Prevalence of Uncontrolled Blood Pressure and Drug Related Problems in Adult Hypertensive Patients: A Comparative Study

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ABSTRACT

Background: DRPs are one of the major challenges to health care providers as this may affect morbidity, mortality and patients' quality of life.

Objective: This study aimed to compare the prevalence of uncontrolled blood pressure and drug therapy problems in two Nigerian tertiary institutions.

Methods: This was a retrospective cross sectional study carried out in the Department of Internal Medicine, University of Nigeria Teaching Hospital (UNTH), Ituku/Ozalla, Enugu state and Federal Medical Centre Lokoja (FMCL), Kogi State, over a period of two months (June1, 2019- July 31, 2019). Ethical clearance for the study was obtained from the Health and Research ethics committee of both hospital. A well designed proforma adopted from similar studies was used to collect patients' socio-demographic and clinical variables from their folders. Pharmaceutical Care Network Europe (PCNE) Classification tool Version8.02 (PCNE, 2010) was used to document the types and causes of Drug therapy problems. The data cleaning was conducted in Microsoft excel after which information were exported and analysed using the Statistical Package for Social Sciences (SPSS for windows, Version 16.0. SPSS Inc. 2007.Chicago, USA) software. Continuous data were presented as mean ± standard deviation while categorical data were presented as percentages and frequencies.

Results: The ratio of male to female patients was 1.03: 1 with a greater number of the patients being above 55 years of age. the ratio of controlled blood pressure to uncontrolled blood pressure was 1:1.02 for UNTH and 1:0.601 for FMCL. FMCL recorded a percentage of patients with uncontrolled blood pressure. Older patients had more DTPs than the younger ones and this was statistically significant. Blood pressure control was associated with age in both study centres as increase in age decreased blood pressure control and this was statistically significant.

Conclusion: Blood pressure control in both centres were below average while prevalence of DRPs was high in both centres too. An educational interventional programmes is recommended to enlighten patients on the need adopt lifestyle modifications to control their blood pressure and the dangers of uncontrolled blood pressure.

Introduction

DRPs are one of the major challenges to health care providers as this may affect morbidity, mortality and patients' quality of life [1]. DRPs have been found to lead to reduced quality of life, increased hospital stay, increased overall health care cost with an increase in morbidity and mortality [2]. Also, inappropriate use of drugs are harmful and can possibly evoke side effects [3]. Clinical pharmacists in coordination with other health care providers can identify DRPs through medication reconciliation [4]. Although there are several classifications of DRPs, there is no single standardized classification

in the world [5]. However, the PCNE classification system has been commonly practiced because it has better usability and internal consistency as it is being updated and revised periodically. It is also being employed in pharmaceutical care process for documenting DRPs [6].

In a recent study, it was observed that the occurrence of DRPs per patient increased linearly with the number of drugs used, where one unit increase in the number of drugs yielded 8.6% increase in the number of DRPs [7]. In addition, a prospective study conducted in Jordan reported that 98.3% of all the patients who attended the hospital had DRPs and on an average, 9.35% of DRPs occurred per patient [1]. Although there are no documented figure for Nigeria, it has been documented that the economic burden arising from DRPs was $177.4 billion and £100707 annually in the United states of America [8] and Australia [9] respectively. Therefore, improving drug therapy by minimizing DRPs can help reduce treatment related costs [10].

Objective

This study aimed to compare the prevalence of uncontrolled blood pressure and drug therapy problems in two Nigerian tertiary institutions.

Methods

Study Design

This was a retrospective cross sectional study carried out in the Department of Internal Medicine, University of Nigeria Teaching Hospital (UNTH), Ituku/Ozalla, Enugu state and Federal Medical Centre Lokoja (FMCL), Kogi State, over a period of two months (June1, 2019- July 31, 2019) to evaluate the prescription pattern, determine the rate of control of blood pressure, identify Drug related problems in the management of Hypertension.

Ethical Clearance

Ethical clearance for the study was obtained from the Health and Research ethics committee of University of Nigeria Teaching Hospital, Ituku-Ozalla and the Federal medical centre (FMC) Lokoja, Kogi State.

Eligibility Criteria

The inclusion criteria were:

a)   Hypertensive patients who received care from January 1, 2018 - December 31, 2018.

b)   Availability of patient demographic data on the patient folder.

c)   Patient folder having prescriber's information (signature and/or name).

d)   Patient folders with ages > 18 years.

e)   All patient folders having at least a single antihypertensive medication.

Sample size and selection: The entire patient folders that met the eligibility criteria were included in the study.

Data Collection

A well designed proforma adopted from similar studies was used to collect patients' socio-demographic and clinical variables from their folders. Pharmaceutical Care Network Europe (PCNE) Classification tool Version8.02 (PCNE, 2010) was used to document the types and causes of Drug therapy problems.

Data Analysis

The data cleaning was conducted in Microsoft excel after which information were exported and analysed using the Statistical Package for Social Sciences (SPSS for windows, Version 16.0. SPSS Inc. 2007. Chicago, USA) software. Continuous data were presented as mean ± standard deviation while categorical data were presented as percentages and frequencies. Chi square and correlation test was also used to examine association between the variables in the data collected.

Results

From Table 1, majority of the hypertensive patients were females 216(52.7) and 173(50.6) at UNTH and FMCL respectively. Also, a majority of the patients were aged 56-65 years 143 (36.7) and 104 (30.5) at UNTH and FMCL respectively. Majority of the hypertensive patients that visited UNTH within the study period were Christians by religion 387 (92.2) while 198 (58.1) who visited the FMCL within the study period were Muslims by religion. Almost all the patients that visited the study centres were not smokers with 354 (90.8) and 310 (90.9) for UNTH and FMCL respectively. Also, a majority of the patients at both study centres were married and had a source of income (Table 1).

Table 1: Socio-demographic characteristics of patients.

Socio-Demographics	Frequency		Percentage	
	UNTH (n= 390)	FMCL (n= 341)	UNTH (n= 390)	FMCL (n= 341)
Gender				
Male	174	168	42.4	49.1
Female	216	173	52.7	50.6
Age				
24-35	11	17	28.0	5.0
36-45	37	47	9.5	13.8
46-55	59	56	15.1	16.4
56-65	143	104	36.7	30.5
66-75	84	60	21.5	17.6
≥76	56	57	14.4	16.7
Religion				

Christianity	387	140	92.2	41.1
Islam	3	198	0.8	58.1
Other	0	3	0	0.8
Smoking Status				
Smoking	36	31	9.2	9.1
Not Smoking	354	310	90.8	90.9
Employment Status				
Civil servant	63	42	16.2	12.3
Self employed	219	243	56.1	71.3
Unemployed	27	16	6.9	4.7
Retired	81	40	20.8	11.7
Marital status				
Married	287	288	73.6	84.5
Single	25	30	6.4	8.8
widowed	78	23	20.0	6.7

From Figure 1, UNTH had an almost equal distribution of patients with controlled and uncontrolled blood pressure, while FMCL had a majority of patients with uncontrolled blood pressure (Figure 1).

From Table 2, A majority of the patients who were aged 56-65 years had their blood pressure uncontrolled in b UNTH and FMCL and this was statistically significant (p= 0.018 and 0.012 respe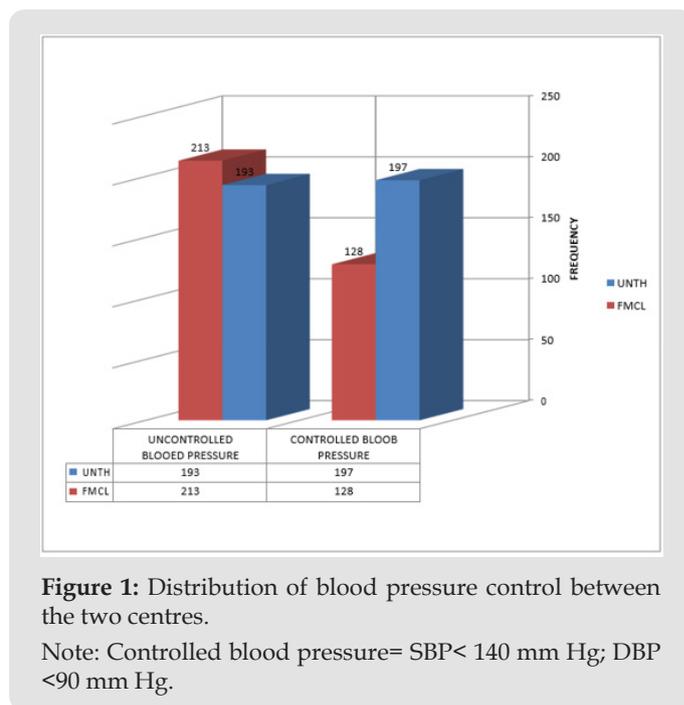ctively). Also, singles and widowed who had uncontrolled blood pressure were more than those that had controlled blood pressure in both UNTH and FMCL and this was statistically significant (p= 0.010 and 0.048 respectively) (Table 2).

Figure 1: Distribution of blood pressure control between the two centres.

Note: Controlled blood pressure= SBP< 140 mm Hg; DBP <90 mm Hg.

Table 2: Relationship between blood pressure control and patients socio-demographics and clinical characteristics.

Socio- Demographics	UNTH			FMCL		
	Controlled n(%)	Uncontrolledn(%)	p- value	Controlled n(%)	Uncontrolledn(%)	p- value
Gender						
Male	90	82		80	128	
Female	107	111		92	181	
Age						
24-35	10	1		7	10	
36-45	20	17		22	25	
46-55	34	24	0.018*	21	35	0.012*
56-65	68	76		44	60	
66-75	40	44		10	50	
≥ 76	21	35		16	41	
Marital Status						
Single	13	20		12	18	
Married	149	136	0.010*	168	120	0.048*
Widowed	26	46		5	18	
Smoking Status						
Smoking	9	7		15	16	
Not smoking	188	186		169	141	
Employment Status						
Unemployed	111	108		19	23	
Civil servant	34	29		140	103	
Self employed	52	56		16	40	

From Figure 2, the most common type of drug related problem encountered in UNTH was untreated indication while the least type of DRP was adverse drug event. Whereas the most common type of DRP encountered in FMCL was effect of drug not optimal while the least type of DRP was untreated indication (Figure 2).
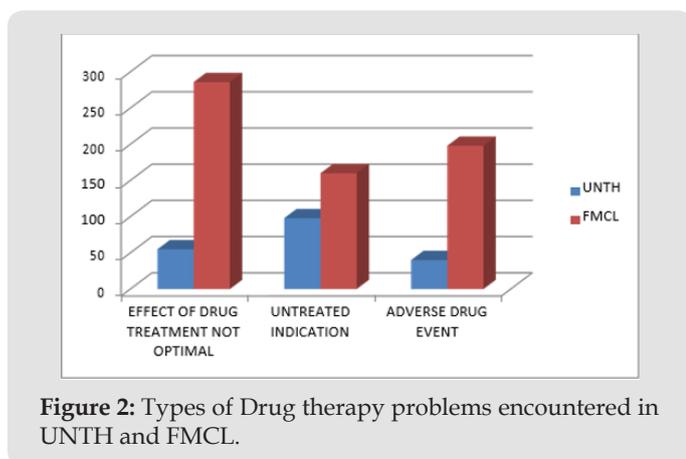

Figure 2: Types of Drug therapy problems encountered in UNTH and FMCL.

From Table 3, dosage too high 50 (25.9) was the major cause of DRP encountered in UNTH while prescribing error 189 (29.3) was the major cause of DRP encountered in FMCL. Inappropriate drug combination 10 (5.2) was the least reported cause of DRP in UNTH while wrong drug taken/ administered 27 (4.2) was the least reported cause of DRP in FMCL (Table 3).

Table 3: Causes of DRPs.

Variables	UNTHn(%)	FMCLn(%)
Drug Selection		
Inappropriate drug	22(11.4)	122(18.9)
No indication for drug	15(7.8)	52(8.1)
Inappropriate drug combination	10(5.2)	87(13.6)
New indication presented	17(8.8)	61(9.5)
Dose Selection		
Dosage too high	50(25.9)	62(9.6)
Dosage too low	20(10.4)	44(6.8)
Drug Use Process		
Wrong drug taken/ administered	42(21.8)	27(4.2)
Prescribing error	17(8.8)	189(29.3)

From Table 4, majority of the DRPs were found among patients who were 65 years and older and this was statistically significant (p = 0.002). Most of the DRPs were found in the females 87 (50.9) and traders 62 (36.3). Also, 146 (85.4) of the DRPs reported were found among those who were married and this was also statistically significant. Also increase in DRP was seen in increased number of co-morbid states and in patients receiving more than one antihypertensive medication (P <0.001) (Table 4).

Table 4: Association between Socio-demographics and DRPs.

Characteristics	Frequency of DRP	Percentage of DRP	p-value
Age			
18-25	1	0.6	
26-35	7	4.1	
36-45	19	11.1	0.002*
46-55	28	16.4	
56-65	52	30.4	
>65	64	37.4	
Gender			
Male	84	49.1	0.963
Female	87	50.9	
Employment status			
Civil servants	21	12.3	
Trader	62	36.3	
Famer	44	25.7	0.321
Unemployed	8	4.7	
Retired	20	11.7	
Self employed	16	9.4	
Marital Status			
Single	10	5.8	
Married	146	85.4	
Separated	0	0	0.003*
Divorced	0	0	
Widowed	15	8.8	
Religion			
Christian	166	97.1	
Muslim	1	0.6	1.000
Others	4*	2.3*	
Smoking Status			
Current smoker	4	4.1	< 0.001*
Non-current smoker	164	95.9	
No of co-Morbid			
1	30	17.5	
2	91	53.2	< 0.001*
3	44	25.7	
4	2.9	2.9	
No of Antihypertensive			
1	10	5.8	
2	64	37.4	<0.001*
3	75	43.9	
4	13	7.6	

Discussion

The ratio of male to female patients was 1.03: 1 with a greater number of the patients being above 55 years of age. This finding is comparable to similar studies among hypertensive patients in a Nigerian Hospital [11]. Increase in arterial and arteriole

wall stiffness, decreased baroreceptor sensitivity, increased responsiveness to sympathetic nervous stimuli, altered renal and sodium metabolism which are associated with aging could be a reason why hypertension is more prevalent in older adults [12]. Also, the ratio of controlled blood pressure to uncontrolled blood pressure was 1:1.02 for UNTH and 1:0.601 for FMCL. FMCL recorded a percentage of patients with uncontrolled blood pressure. The BP cut off of 140/90 mmHg was used in this study to define good BP control as recommended by JNC 8. Studies that used the same BP cut off also reported similar proportion of patients with controlled BP [13]. Blood pressure control was associated with age in both study centres as increase in age decreased blood pressure control and this was statistically significant.

This could be because older patients are more likely to have more co-morbid conditions which could affect hypertension management. Also, it is possible that older patients must have had hypertension for longer years which could lead to high disease burden as they may get tired of being on daily medications. Both centres recorded that married patients had a better BP control than the singles and widowed and this was statistically significant too. This could be because married patients could be more emotionally stable than unmarried ones. Also, it is possible that married people can have someone supporting them both financially and emotionally too. Methyldopa and frusemide were majorly involved in DTPs. This could be because they were more commonly prescribed that other antihypertensive. A combination of methyldopa and frusemide can lead to an enhanced hypotensive effect.

The most common type of DTP found in UNTH was untreated indication while the most common type of DTPs found in FMCL was drug treatment not optimal. This could be the reason why FMCL reported a higher proportion of patients with uncontrolled BP than UNTH. Older patients had more DTPs than the younger ones and this was statistically significant. This could be because older patients have a likelihood of having more co-morbid conditions and this will invariably expose them to more number of drugs. Increase in the number of drugs has been found to lead to an increase in DTPs. Although the female patients had more DTPs than the male, it was not statistically significant. Unsurprisingly, smokers had more DTPs than non- smokers. This could be explained by the fact than smoking could predispose one to more ailments which can lead to

increased number of medications. Also, patients who were on more than one antihypertensive medication encountered more DTPs. This is because increased number of drugs can lead to an increase in drug-drug interactions.

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