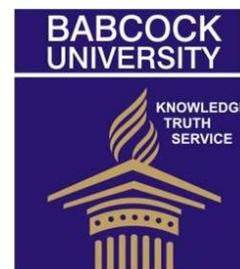




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Treatment adherence and risk of non-compliance among hypertensives at a Teaching Hospital in Ogun state, southwest Nigeria.

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ABSTRACT

The level of medication adherence of hypertensives and the attendant risks of non compliance were studied in a University teaching hospital in Ogun state. The study was a cross-sectional design utilizing a pretested 35-item questionnaire (Cronbach's alpha of 0.781) to collect information about perceived severity and threat to life from poor treatment response and medication adherence in hypertensives. One hundred and three participants were enrolled for the study by systematic random selection of patients attending the outpatient clinic. Results indicated that 56(54.4%) Males and 47(45.6%) females with mean age 62.6 ± 12.19 years participated in the study. Mean systolic and diastolic blood pressure of 155.2 ± 16.3 and 99.2 ± 8.78 mm of Hg were recorded. Perception of risk of complications from poor treatment measured on a 30-point scale recorded a mean score of 22.63 ± 4.47 and treatment adherence measured on a 42-point scale similarly recorded a mean score of 29.12 ± 5.70 representing, representing 69.3% adherence rate for the participants in the study. There was no significant difference in measures of adherence to treatment and perception of risk of poor treatment recorded between males and females. The findings suggest that the adherence rate in this study was unacceptably low and require stimulation through appropriate health promotion intervention to improve treatment outcomes.

Keywords: *Perception of risk, Treatment adherence, hypertension, health Promotion, blood pressure.*

INTRODUCTION

Hypertension is often the precursor to congestive heart failure, chronic occlusive peripheral vascular disease, renal failure and stroke (Giles & Materson, 2005). Target organ damage is an important clinical endpoint in poorly managed hypertension. Chronic illnesses represent significant health challenges in developing countries of the world next to infectious diseases (Murray & Lopez, 1997; Cappuccio, *et al.*, 2004; Agyemang, *et al.*, 2005). This observation probably serve to confirm the health transition model which has been described as the gradual but consistent shift along the health transition continuum from predominantly infectious disease to that of chronic illness among the population of many developing countries like Nigeria. It has been established that individuals of black ethnic expression tend to develop and sustain hypertension (Murray & Lopez, 1997). Cappuccio *et al* (2004) in

recent study observed rapid increases in blood pressure and prevalence of hypertension in adults in Africa. The mortality rates recorded for these diseases, especially hypertension and diabetes mellitus among these ethnic groups remains unacceptably high despite availability of potent and efficacious medications and therapy modality. High blood pressure is an important preventable cause of premature death from heart diseases and stroke world over. This is increasingly becoming an important public health problem particularly among blacks who have been extensively studied in the United States (Quipping *et al*, 2008;) and elsewhere (Sliwa, *et al.*, 2008) . Over the past century, life expectancy has increased dramatically as a result of advances in public health research and practices, especially in countries where these are given high priority. Unfortunately, the incidence of hypertension

continues to rise in Nigeria and other parts of the world among blacks, with consequent high morbidity and mortality (Erhun, *et al.*, 2005; Akpa, *et al.*, 2005). Epidemiologically, enormous health hazards such as stroke and blood pressure-related end-organ damage are associated with persistent elevation of blood pressure, whether undiagnosed, untreated or unresponsive to treatment. Furthermore, patients that are poorly managed or are unresponsive to medication are at significant risk of morbidity and mortality (Svensson, *et al.*, 2000). Uncontrolled blood pressure have been demonstrated to be a major risk factor contributing to the more than 500,000 strokes and 1 million myocardial infarction cases reported each year in the United States alone (Johnson, *et al.*, 1999). The total estimated deaths from cardiovascular disease reported for Nigeria in 2004 was 201,500 deaths and 10,700 of these was recorded for hypertensive heart disease; comparing the 922,700 and 229,000 deaths reported for the USA and the United Kingdom respectively, it is clear that there is a growing health problem that requires an intervention. An estimated 14.55 million people worldwide between the ages of 30 to 80 years were reported to have died as a result of hypertensive-related conditions in 2005; while 7.03% of this was reported for sub-Saharan Africa (Mathers, 2005). The total estimated deaths resulting from all cardiovascular diseases and hypertensive heart disease recorded for Nigeria in 2004 by WHO was 201,500 and 10,700 respectively, and placed Nigeria in the 16th position globally. Similarly, in terms of disease burden expressed as disability adjusted life years (DALYs) lost to cardiovascular diseases and hypertensive heart disease reported for Nigeria in 2004 was 2,116,000 and 105,000 respectively and puts Nigeria in the first position in sub-Saharan Africa (Mathers, 2005). It is projected that in the year 2015 the total deaths estimate resulting from hypertensive heart disease would be 81,383 for Africa representing an increase of 20.67% from current estimate of 64,559 deaths. It is becoming obvious that a disease like hypertension which is preventable is progressively becoming an important public health problem requiring serious attention. However, medication adherence failure in cardiovascular illnesses continues to remain a major problem in the effective control of hypertension despite availability of effective drugs, therapy modality and knowledge of hypertension aetiologies (Bloom, 2001). Medication compliance is a critical determinant of blood pressure control (Burnier, 2006; Perreault, *et al.*, 2005). Although factors influencing compliance such as nature of the

treatment modality (Wanovich, *et al.*, 2004), adverse effects and slow onset of response are known in essential hypertension, and clinicians are worried when patients are not making expected progress in their treatment despite the advantages of potent medications that can be used in different combinations for treating hypertension. No doubt, poor medication adherence has been blamed for low treatment success a number of hypertensive patients achieving BP levels at or below the treatment goal of 140/90 mm Hg, especially in the United States where much studies have been carried out (Morisky, *et al.*, 2002; Ramsay, 1999). Poor adherence to antihypertensive medications contributes to lack of control in more than two-thirds of these patients, and it is a critical determinant in the response to antihypertensive therapy (JNC VI 1997 Published in JAMA, 2003). Among hypertensive patients, control of BP is significantly better with improved medication compliance (Gerbino, *et al.*, 2004). Unfortunately, the incidence of hypertension continues to rise in Nigerians with its consequent high morbidity and mortality (Kabir, *et al.*, 2004). Adequate control of blood pressure (BP) in patients with essential arterial hypertension increases their life expectancy and quality of life measures. Nevertheless, one of the problems inherent to its treatment is that early in the pathogenesis of hypertension, increased BP does not usually produce relevant clinical manifestations, and therefore the patient may assume that the disease is under control. Therefore, failure in therapy for high blood pressure is common and is mainly related to lack of treatment adherence. In this wise there is need to fully understand the mindset of the patient in relation to adherence through further studies. Hypertension is defined as a sustained diastolic pressure greater than 90mmHg accompanied by an elevated systolic pressure greater than 140mmHg. Hypertension results from increased peripheral vascular smooth muscle tone which leads to increased arteriolar resistance and reduced capacitance of the venous system. Chronic hypertension can lead to congestive heart failure, myocardial infarction, renal damage and cerebro-vascular accidents, which can produce premature death or permanent disability. The goal of treatment of hypertension is to reduce blood pressure so that risks of complications become reduced. There are many treatment modalities for hypertension that can be used to treat high blood pressure. They include Alpha blockers, Angiotensin-converting enzyme (ACE) inhibitors, Angiotensin receptor blockers (ARBs), Beta-blockers, Calcium ion channel blockers, Central alpha agonists, Diuretics, Renin

inhibitors including aliskiren (TEKTURNA), Vasodilators. Prescription compliance is defined as the level at which the patients' individual behavior corresponds exactly to the physicians recommendations, making effective what was outlined or prescribed (Benfari, *et al.*, 1981; Pitkala, *et al.*, 2007). Compliance involves not only taking the prescribed medications but also adherence to follow-up appointments and maintaining the recommended lifestyle modifications. It has been suggested in literature that an adherence rate of minimum of between 80% to 90% is regarded as good (Schroeder, *et al.*, 2006; Zeller, *et al.*, 2008) Lack of compliance or adherence to prescribed antihypertensive regimens constitutes a barrier to adequate blood pressure control and prevention of cardiovascular events and is attributed to ignorance (Olubodun, 1990). The information gained from measurement of adherence can help to formulate recommendations for individual patients regarding necessary adjustments to their medication-taking behavior to achieve the optimum outcome. To be effective, strategies employed in clinical practice to overcome non-adherence need to take into account patients' individual characteristics. The benefits of proven medical treatments are only available to patients who actively use them; thus, patient adherence to healthcare provider recommendations is the key mediator between medical practice and health outcomes. (Hawkshead & Krousel-Wood, 2007) In recent years, patient's opinion is increasingly considered to be a useful component in the determination of care outcomes. Measuring the perceptions of patients presents concrete advantages for the evaluation of the success of therapy and patients' needs since patients constitute essential source of information about accessibility and effectiveness of care. (Erah, & Chuks-Eboka, 2008). Adherence is a primary determinant of the effectiveness of treatment because poor adherence attenuates optimum clinical benefit. Good adherence improves the effectiveness of interventions aimed at promoting healthy lifestyles, such as diet modification, increased physical activity, non-smoking behavior and of the pharmacological-based risk-reduction interventions. It also affects secondary prevention and disease treatment interventions. For example, low adherence has been identified as the primary cause of unsatisfactory control of blood pressure. Good adherence has been shown to improve blood pressure control and reduce the complications of hypertension. However, further studies still needs to be carried out to understand fully the dynamics involved in adherence to medication in hypertension.

The study was guided by specific objectives developed based on the nature of the problems discussed and the Health Belief Model (HBM) developed by Rosenstock (1974) which provided the conceptual framework for understanding the dynamics of preventive health behavior. We examined the correlation between participants' risk perception and levels of medication adherence in the management of hypertension by determining the level of medication adherence of participants, by assessing levels of perceived severity of disease with poor treatment amongst participants. It was hypothesized that perception of severity of hypertension complications from poor treatment and threat to life will positively correlate with medication adherence.

Methodology

The study was a cross-sectional survey utilizing a pretested 35-item questionnaire (Cronbach's alpha of 0.781) to collect information about perceived severity and threat to life from poor treatment response and medication adherence in hypertensives. Informed consent was sought from all patients who accepted to participate. One hundred and three participants diagnosed with uncomplicated hypertension were enrolled for the study by systematic random selection of patients attending the outpatient clinic at the Teaching Hospital located in Sagamu (*location-12°16' North and 6°33' East*) a Southwestern city in the tropical rain forest of Nigeria. The participants were served the questionnaire constructed in both English and Yoruba languages which was self-administered within a period of between forty five minutes and one hour. Measures for the study were conceptually derived from the Health Belief Model and Hill-Born compliance scale for medication-taking and appointment-keeping behaviours (Kim, Hill, Bone & Levine, 2000). The health belief model provided variables that measured perception of risk and threat to life of the patient associated with not taking prescribed medications in hypertension. The perception of risk variable was measured on a 4-point Likert-type scale with response: 0 = *Strongly Disagree*, 1 = *Disagree*, 2 = *Agree* and 3 = *Strongly Agree*. The perception items were aggregated to create the perception of risk scale on a 42-point scale. On the other hand, adherence to treatment in hypertension was measured using a 4-point scale which require respondents to answer: 0 = *all of the time*, 1 = *most of the time*, 2 = *some of the time*, 3 = *none of the time*, reflecting how often they missed their medication or added salt to their food or missed

a doctor's appointment. Data analysis was conducted using Statistical Package for Social Sciences version 12 (SPSS Inc., 2003). Descriptive statistics such as frequency distributions and means were used to evaluate personal characteristics, age, blood pressure, perception of risk of poor treatment outcome in hypertension and treatment adherence variables. Correlation analysis was conducted to validate the hypothesis proposed. The significance level was set at ($p \leq 0.05$) for all statistical procedures.

Results

The study was designed to measure levels of perceived risk of severity of complications arising from poor medication adherence and treatment adherence among hypertensive patients attending the hypertension clinic at a University Teaching hospital in Sagamu, Nigeria. The result showed that 56(54.4%) males and 47(45.6%) females with a mean age of 62.2 ± 12.19 years participated in the study. Majority 91 (90.4%) had formal education while

12(11.7%) did not have any formal education. Mean systolic and diastolic blood pressures were 155.2 ± 16.3 and 99.2 ± 8.78 mm of Hg respectively. Self reported perception of risk resulting from poor treatment of hypertension measured on a 30-point aggregated scale, revealed that the participants in this study scored a mean of 21.63 ± 4.47 (95% CI: 20.77 to 22.43). Similarly, on a 42-point aggregate scale measuring adherence to treatment, the participants scored a mean of 29.12 ± 5.70 (95% CI: 28.01 to 30.22). Adherence rate in this study translates to 69.3%. There was no significance difference in perceived risk of complication resulting from poor treatment between males and female participants in this study ($p=0.95$). Again there was no significant difference in the mean scores for adherence to hypertensive treatment between males and females in this study ($p=0.88$).

Bivariate analysis revealed that perception of severity of hypertension complications from poor treatment and threat to life positively correlated with Treatment adherence ($r= 0.46, p<0.0001$).

Table 1. Summary of descriptive statistics for major variables in the study among hypertensives surveyed.

Variables	Maximum Point	Mean score	Standard Deviation
Age	-	62.6	12.19
▪ Males		63.5	13.0
▪ Females		61.6	12.19
Blood Pressure	-		
▪ Systolic		155.2	16.3
▪ Diastolic		99.2	8.78
Perception of Risk of Complications from Poor Treatment in Hypertension.	30	21.63	4.47
Treatment Adherence Behaviour*	42	29.12	5.70
▪ Medication-Taking	27	19.26	4.17
▪ Appointment-Keeping	3	2.00	0.88
▪ Food/Salt consumption	6	4.04	1.16
▪ Alcohol Consumption	6	3.81	1.42

*This variable is a composite aggregate of the components.

Discussion

In the present study on perception of risk from poor treatment in hypertension and adherence to recommended treatment we attempted to provide important information that would represent baseline data for any intervention that would be developed to stimulate adherence to treatment in hypertension. In this study we report adherence rate for hypertensive treatment among the respondents of 69.3% which is well below what is considered minimal to sustain

therapeutic outcome that would prevent hypertensive complications. Perceived risk of participants towards complications arising from poor adherence to treatment measured on a maximum aggregate scale of 30-points showed that the participants scored a mean of 21.63 with a standard deviation of 4.47 suggesting that they perceived themselves at some risk but not sufficiently high to bring about very significant impact on adherence to treatment, as can be observed in this study. The adherence to treatment mean score

on a maximum scale of 42 points was 29.12 with a standard deviation of 5.70 translates to 69.3%, well below the minimum of 80% suggested by other researchers (Osterberg, & Blaschke, 2005; Schroeder, *et al.*, 2006; Zeller *et al.*, 2008). Considering Health Belief Model (HBM) construct developed by Rosenstock (1974) to explain preventive health behaviour examines the extent to which an individual perceives a health problem as having serious consequences and a high probability of occurrence, suggested that behaviour exhibited by the individual is determined by whether the individual (a) believes that he/she is susceptible to the particular health problem, (b) regards this problem as serious, in this study the severity of complications arising from poor treatment in hypertension, (c) is convinced that treatment or prevention activities are effective and (d) at the same time inexpensive, and (e) receives a cue to take health promoting action. In other words, health behaviour decisions are made through mental disposition computational analysis of susceptibility to disease, disease severity, cost/benefit of treatment. Furthermore, It should be borne in mind that acceptance of personal susceptibility to a adverse condition varies from person to person, so also is the individual's perception of the seriousness vary. This perception must be viewed in the context of the knowledge of the condition that the individual has and how significantly his educational attainment, culturally set values and beliefs impinge on this knowledge. These modifying factors also awaken or subdue threat of the likelihood of serious consequences as a result of inactivity. Furthermore, the modifying factors enables the individual to evaluate the outcome expected in the perspective of any constraint; where the benefit clearly outweighs the constraint, the individual is motivated to take the action recommended. However, if the individual did not believe himself or herself particularly susceptible, a very strong cue to action would be required to motivate behaviour. Conversely, a high level of perceived personal susceptibility and seriousness would require only minor stimuli to trigger the recommended behaviour. We have examined some components of the construct that directly influence adherence and demonstrated that perception of severity of hypertension complications from poor treatment and threat to life positively correlated with Treatment adherence ($r = 0.46$, $p < 0.0001$) sustaining our hypothesis. Surprisingly, the result showed no significant differences in adherence to treatment between males and females.

In conclusion, the level of adherence to treatment among the participants in this study seriously needs to be improved through well designed health promotion and education strategies in order to prevent poor treatment outcomes. The health promotion intervention needs to have components that would also improve perception of risk of complications arising from poor adherence to treatment and threat to life of hypertensives taking medications. The present study has implications for clinical practice, preventive health care practice and future research as data from this study would serve as baseline for any intervention planned to stimulate treatment adherence in the clinical settings. Modifying risk factors in cardiovascular event would improve quality of life for individuals with hypertension and reduce morbidity and mortality. We acknowledge the inherent difficulty in measuring adherence; however we adopted the self-reporting approach which has been shown to be valuable in assessing patients.

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