Drug Therapy Problem: Prevalence and Associated Risk Factors Among Hypertensive Patient

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Abstracts: Drug therapy problem is an event involving drug therapy that actually or potentially interferes with the desired health outcomes. This study aimed to identify drug therapy problems encountered by hypertensive patients receiving care in BUK Clinic, Nigeria. It was a retrospective analysis of the medical records of adult hypertensive patients. A total of 206 patient folders were used for the study. The data were collected from the patient's medical records using the Pharmaceutical Care Network Europe (PCNE) Classification tool Version 9.1 (PCNE, 2020). Data were analyzed using the IBM Statistical Product and Service Solutions (SPSS). The total number of drug therapy problem found was 314 of which majority was effect of drug treatment not optimal [P1.2] 155(49.4%) followed by adverse drug event [P1.3] 155(49.0%) and no effect of drug therapy despite correct use [P1.1] 5(1.6%) was the least type of drug therapy problem encountered. The major cause of drug therapy problem was inappropriate drug according to guidelines/formulary and inappropriate combination of drugs (C1.1 & C1.3) which account for 80(26.4%) of drug related problem. Prevalence of drug therapy problem was high (85.9%). Number of Antihypertensives on (P=0.022) and age(P=0.025) were significantly associated with increased drug therapy problem. Increased drug therapy problem can lead to increase in complications, increased hospital stays, emergency hospitalization and increased medical cost.

Keywords: Hypertension; Drug therapy Problem; Antihypertensives.

1. INTRODUCTION

Hypertension is considered a disease of high prevalence and low control, and its inadequate treatment can lead to coronary heart disease (CHD), acute myocardial infarction (AMI), peripheral vascular disease (PVD), stroke, congestive heart failure and renal failure [1,2]. Because of these consequences it is the leading cause of morbidity and mortality among non-communicable diseases, and accounts for 13% of all deaths globally [1,2,3,4,5]. Analysis of the global burden of hypertension revealed that over 26% of the world's adult population had hypertension in 2000 [6,8] and has shown a rapid increase in prevalence affecting significant numbers of individuals in Sub-Saharan Africa.

Studies worldwide indicate that despite the availability of effective medical therapy, more than half of hypertensive patients on treatment have blood pressures over 140/90 mm Hg threshold [2,6] This is mostly because of drug therapy problems which include but not limited to non-compliance, ADRs, improper drug selection and drug interactions [6].

The occurrence of a DTP among hypertensive patients could prevent or delay patients from achieving desired therapeutic goals. As a result, substantial numbers of patients do not get the maximum benefit of medical treatment, resulting in poor health outcomes, lower quality of life, increased health care costs and erodes public confidence in health systems. Interventions to improve drug therapy problems are needed to overcome the harms imposed by the

problem [2,5]. Therefore, this study aimed to determine prevalence, the pattern and risk factors of drug therapy problem among hypertensive patients attending Bayero University Kano Clinic.

2. METHODOLOGY

2.1 Study Design & Participants

A cross-sectional hospital based retrospective study was conducted for hypertensive patient receiving care in BUK clinic, Nigeria from January 2016 to February 2022.

2.2 Eligibility Criteria

The participants were taken as eligible for this study when they met the following criteria: Patient above 18 years old, Participants who have been taking antihypertensive medication for at least past one month. However, patients with pregnancy induced hypertension and those who had not started antihypertensive were excluded from the study. All patient folders that fell within the eligibility criteria were utilized for the study.

2.3 Instrument for Data Collection

A Data collection form was used as the instrument for data collection. The form consists of three sections which are: section A: Socio demographic data, section B: Clinical characteristics of the patients, section C: Medication use, section D: Drug therapy problems (DTP) using Pharmaceutical Care Network Europe classification tool version 9.1 (PCNE, 2020). The PCNE V 9.1 has three (3) primary domains for problems, nine (9) primary domains for causes.

2.4 Data Collection and Procedure

The data was collected from the patients' medical records using the Pharmaceutical Care Network Europe (PCNE) Classification tool Version 9.1 (PCNE, 2020). For each of the medical records, the DTPs experienced within the study period were identified. The demographic information such as age and gender were recorded. Other items that were documented are the drugs implicated in the therapy problems, type of drug therapy problem, and cause of drug therapy problem (DTP).

2.5 Statistical Analysis

Analysis was performed with IBM Statistical Package for Social Sciences (SPSS) version 26. Descriptive statistics such as frequency tables and chi-square were performed to determine the prevalence of drug therapy problem and associated risk factors.

2.6 Ethical Consideration

Ethical clearance and approval of the research was obtained from College of Health Sciences Research Ethics Committee, Bayero University Kano (BUK/CHS/HREC/217) before starting the study.

3. RESULT

Majority 64 (52.4%) of the patients were 56 and above years of age, while more than half of the patients were females (51.0%). Most of the patients were housewives 88(42.7%), married 176(85.4%) and Muslims 198(96.1%) [Table 1].

Table 1: **Socio demographic Characteristics (n = 206)**

Characteristics	Frequency	Percentage
Age		
18-25	0	0
26-35	8	3.9
36-45	25	12.1
46-55	48	23.3
56-above	108	52.4
Gender		
Male	101	49.0
Female	105	51.0
Occupation		
Lecturer	14	6.8
Driver	12	5.8
Security	8	3.9
Pensioner	17	8.3
Housewife	88	42.7
Others	63	30.6
Marital Status		
Single	2	1.0
Married	176	85.4
Widowed	1	0.5
Religion		
Christianity	198	96.1
Islam	7	3.4
Nationality		
Nigerian	205	99.5
Foreigner	1	0.5

The presence of DTP among hypertensive patients was 177 in 206 folders studied, this is to say prevalence of drug therapy problem is 85.9% which is high whereas no drug therapy problems was detected in 29(14.1%) folders. In this study the most common DTP identified was the effect of drug treatment not optimal mostly caused by drug interaction and non-compliance. [Table 2]

A total of 104 (50.5%) are suffering from two diseases while 74 (35.9%) of the patients suffered from two or more co-morbid conditions and 28 (13.6%) are not with any co-morbidity. The most common hypertension co-morbid disease was peptic ulcer disease 53 (25.7%) followed by Diabetes mellitus 27 (13.1%). Renal and hepatic disorder appear to be least type of co-morbidity encountered 1 (0.5%). [Table 2]

Table 2: Prevalence of DTP

	Frequency	Percentage
Drug Therapy Problem (DTP)		
Presence of DTP	177	85.9
Absence of DTP	29	14.1
Number of co-morbid		
One	104	50.5
Two	70	34.0
Three	4	1.9
Nil	28	13.6
Types of co-morbid		
Diabetes	27	13.1
Peptic Ulcer	53	25.7
Renal disorder	1	0.5
Hepatic Disorder	1	0.5
Diabetes & Peptic ulcer	24	11.7
Gout & peptic ulcer	23	11.2
Gout & arthritis	16	7.8
Asthma & peptic ulcer	9	4.4
Others	25	12.1
Nil	27	13.1

In monotherapy, amlodipine (17%) was most commonly prescribed antihypertensive in this study as should be expected in black patients while Amlodipine and Lisinopril (23%) were the major combination drugs prescribed. The most common drug interactions in this study results from high occurrence of Lisinopril in prescriptions [Fig 1]. Similarly, the result show omeprazole, antacid and NSAIDS 65(31.6%) comprising the majority of “other drug” the studied patients are on. Most NSAIDS prescribed in this study include meloxicam, diclofenac, aspirin and ibuprofen. Oral hypoglycaemic agent such as metformin, glibenclamide and glimepiride also encompass majority of other drugs prescribed for patient with diabetes co-morbidity.

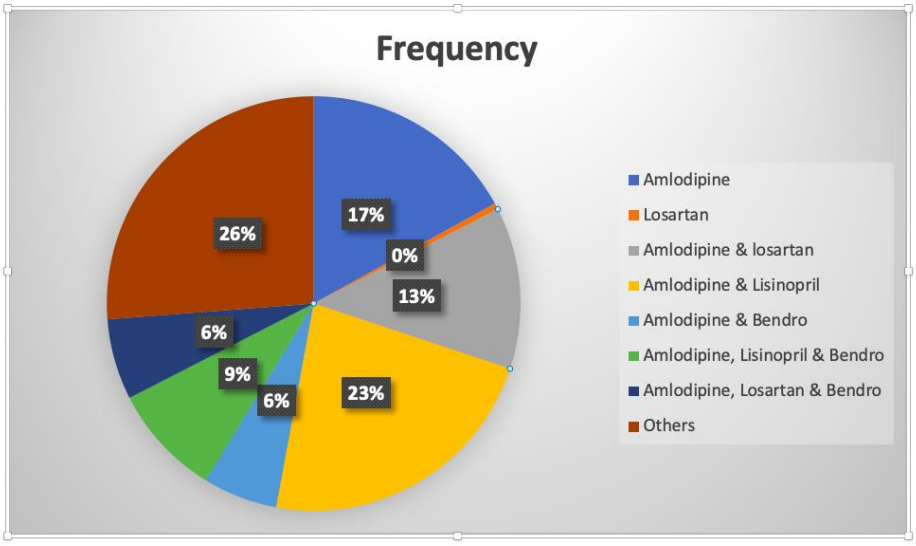

Figure 1: Frequently Prescribed Drugs

The total number of drug therapy problem found was 314, which majority was effect of drug treatment not optimal 155 (49.4%) while no effect of drug therapy despite correct use 5(1.6%) was the least type of drug therapy

problem encountered. Total number of adverse drug event (P1.3) in the result is 154(49.0%) which slightly occurs less than effect of treatment not optimal (P1.2). Commonly identified ADR were dry cough, gastrointestinal disturbances, headache, vomiting, peripheral oedema and allergic reactions [Table 3]

Table 3: **Type of Therapy Problem**

Therapy Problem	Frequency	Percentage
No effect of drug treatment (P1.1)	5	1.6
Effect of treatment not optimal (P1.2)	155	49.4
Adverse drug event (P1.3)	154	49.0
Total	314	100.0

The major cause of drug therapy problem was inappropriate drug according to guidelines/formulary and inappropriate combination of drugs (C1.1 & C1.3) which account for 80(26.4%) of drug therapy problems mostly leading to DTP in form of adverse drug event (P1.3). This is followed by other causes like non-compliance (C9.2) which is 76(25.1%), another prevailing cause observe in this study is patient intentionally taking less drug prescribed or does not take the drug at all (C7.1) which leads to drug therapy problems such as No effect of drug treatment (P1.1) or effect of drug treatment not optimal (P1.2) [Table 4]

Table 4: Cause of Therapy Problem

Cause of DTP	Frequency	Percentage
C1.1 (inappropriate drug according to guideline)	11	3.6
C1.3 (inappropriate combination of drugs)	47	15.5
C1.1 & C1.3	80	26.4
C1.1 & C1.4	2	0.7
C1.3 & C1.4	5	1.65
C1.1, C1.3 & C1.5	1	0.3
C5.1 (prescribed drug not available)	2	0.6
C5.2 (necessary information not provided)	28	9.2
C7.1 (patient intentionally takes less or no drug at all)	42	13.9
C7.5 (patient takes food interact)	5	1.65
C9.2 (other cause)	76	25.1
C9.3 (no obvious cause)	3	1.0
C9.2 & C9.3	1	
Total	303	0.3
		100

Number of antihypertensive drugs (P=0.022) and age (P=0.025) were significantly associated with increased drug therapy problems while co-morbidity (P=0.073), gender (p=0.055) religion (p=0.991), marital status (p=0.310) and occupation (P=0.738) were not significantly associated with increased DTP. The study also found that female patients have higher ratio of drug therapy problem when compared with male although the result shows gender association with DTP not statistically significant (p=0.055) [Table 5]

Table 5: DTP and associated risk factor

Variables	DTP Present	DTP Absent	Ratio of DTP present	P-value*
Age				
18-25	0	0	0	
26-35	4	4	50	
36-45	21	4	84	0.025
46-55	39	9	81.25	
56-above	96	12	88.9	
Gender				
Male	82	19	81.2	0.055
Female	95	10	90.5	
Occupation				

Lecturer	11	3	78.6	
Driver	11	1	91.7	
Security	7	1	87.5	
Pensioner	15	2	88.2	0.738
Housewife	79	9	89.7	
Others	52	11	84.2	
Marital Status				
Single	1	1	50	
Married	152	24	86.4	0.310
Widowed	1	0	100	
Religion				
Christianity	6	1	85.7	0.991
Islam	170	28	85.9	
Nationality				
Nigerian	176	29	85.9	0.685
Foreigner	1	0	100	
No of co-morbid				
One	84	20	80.8	
Two	63	7	90	0.171
Three	4	0	100	
Nil	26	2	92.9	
No of antihypertensive				
One	30	12	71.4	
Two	96	12	88.9	0.022
Three	47	5	90.4	
More	4	0	100	

Pearson's Chi-Sq. Significance at $p > 0.05$

4. DISCUSSION

In this study, a total of 314 drug therapy problems were identified in 206 folders. The most common DTP identified was effect of drug treatment not optimal mostly caused by drug interaction and non-compliance. The most cause of drug interactions in this study is Lisinopril, other studies reported Beta blockers as the main cause of drug-drug interaction followed by ACE inhibitor and this difference may be due to the variation in commonly prescribed medications [7,8] which may have come to be due to absence of drug interaction checker. ACE Inhibitor (Lisinopril) causing drug interactions is in line with the result of research done in Palestine which states ACE inhibitor and Beta blockers as the major cause of drug interactions [9], this provides relevant support to this study. Difference is, in Palestine beta blocker was the main cause of drug-drug interaction (31.5%) followed by ACE inhibitor (23.4%) and this difference may be due to the variation in commonly prescribed medications in two countries. The most frequently prescribed combination of inappropriate drug was ACE inhibitor and NSAID, this is mostly because most patients were co-morbid with peptic ulcer disease or Gout therefore taking NSAIDS to manage the pain leading to patient taking both ACE Inhibitor and NSAIDs (meloxicam, diclofenac, ibuprofen and aspirin).

The data obtained from patient's folder revealed proportion of treatment non-compliance was high, classified under C9.2 (other cause) which shows that a large proportion of patients found in the hospital do not comply with their medications. Factors causing non-compliance may include patient memory(forgetfulness), fear of side effect or the drug actually caused side effect, cost of the medication, use of traditional medicine or religious belief, feeling or worse. The number of co-morbidities not statistically significant association with DTP is not in line with most studies, this difference may be due to the fact that most common co-morbid condition in this study is peptic ulcer disease and diabetes therefore little to no drug problems are encountered with the drugs prescribed to managed these conditions in background hypertension. Number of co-morbidities is associated with DTP, although not statistically significant in this result. Increase in the number of co-morbid conditions a patient has, will invariably lead to an

increase in the number of medications the patient will be taking, as seen in this study, the association of number of antihypertensive on to DTP is statistically significant. Similar studies recorded that increase in the number of co-morbidity lead to an increase in the drug therapy problem a patient might experience [10,11,12]. The high number of adverse drug event 154(49.0%) in this study is in line with research done in east Ethiopia, Sweden and in India which was 42.7%, 25.7% and 10% respectively [7,13]. This may be because many patients in our study are aged/old with co-morbid condition therefore taking multiple antihypertensive drug, which is significantly associated with increased DTP. Gastro intestinal disturbance and risk of peptic ulcer disease was the main ADR identified followed by dry cough while in research done in India the main ADR identified was dry cough and peripheral oedema caused by anti-hypertensive drugs [7].

Majority of the drug therapy problems recorded were among the married population (98.7%), this could be because single patients are younger in age and so may have less or no co-morbid conditions and invariably taking a smaller number of drugs. This is in agreement with other studies which revealed that married people tend to have a lot of responsibilities and financial burden which makes them to stop taking their medications as a result of their inability to afford these drugs [14,15].

CONCLUSION

The prevalence of drug therapy problems among hypertensive patients was high 85.9%. Numbers of antihypertensive drugs on (P=0.022) and age(P=0.025) were significantly associated with increase drug therapy problem. Increased drug therapy problem can lead to increase in complications, increased hospital stays, emergency hospitalization and increased medical cost.

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Conflict of interest: The authors declare no conflict of interest.

Informed Consent Statement: It was a retrospective study; therefore, ethical clearance and approval of the research proposal was obtained from College of Health Sciences Research Ethics Committee, Bayero University Kano (BUK/CHS/HREC/217) before starting the study.

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