Research Article

Psychiatric morbidity and substance use correlated with drug compliance among subjects with essential hypertension attending the out-patient clinic of university of Port Harcourt teaching hospital (UPTH)

Abstract

Background: Essential hypertension, a non-communicable disease, commonly of adult and the aged, is fast assuming an epidemic dimension. Psychiatric comorbidity and substance use tend to affect drug compliance as well as outcome of the disease.

Aim: The aim of this study, therefore, was to determine common psychiatric comorbidity, substance use and medication adherence among patients with essential hypertension at the University of Port Harcourt Teaching Hospital.

Methods: A cross-sectional study was conducted among 360 hypertensive patients on follow-up at Cardiovascular Clinic of the General Outpatient Department of the University of Port Harcourt Teaching Hospital. Structured questionnaires were used to assess alcohol use, Kolanut chewing, caffeine use, cigarette smoking, tramadol, codeine, cannabis, and cocaine. Psychiatric comorbidity was assessed using the GHQ-12 in conjunction with the DSM 5. Data was analysed using the SPSS version 20.

Results: The prevalence of psychological morbidity among hypertensive patients was 31.6%. Of the total participants, 62 (17%) of them had alcohol use disorders,cigarette smoking 44 (12.2%), Nicotine snuffing 6 (1.7%), kolanut and khatchewing 15 (4.2%), tramadol 17(4.7%), codeine 14 (3.9%), caffeine 12 (3.3%), cannabis 8 (2.2%) and cocaine 5 (1.4%).Of the 104(28.9%) who had ever missed or discontinued medications, 37(35.6%) had psychiatric comorbidity, 23(22.1%) has substance use, 25(24.0%) had both psychiatric and substance use comorbidity while 19(18.3%) had no psychiatric or substance use comorbidity(p=0.001).

Conclusion: Psychological morbidity and substance use are prevalent among hypertensive patients on follow-upat the hospital. The findings of the study imply that there is a need for further studies to understand the effect ofpsychological morbidity on the clinical outcomes of hypertensive patients.

Keywords: psychological morbidity, substance use, essential hypertension, port harcourt

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Abbreviations: DALYs, disability adjusted life years; NCDs, non-communicable diseases; WHO, world health organization; AUD, alcohol use disorders; GABA; gamma-aminobutyric acid; CNS, central nervous system; HIV, Human Immunodeficiency Virus; AIDS, acquired immune deficiency syndrome

Introduction

Worldwide, data from variety of studies have put the burden of mental health problems and substance use disorders to be greater than those of HIV/AIDS, asthma, tuberculosis, diabetes and traffic accident.[1–3] Mental, substance use and neurological disorders constitute a high proportion of the world's disease burden in both high , low to middle-income countries.[3] Hypertension is a major cardiovascular disease and common all over the world.[4–6] The productive age group seems to be the worst hit particularly for cardiovascular diseases productive age.[4,5] Hypertension was a forefront risk factor for disability adjusted life years (DALYs) in 2010.[7] Both cardiovascular disease as well as

psychiatric conditions combined to contribute greater proportion to the world's total burden of non-communicable diseases (NCDs).[8–14] The World Health Organization (WHO) has estimated that not less than 25% of all patients who seek the services of health facilities both in rural as well as urban areas suffer from at least one mental, neurological or behavioural disorder, adding that most of which are undiagnosed or untreated.[8,15] Patients with chronic medical illness like hypertension usually have the vulnerability for psychological problems due to difficulty in adjusting their aspirations, lifestyles, employment, and spending on treatment and medication and also have poor coping skills in the face of stressors.[8–14] Many chronic illnesses, with or without psychological illnesses as consequence, may also be associated with substance use as double or triple diagnosis.[16–23]

Various definitions have been given to hypertension and have undergone modifications over the years. The generally accepted definition is that Hypertension is a sustained elevation in blood pressure over an acceptable upper limit of normal values of systolic

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and diastolic blood pressures.[24,25] Objectively and quantitatively, hypertension is blood pressure persistently equal to or greater than 140/90mmHg.[24,25] Hypertension may be of unknown cause where it is called essential hypertension or hyperpiesia, or may have an underlying biological or environmental cause when it is known as secondary hypertension.[24,25] The World Health Organization/International Society of Hypertension classified hypertension into mild, moderate, severe and high normal.[26] (Table 1).

Table 1 Modern Classification of Hypertension by the World Health Organization /International Society of Hypertension

Category (B.P.)	Systolic blood pressure (mmHg)	Diastolic BB (mmHg)
Optimal	<120	<80
Normal	<130	<85
High normal	<130-139	<85-89
Hypertension	High normal	
Grade 1 (mild)	140-159	90-99
Grade 2 (moderate)	160-179	100-109
Grade 3 (severe)	180	110
Isolated systolic hypertension	180	<90

As a leading non-communicable chronic disease, hypertension often requires long term treatment.[26] Increasing urbanization and changing life styles around the world have equally continued to cause the rising incidence.[27–30] Hypertension is regarded as major public health problem,[31] and has continue to constitute a major threat to the health of adults in particular in sub-Saharan Africa.[32,33] Different researches have put the prevalence to range from 25% to 35% among adults aged 25 to 64 years with an estimated 20 million people being affected in the African Region.[32,34–40] Globally, the prevalence of hypertension is 25%,[40] with an estimated 972 million (26.4%) adults being affect, out of which 333 million (34.26%) are in the developed and 639 million (65.73%) in developing countries.[38] It has been projected that by the year 2025, about 1.56 billion of the world population will have hypertension.[39] Hypertension is estimated to cause 7.1 million deaths, which is about 13% of all cases.[39,40] A study done in Canada and six European countries, the age- and sex-adjusted prevalence of hypertension was 28 and 44% respectively.[40]

Nigeria as a developing country is equally witnessing a rising prevalence of hypertension probably due to adoption of western lifestyles and the stress of urbanization, both of which are capable of increasing the morbidity associated with unhealthy lifestyles.[41] Racial composition of the population of the study and the criteria for defining the condition are equally strong determinants.[42,43] Many studies done in Nigeria have stated that hypertension remains the commonest non communicable disease with over 4.3 million Nigerians above the age of 15 years being classified as hypertensive.[32,33,39] Studies have estimated the overall prevalence rate of hypertension in Nigeria to be within the range of 1.2-1.8%[34-37].Environmental and behavioural factors like salt intake, occupation[44]and alcohol intake, cigarette smoking and use of other psychoactive substances,[17–23,27,28] family size,[39] prolonged period of unemployment and poverty,[45] overcrowding and other life stressors, impaired intrauterine growth[46] and lack of exercise have been implicated in the development of hypertension.

Studies have observed direct link between use of alcohol (daily >14g intake of ethanol),[47–51] tobacco,[52–56] kolanut and khat consumption in men and women[57–61] and isolated systolic high blood pressure. A study has observed that over 10% of the population using kola nuts regularly and or alcohol are hypertensive.[39] Caffeine, cannabis and cocaine have equally been associated with hypertension.[27,28] From these findings, it became an obvious suggestion development of programs to improve management of hypertension should not only focus on lifestyle variables and their modifications like smoking and alcohol, but most importantly include the assessment and treatment of substance abuse and dependence disorders as well as other psychological morbidity.[27,28,39]

Studies have noted the relationship between depression and anxiety symptoms and medical treatment of hypertension.[62,63] In the recent large scale review, DiMatteo et al.,[63] observed a strong association of depression with noncompliance with medical treatment. The odds for being noncompliant with medication recommendations were three times higher for depressed patients when compared to nondepressed patients.[63] However, no association between anxiety and noncompliance was found,[63] despite its predictive value in the development of hypertension.

Management of hypertension requires strick medication adherence for successful control and to better the quality of life and well being of the individual. Majority of drug treatment regimen for hypertensive patients is polytherapy and this may require additional dedication. Both psychiatric comorbidity as well as substance abuse can singly or in synergy affect drug adherence to anti-hypertensive medications. There had being consistent findings from various studies that have looked at the association between hypertension treatment and smoking and alcohol intake. Briganti et al.,[15] noted that male sex, younger age, extreme poverty, not being obese, insufficient physical activity, current smoking, and excessive alcohol intake were significantly associated with untreated hypertension compared with treated hypertension. The results also observed comorbidity with psychological disorders and substance abuse and dependence were associated with lack of hypertension treatment, too. The aim of this study, therefore, was to determine common psychiatric comorbidity, substance use and medication adherence among patients with essential hypertension.

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Methodology

Informed consent was obtained from the participants. A cross-sectional study was conducted among 360 patients with hypertension who were on follow-up at the Cardiovascular Clinic of the General Outpatient Department of the University of Port Harcourt Teaching Hospital. Hypertensive patients who had primary myocardial or vascular disease, in cardiac failure, renal failure or who had a stroke, or coronary heart disease, diabetes mellitus, asthmatic illness, or any other chronic illnesses or those found to be acutely ill were excluded. Subjects selected were those who have been diagnosed for at least the past one year and have had at least six months of treatments, and were selected through simple random sampling. A structured socio-demographic questionnaire was used to obtained socio-demographic data of participants.

Screening for psychiatric comorbidity

To assess psychiatric comorbidity, the GHQ-12, in conjunction with the DSM 5, was used.

Screening for substance use

Alcohol use disorders (AUD) was screened using the four item CAGE questionnaire,[64] (cut down, annoyed, guilty, eye opener).[64] Any participant who scored two or more on the CAGE was classified as having AUDs.[64] Structured questionnaires were used to assess all the other psychoactive substances: Kolanut and khat chewing, caffeine use, cigarette smoking, tramadol, codeine, cannabis, and cocaine. In this study, current use was defined as use during the month preceding the interview.

Data analysis

The SPSS version 20 statistical package was used to analyzed the data. A correlation analysis was also done. Confidence interval was set at 95% while P-value of less than 0.05 was considered statistically significant.

Results

From the study, the mean age of hypertension was 44.59 ±7.86. Those who had their onset of illness at the age of 40 years and above constituted 231(64.2%) (Table 2) (Table 3) (Table 4).

Table 2 Socio-demographic and Clinical Characteristics of Subjects with Essential Hypertension and People Living with HIV (PLWHIV)

Variables	Hypertension=360	Statistical analysis
Age	**Freq**	
<20 yrs	0(0.0%)	X^2 = 150.83
20-29	16(44%)	df = 4 p=0.001
30-39	77(21.4%)	
40-49	132(36.7%)	
≥50	135(37.5%)	
Gender		
Male	141(39.2%)	X^2 = 0.73
Female	219(60.8%)	df = 1 p=0.39
Marital status		
Married	257(71.4%)	X^2 = 41.72
Single	38(10.6%)	df = 4 p=0.001
Divorced	3(0.8%)	
Separated	8(2.2%)	
Widowed	54(15.0%)	
Educational		X^2 = 20.64 df = 3
None	17(4.7%)	p=0.001
Primary	76(21.5%)	
Secondary	122(34.5%)	
Tertiary	139(39.3%)	
Tribe		
Hausa	5(1.4%)	X^2 = 17.97
Ibo	130(44.8%)	df = 6
Yoruba	28(7.8%)	p=0.006

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Table Continued

Variables	Hypertension=360	Statistical analysis
Age	**Freq**	
Ijaw	79(21.9%)	
Ogoni	44(12.2%)	
Ikwerre	49(13.6%)	
Others	31(8.6%)	
Occupation		
Managers	5(1.4%)	$X^2 = 64.47$
Professionals	15(4.2%)	df = 10
Technicians and Associates professionals	30(8.3%)	p=0.001
Clerical support workers	46(12.8%)	
Services and sales workers	29(8.1%)	
Skilled agricultural forestry and fishery workers	30(8.3%)	
Craft and related trade workers	54(15.1%)	
Plant and machine operators and assemblers	47(13.1%)	
Elementary occupation	81(35.2%)	
Armed forces occupation	3(0.05)	
Unemployed	37(16.1%)	
Ave. income		
≤ 10,000	83(24.6%)	$X^2 = 20.86$
10,000 – 30,000	81(24.0%)	df = 4
30,000 – 50,000	77(22.8%)	p=0.001
50,000 – 100,000	54(16.0%)	
> 100,000	43(7%)	
No income	12( )	
Unable to estimate	22(6.8%)*	
Rxn to diagnosis		
Normal	38(10.6%)	$X^2 = 109.83$
Sad	175(48.6%)	df = 1
Very Sad	146(40.6%)	p=0.001
With to die	1(3%)	
Mode of getting drugs		
From government	26(7.2%)	$X^2 = 483.53$
Self Purchase	328(91.1%)	df = 2
Both	6(1.7%)	p=0.001
Source of support		
Charity Organization	8(2.2%)	$X^2 = 9.87$
Friends	3(8%)	df = 3
Relatives	77(21.4%)	p=0.02
None	272(75.6%)	
Stigma		$X^2 = 153.62$
Yes	4(1.1%)	df = 1

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Table Continued

Variables	Hypertension=360	Statistical analysis
Age	**Freq**	
No	356(98.9%)	p=0.001
Domestic situation (Live With)		
Partner	37(10.3%)	X² = 73.63
Family	307(85.3%)	df = 3
Friends	7(1.9%)	p=0.001
None	9(2.5%)	
Partner	37(10.3%)	
Family	307(85.3%)	
Friends	7(1.9%)	
None	9(2.5%)	
Blood pressure (B.P)		
B.P within normal range		
Mild Hypertension	119(20.2%)	
Moderate hypertension	161(27.3%)	
Severe hypertension	80(13.6%)	
Age of onset of illness		
< 20 years	0(0.0%)	X² = 185.75
20 – 29 years	27(7.5%)	df = 23
30 – 39 years	102(28.3%)	p=0.001
40 – 49 years	169(46.9%)	
> 50 years	62(17.2%)	
Duration of illness		
5 years and below	316(87.8%)	X² = 10.29
6 – 10 years	30(8.3%)	df = 2
11 years and above	14(3.9%)	p=0.005
Duration of treatment		
< 1 year	74(20.6%)	X² = 8.59
1 – 5 years	242(67.2%)	df = 2
6 – 10 years	31(13.5%)	p=0.03
> 10 years	2(0.9%)	
Ever missed or discontinued treatment		X² = 7.79
Yes	104(28.9%)	df = 1
No	256(71.1%)	p=0.04

Source: Researcher's field study.

Table 3 Summary of Psychiatry Diagnosis

SN	Psychiatric Morbidity Total	Total	Essential Hypertension (%)
1	Depressive disorders	102	28.3
2	Anxiety disorders	76	21.1
4	Mixed Anxiety and Depressive disorders	21	5.8
5	Substance Abuse	82	22.7
12	Nil (no psychiatric illness)	79	21.9
	Total	360	100%

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Table 4 Distribution of Substance use among hypertensive patients

Psychoactive Substance	Frequency	%
Alcohol	62	17.2
Cigarette smoking	44	12.2
Nicotine snuffing	6	1.7
Kolanut and khat chewing	15	4.2
Tramadol	17	4.7
Codeine	14	3.90%
Caffeine	12	3.30%
Cannabis	8	2.20%
Cocaine	5	1.40%

Source: Result fromresearcher's field study. Data include cases of polysubstance use.

Discussion

From the study, strong direct association was observed between age and occurrence of hypertension as the prevalence was noted to be increasing with age. It was twice higher, in the age groups 40-49 and 50 and above, in comparism with age group of 30-39, and about 6 times higher compared with age group 20-29. This finding is in line with previous studies which noted that about 4.3 million Nigerians above the age of 15 years are classified as being hypertensive.[38,39] In females especially, a substantial increase in the prevalence of hypertension occurs after the age of 50.[38,39] This is presumably attributed to the hormonal changes associated with menopause.[24,38] The illness may progressively become worse with age causing attendant incapacitating symptoms that may infringe on the functional capacity of the individual and thereby reducing the quality of life.[10,14,25]

Age range of 40-49 formed the most prevalent age of onset of hypertension with 46.9% (n=169). This finding tallied with other studies which had noted that the illness is commonest after 40 years.[38] Equally worthy of note is that the number of patients steadily increased with increasing age of onset of illness with a sharp decrease from the age of 50. Hypertension which starts after the age of 50 years is most likely to be secondary hypertension.[24] In females, the prevalence is related to age with a substantial increase occurring after the age of 50.[38]

Psychological morbidity are common among the hypertensive population, and the study found a prevalent of 55.3%.[10,14] Depressive illness was higher and this is consistent with earlier studies.[14] The psychopathogenesis of depression in hypertension could be easily explained. Hypertension is essentially a chronic illness with disabling and sometimes incapacitating symptoms. The persistent or frequency of occurrence of these symptoms, the dysfunctions, need to for long term medications, associated economic burden, emergent complications, overall affection of quality of life often may summed up to cause depression.[25] This reduces the zeal and often discourages the individual from further taking or adhering to medications.[63] There is a perceived expectation in ailing individual that medications will substantially ameriorate the symptoms and bring about enormous relief.

However, in most chronic illnesses including hypertension in which one is required to take medications sometimes lifetime, this self encouragement may reduce or be lost. You may then observe irregularity in medication intake.

Psychological morbidity particularly depression affects negatively the management of hypertension, with most studies among men giving interesting revelations.[62,63] Depression is known to impare adherence to medications and self-care regimens in patients with chronic diseases.[63] The hopelessness and general lack of interest,[25] both are key symptoms of depression and they make compliance difficult or impossible as the patient holds little optimism that any action will be worthwhile. Furthermore, the general loss or decrease in energy could equally play a role in causing medication non adherence.[63] Finally, both depression and anxiety associated with poor attention and concentration as well as variable degree of memory problems.[25] This may cause some individuals with hypertension to ordinarily miss their medications. Definitive aetiological conclusions would therefore need a causal correlation from longitudinal data. As noted by DiMatteo,[63] it is possible that a bidirectional loop exists in which depression causes noncompliance with medical treatment and noncompliance further worsen depression. Therefore, a clinical focus on both might be essential. Nevertheless, depressive symptoms may be a modifiable risk factor for poor compliance with antihypertensive medications.[63]

Anxiety disorders were equally quite prevalent in the study. Anxiety and hypertension share the same pathophysiological pathway which is the sympathetic pathway.[24,25,65] Excessive sympathetic firing with accompanying adrenergic discharge remains the underlining pathophysiology. Suffices to say this is also the reason benzodiazepines potentiate GABA find therapeutic usefulness in both conditions. The occurrence of symptoms of hypertension alone appear to be more disabling especially as the methodology in this study excluded acute cases. Severe hypertension causes more symptoms and expectedly therefore, poses more morbidity and burden than mild to moderate hypertension.[65] The physical symptoms of hypertension are largely similar to the physical symptoms of anxiety disorders, particularly, generalized anxiety disorder, and they tend to be very sensitive to adverse changes in the environment. In hypertension, little changes in the environment including change in income level, employment, marital status (prolonged difficulty, disharmony, separation, divorce or widowhood), and poor drug adherence could have profound affects on patients who had hitherto remained stable on medications.[41,44,45]

The prevalence of substance abuse among hypertensive patients in the study was found to be 22.7%. Alcohol intake constituted the highest percentage (n=62, 17.2%). This was in agreement with the previous findings.[16,22] Majority had multiple substance abuse. More than 70% of them had alcohol related disorder with greater ratio in male (5:1). Alcohol acts as a sedative agent at low doses and as a central nervous system depressant at high doses and in long term use. It acts potentiating GABA neurotransmission.[25] At the long run has also been found to affect dopamine and serotonine pathways. This provides some relaxing and initialanxiolytic effects. The sedative and anxiolytic effects provide the rewards and attraction for the hypertensive patients for using alcohol to self medicate the many anxiety-like symptoms of hypertension.[25] Also, the alcohol related problems together with complications of the hypertension may singly or in combination further heighten the emotional burden and this may have a negative impact on medication compliance.[15,63]

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The active pharmacological ingredient in tobacco is nicotine. Nicotine smoke was next most used psychoactive substance after alcohol. Few subjects used it as nicotine snuff. The aetiological link between nicotine smoke and occurrence of hypertension has long been established by several studies.[65,67] Nicotine is an agonist at the nicotinic subtype of acetylcholine receptors. It activates the doparminergic pathway, causes an increase in circulating norepinephrine and epinephrine, increase in the release of vasopressin, endophine and cortisol.[25] Nicotine smoke, including passive smoking has also been associated with endothelial damage.[22,56] All these contribute to the stimulatory effects of the CNS, hence the tendency of causing hypertension.[66] Kolanut and khat chewing, both CNS stimulants, are consumed commonly in Nigeria. They have been implicated in hypertension.[57–59] Khat has been found to contain cathinone and norephedrine.[58] Caffeine use primarily increases the activity of cAMP.[27,28] However, it also, specifically at high dose or concentration, can enhance the activity of dopamine and noradrenergic neurones, and thereby causing an increase in blood pressure. In most cases of increased dopamine, there may be a relative decrease in acetylcholine, a neurotransmitter involved memory. Forgetful was identified as a key reason for poor adherence to ant-hypertensive medications. Cannabis and cocaine also enhance dopaminergic activity.

Curious attention to the aetiology of hypertension has prompted interesting findings. Substances of abuse particularly alcohol, nicotine, cannabis and cocaine have been implicated in the aetiology of hypertension through their respective mechanism of action. On the other hand, the frustrations particularly from functional incapacitation, need to ameriorate the disturbing symptoms, emotional disturbance especially depression and anxiety, reduced quality of life and well being all drag the individual into substance use and subsequently abuse. This simply describes the existence of a bidirectional relationship between substance abuse and hypertension.[27,28] However, stating the precise relationship was not the scope of this study. Hypertension patients tend to abuse substance mainly to self-medicate their depression or to abate the many anxiety or anxiety like symptoms that are usually present in hypertension, hence the therapeutic use of diazepam and propranolol which have proven anxiolytic effects. Conversely, consumption of caffeine[27,28] and alcohol,[47-51] smoking nicotine,[22,53–56] cannabis and cocaine have equally been identified as strong causal factors.

Conclusion

The study reveals that essential hypertension is a chronic debilitating and disabling illness associated with common psychiatric comorbidity and substance use, with both either singly or in combination affect medication adherence. Is therefore important that the management of hypertension should include more attention to their mental health status and possible substance use among these patients in order to enhance the quality of healthcare.

Limitation

However, it was difficult for most of the respondents to know exactly the age of onset of disease since majority only became aware of the diagnosis during their first or routine hospital visits.

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Conflict of interest

The author declares no conflict of interest.

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