study, the mean Prescription Quality Index (PQI) was  $31.4 \pm 5.6$ . Although, this finding is higher than what Suthar & Varsha observed in 2014 in India (PQI of  $23.6 \pm 9.6$ ), a developing country like Nigeria, where poor quality prescription was reported among 71.6% of their study participants.<sup>3</sup>

As regards the class of antihypertensive prescribed, studies have shown that diuretics was the commonest first line drugs prescribed in Africa.<sup>7,9</sup> This is similar to the finding of this study where diuretics were found to be the most prominent of the prescribed antihypertensive drug (53.3%).

This may could be because the patho-mechanism of hypertension in the black population had been basically proven to be volume dependent and as such diuretics is commonly used to reduce the volume overload that contributed to hypertension among the black populace.<sup>7,9</sup>

Moreover, some factors that influence prescription quality such as age, gender, adherence to medications, co-existing morbidities, cost of drugs, and awareness of prescribers of standard of prescribing was examined previously with mixed reports.<sup>3,4,11-13</sup>

However, in this study, the mean age of the patients was  $59.0 \pm 10.9$  years, with the youngest and oldest age group being 40 years and 95 years old respectively. This finding is in consonance with other studies that reported hypertension as mainly a disease of the middle aged and elderly.<sup>9,11,13</sup> Additionally, our study observed that male 221, outnumbered females, 126 in the hypertensive clinic: this is in concordance with current systematic reviews of prevalence and pattern of hypertension in Nigeria where more men were found to be hypertensive.<sup>14</sup> The observation of higher proportion of men might be due to the cultural belief of the region where the study was carried out, wherein women are submissive to men and might be denied the permission to attend to their health issues or an increase health seeking behavior among men which overruled the previously documented reverse observations.<sup>5,15</sup> Similarly, there is significant difference in the quality of prescriptions between male and female patients: male tends to have poorer prescription quality than females. This contradict previous observation by Dembe and Co researcher in their national survey of working class of both gender: They observed that the risk of chronic diseases was higher in female when

compared with their male counterparts.<sup>10</sup> However, our observation of poorer quality of prescription among males might be because the number of males who attended the study center during the study period was higher than females.

Our study reported that slightly more than two-third of the patients (66%) had co-morbidities, this is in accordance with a study in Lagos which reported a higher (72.2%) comorbidities with hypertension.<sup>9</sup> Of these comorbidities, diabetes mellitus was the highest and this is in accordance with WHO report on double burden of hypertension and diabetes and a study by Akunne and Adedapo at the University College Hospital in Ibadan where diabetes mellitus was seen as the highest comorbidities.<sup>5,6</sup>

Aside antihypertensive prescribed in our study, the highest number of other drug prescribed is under antiplatelets and the second commonest drug prescribed is anti-diabetes which is similar to report from previous study in Ibadan.<sup>5</sup> However, the use of antiplatelets among hypertensive in this study might be due to its cardioprotective properties which has been widely publicized<sup>5</sup>, and anti-diabetes being the second commonest medication is because diabetes was previously documented as the commonest disease that coexisted with hypertension among other illnesses.<sup>5</sup>

Correlates of prescription had been reported by Hussein and co researchers and they observed that the PQI was significantly and negatively correlated with age ( $r=0.34$ ,  $p<0.001$ ), number of drugs in prescriptions ( $r=0.51$ ,  $p<0.001$ ) and number of comorbidity ( $r=0.35$ ,  $p<0.001$ ). The results of our study concurred with this summation, although not all these parameters were statistically significant except for the number of comorbidity which correlated significantly with prescription quality ( $r=0.03$ ,  $p<0.01$ ). We attributed this finding to the fact that the higher the number of diseases, the higher the likelihood of prescribing more drugs hence, the lower the prescription quality. Furthermore, this observation might be as a result of increase in morbidity associated with ageing which usually necessitated more medications; hence, the higher the number of medications the poorer the quality of prescription.<sup>4</sup>

The finding of negative correlations in this study is in contrast with the results of Suthar and Varsha, 2014 who observed significant positive correlation with age ( $r=0.28$ ,  $p=0.00$ ), number of comorbidities ( $r=0.42$ ,  $p<0.001$ ) while number of drugs was negatively correlated ( $r=-0.33$ ,  $p<0.001$ ).

### Limitations

The study was a hospital-based cross-sectional study thus the result gotten cannot be generalized and do not give room for causality.

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### CONCLUSION

The study demonstrated that patients attending the study center received poor quality prescriptions and majority of the hypertensive patients had comorbidities. Hence, the outcome of this study suggests that hypertensive patients with comorbidities should be given prescriptions cautiously.

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