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Evaluation of Medication Adherence among Hypertensive Patients in a Liberian Teaching Hospital

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Abstract:

Hypertension is known to be the main risk factor for cardiovascular diseases and stroke. Hypertension is a major modifiable risk factor, which significantly and independently increases the risk of developing major cardiovascular and cerebrovascular complications when not taken seriously. Lack of adherence to medications and lifestyle adjustment, mainly among hypertensive patients has become an issue of global concern and comprised a major barrier to safe, cost-effective and effective use of drugs. The study aimed to evaluate medication adherence and to assess frequency of lifestyles adjustments associated with treatment adherence among hypertensive patients followed at the Out-Patient Department of the John F. Kennedy Memorial Hospital in Liberia.

A descriptive cross-sectional study was conducted on hypertensive patients at the John F. Kennedy Memorial Hospital in Liberia. A face-to-face interviewer-guided questionnaire was distributed and responded to by 138 patients. The questionnaire consisted of 3-parts: sociodemographic characteristics, treatment adherence and issues related to healthy lifestyle practices (physical activities, diet, and taking medications).

From the 138 participants recruited for the study, 42.9 %, 33.3 % and 52.1 %, stopped taking medications on own initiative, did not take medications the previous day and stopped taking medications against physician's orders respectively. 78 % of the participants did not adhere to lifestyle adjustments recommended by their physicians. Based on the scoring system of MMAS-8, the mean score of the participants was < 6. The level of association between patients and medication adherence was $P = 0.922$ [95 % CI: 0.848 – 0.993].

Patients were non-adherent to antihypertensive medications and lifestyle adjustments. It is recommended that patient's education become an integral part of the management of patients with hypertension. Thus, a public educational program for promoting HTN awareness and lifestyle modification is an urgent need.

Keywords: Hypertension, lifestyle adjustment, adherence, Quality of life

1. Introduction

Adherence, as defined by the World Health Organization, is 'the extent to which a person's behavior – taking medication, following a diet and/or executing lifestyle changes – corresponds with agreed recommendations from a healthcare provider (Profect, 2003). Non-adherence to medication in hypertensive patients has become global concern and covered major barriers to safe, cost-effective and effective use of drugs (Profect, 2003). Issues influencing patients' adherence to medication are reported to be multifactorial and grouped under five main domains which included socio-economic factors such as literacy, cost of medications, availability of health insurance, religious and cultural beliefs about a particular disease condition and treatment (Ferdinand, Senatore, Clayton-Jeter et al., 2017). Also, issues relating to the healthcare system such as patient-provider relationship, provider communication skills, presence of community care and waiting time. Third, issues relating to conditions such as absence of symptoms, chronic conditions, depression and psychotic disorders. Fourth, therapy related conditions such as duration of therapy, frequency of changes in medication, absence of side effects, number of daily doses and absence of concurrent medication. Finally, patient-related factors such as motivation, good knowledge about medications and perceived benefit to treatment. Adherence to diet and lifestyle adjustments and medication therapy are pivotal in achieving optimal blood pressure control especially among hypertensive patients whose blood pressure cannot be controlled by diet and lifestyle adjustment alone. Similarly, improving adherence to antihypertensive medications is key to enhancing outcomes in hypertensive patients. (Ferdinand, Senatore, Clayton-Jeter et al., 2017).

Lowering blood pressure in hypertension reduces the associated risks. Therefore, an effective strategy for reducing hypertension associated-complications is increasing patient's knowledge of their condition and their level of adherence (Ayatollahi, et al., 2010; Dolor, Yancy et al., 2009). Patients' knowledge about hypertension and benefits of lifestyle modifications seem to be the key to successful control of hypertension (Alexander et al., 2003). Lifestyle modifications are not easily achieved. Adherence to treatment increases when the patients are active participants in their

drug therapy. However, poor medication adherence, lack of knowledge and awareness on lifestyle modifications are major reasons for BP control, which largely deteriorates a patient's quality of life (Drevenhorn, Kjellgren, & Bengtson, 2007).

Due to the asymptomatic nature of hypertension it is often not taken seriously and repeatedly deficiently controlled (Neutel & Campbell, 2008). Hypertension accounts for approximately nine million deaths among hypertensive patients (Lim, et al., 2010; WHO, 2017). The prevalence of hypertension in Sub-Saharan Africa increased from 9.7% (1990) to 30.8% (2010) where regions differ in the range of 15 % to 70 % (Adeloye, 2014). Some community-based studies have reported that the high prevalence of hypertension in Sub-Saharan Africa was associated with low awareness and treatment rates (Adeloye, 2014; Mills et al., 2015).

In Liberia, hypertension accounts for 5 % of health facility visits (Ministry of Health-Liberia morbidity reports, 2009). A significant segment (22 %) of the population of Liberia between 30 – 70 years was at risk of hypertension and 13% cardiovascular diseases (World Health Organization (2018). Persons with systolic blood pressure (SBP) ≥ 140 mmHg and/or diastolic blood pressure (DBP) ≥ 90 mmHg, including those on medication for HTN, were 30.7% for both sexes, 30.3% for males and 31% for females (Liberia STEPS survey, 2011). Clinical reports indicated that 18% of all deaths and disability combined were caused by stroke resulting from hypertension (Liberia Institute of Health Metrics and Evaluation, 2017).

To the best knowledge of the authors, no research work on medication adherence among hypertensive patients has been conducted in Liberia. Therefore, the general objective was to evaluate level of medication adherence in hypertensive patients followed in the Out-Patient Department of the John F. Kennedy Memorial Hospital (JFKMH) in Monrovia, Liberia. In addition, the study further sought to assess the frequency of lifestyle practices among hypertensive patients.

2. Materials and Methods

2.1. Study Design/Study Population

A descriptive cross-sectional study was conducted over a period of 5 weeks from 23rd August to 4th October. The study was conducted using an interviewer guided, self-administered questionnaire to 138 hypertensive patients. The questionnaire comprised closed-ended and open-ended questions and consisted of 3 sections: sociodemographic characteristics, adherence to medication and lifestyle practices (physical activities, diet, and taking medications).

2.2. Study Area

The study was conducted at the John F. Kennedy Memorial Hospital (JFKMH) in Monrovia, Liberia. The John F. Kennedy Memorial Hospital, the largest referral hospital, is located in Monrovia, the capital city of Liberia. It has a capacity of 500 bed, and receives more than 500 patients of various medical conditions per day. This facility caters to diverse patients including pediatrics and the elderly of diverse medical conditions: hypertension, diabetes, surgical, etc. The JFKMH was selected because of its reputation as a top-notch healthcare center that comprises both internationally and locally trained specialists in medicine and pharmacy, general practitioners in medicine and pharmacy, nurses and other support staff. It is comprised of seven wards and nine clinical departments. The hospital is also a center for the training of health workers and research.

2.3. Data Collection

Patients were recruited to the study on the day of visitation to the primary healthcare provider. The patients usually queue up at the registration station in a separate area inside the waiting hall, before consulting their physicians. During these meetings, the objectives and importance of the study were explained to the patients. The inclusion criteria were adhered to in recruiting eligible patients to participate in the study: patients aged ≥ 20 years; physician-diagnosed hypertension including both essential and secondary controlled hypertension; already on antihypertensive medication plan for at least 2 months before the study and mentally capable to communicate and willing to give written informed consent to participate in the study. Eligible subjects were then interviewed by the researchers in private consultation sessions during their clinic visits.

2.4. Medication Adherence

Medication adherence was assessed by the 8-item Morisky Medication Adherence Scale (MMAS-8), which is a commonly used, validated, and self-reported adherence measure of cardiovascular medications (Morisky et al., 2008). MMAS-8 is an 8-item questionnaire with 7 yes/no questions while the last question was a 5-point Likert scale. Based on the scoring system of MMAS, adherence was rated as follows: high adherence (=8), medium adherence (6 to 7) and low adherence (<6). Patients who had a low or a moderate rate of adherence were considered as non-adherent.

2.5. Sample Size Determination

Sample size was calculated by using the formula

$$X = Z_{1-\alpha/2}^2 P (1 - P) / d^2$$

Here

$Z_{1-\alpha/2}$ = standard normal variate (at 5% type 1 error ($p \leq 0.05$) it is 1.96 and at 1% type 1 error ($p \leq 0.05$) it is 2.58). as in majority of studies p values are considered significant below 0.05 hence 1.96 is used in the formula.

P = expected proportion in population based on previous studies or on pilot studies = 10%

$d = \text{Absolute error or precision} = 0.05$

$\text{sample size} = 1.96^2 \times 0.1 (1 - 0.1) / 0.05^2 = 138.0$

Hence, the sample size was determined to be 138 participants

2.6. Statistical Analysis

Data entry, cleaning, and analysis were done using Statistical Package for social Sciences statistical software version 25 (IBM SPSS, Inc. Chicago, IL). The response rate was determined by the number of responses divided by the number of surveys sent out multiply by 100. Results of the descriptive analysis were presented as frequency and percentages for the categorical variables. Evaluation of medication adherence was measured by descriptive frequencies where level of adherence was determined by the mean score of the patients' response to the MMAS-8. Lifestyle behaviors were also calculated using descriptive analysis that were presented as frequencies and percentages. Chi-square test was also used to determine the association between medication adherence and lifestyle adjustment during the survey. P value < 0.05 was considered as statistically significant.

2.7. Ethics Review

Ethical approval was requested for and obtained from the John F. Kennedy Memorial Hospital's Institutional Review Board. The study was conducted with the understanding and written consent of eligible patients before participation.

2.8. Results

The response rate was determined by the number of responses divided by the number of surveys sent out multiply by 100. All questionnaires were filled and returned to the researcher during the patients' clinic visits. The male to female percentages were 56% and 44% respectively, with mean age \pm SD of 0.71 \pm 0.737 years. The age-groups of < 50 years and 51-65 years were 41.2% respectively while \geq 66 years was 17.6% in the study. Most (60.8%) of the participants were married, 25.5% were single and 13.7% were either divorced, separated or widowed.

Majority (80.4%) of the participants were city residents. 48% and 22% were college (or higher) and high school graduates respectively. Half (50%) of the participants were employed, 25.5% were unemployed, 15.7% retired and 7.8% were housewives (Table 1). 54.9% of the participants forgot to take their antihypertensive medications, 60.8% indicated that at any day they did not take their antihypertensive medications. 29.4% stopped taking their medications when they felt better. 39.2% stopped taking their medications when they felt worse as opposed to 60.8% who continued to take their medications even when they felt worse. 42.9% indicated that they stopped taking their medications on their own initiative. 33.3% did not take their medications the previous day. 76% stopped taking their medications because it ran out. 47.9% stopped taking their medications against physician's orders (Table 2).

Most (56.9%) of the participants had a \leq 5 years' duration of hypertension. 14.3 % indicated that they did not comply with medication advise while 78.4% occasionally adhered to diet recommendations. For exercise recommendations, 76.5% responded that they occasionally adhere to exercise recommendations given by their healthcare provider. The prevalence of co-morbidity was 35.3%. The type of co-morbidities predominantly present were diabetes (17.6%), peptic ulcer disease (7.8%) and stroke (6.9%). Based on the scoring system of MMAS-8, the mean score of the participants was <6. The level of significance between patients and medication adherence was $P = 0.922$ [95% CI: 0.848 - 0.993].

S/N	Variable	Category	Frequency (%)
1	Sex	Male	77 (56 %)
		Female	61 (44 %)
2	Age groups (years)	< 50	57 (41.2 %)
		51 – 65	57 (41.2 %)
		\geq 66	24 (17.6 %)
3.	Marital status	Married	84 (60.8 %)
		Single	35 (25.5 %)
		Divorced/Widowed	19 (15.7 %)
4.	Education	Tertiary/graduates	66 (48.0 %)
		Secondary school	30 (22.0 %)
		Informal education	42 (30.0 %)
5	Area of Residence	Urban	111 (80.4 %)
		Rural	27 (19.6 %)
6	Employment status	Employed	69 (50.0 %)
		Unemployed	35 (25.5 %)
		Retired	19 (15.7 %)
		Housewife	15 (7.8 %)

Table 1: Socio-Demographic Characteristics of Patients
Source: Researcher Field Data

S/N	Variable	Category	Frequency (%)
1	Forgot to take antihypertensive medications	YES	80 (54.9 %)
		NO	58 (45.1 %)
2	Did not take medicines on any given day	YES	84 (60.8 %)
		NO	54 (39.2 %)
3.	Stopped taking their medications when they felt better	YES	35 (29.4 %)
		NO	103 (70.6 %)
4.	Stopped taking their medications when they felt worse.	YES	66 (39.2 %)
		NO	30 (60.8 %)
5	Stopped taking their medications on their own initiative	YES	60 (42.9 %)
		NO	78 (57.1 %)
6	Did not take their medications the previous day	YES	46 (33.3%)
		NO	92 (66.7%)
7	Stopped taking their medications because it ran out.	YES	105 (76.0 %)
		NO	33 (24.0 %)
8.	Stopped taking their medications against physician's orders.	YES	66 (47.9 %)
		NO	34 (52.1 %)

Table 2: Clinical Characteristics of Patients (n = 138)

Source: Researcher Field Data

2.9. Discussion

In this study conducted among 138 adult hypertensive patients attending follow-up treatment at the JFK Memorial Hospital in Liberia, majority were city residents and college students (graduates). Many of the participants were employed whereas few were retired. The current study showed that most of the participants were married and resided in the city. The greater portion of tertiary educated participants could be due to the situation wherein most urban dwellers in many African cities were opportune to obtain tertiary education and job-liberties that city dwellers have (Agyemang, 2006). Contrary to the current study, Thinyane et al. (2015) showed that 90.0% of their study participants were females with a mean age of 57.7 ± 13.2 years. According to Beigi et al. (2014), approximately two third of their patients were below high school degrees. A community-based study indicated that of its 64.6 % females in the study, 52.9 % were found between the ages 30 to 49 years where 69.3 % had received up to secondary school education or at least 8 years of schooling (Guwatudde et al., 2015).

Most of the participants forgot to take their antihypertensive medications, majority indicated that at any day they did not take their antihypertensive medications. Some explained that they stopped taking their medications when they felt better. It was reported that about half of people with hypertension have uncontrolled blood pressure (CDC, 2015). A major cause of poor blood pressure control was inadequate medication adherence (Burnier, 2014; Wofford & Minor, 2009). Adherence to antihypertensive medications drops after initiating treatment, where about 10% of patients missed a dose on any given day and around half of hypertension patients stopping medication by one year after prescription (Vrijens et al., 2008). Among patients with presumed resistant hypertension, 43% to 65.5% of them were medication non-adherent (De Geest et al., 2014; Jung et al., 2013). Poor medication adherence is associated with a major barrier in reducing cardiovascular mortality (Bramlage & Hasford, 2009; Gwady-Sridhar et al., 2013). This rate of poor medication adherence among amongst non-adherent hypertensive patients has led to an increased morbidity and premature mortality.

The current study demonstrated that majority of the participants reported that they continued to take their medications even when they felt worse. Beigi et al. (2014) showed a significant increase in patients' medication adherence from 12% to 51% after an educational intervention. This demonstrated the beneficial effects of education on the triangle of patient's awareness, lifestyle changes, and adherence to medications. Patient's education on the importance of medication adherence, self-monitoring of BP and active patient participation in their medication therapy were also revealed to be effective healthcare measures for controlling hypertension (Beigi et al., 2014).

In the current study, most of the participants indicated that they stopped taking their medications because it ran out. Other participants explained that they stopped taking their medications against physician's orders. Patients indicated that they did not take their medications the previous day as this could be related to either financial constraints, not remembering to take their medications or could be due to stock-outs. Participants may have stopped taking their medications against physician's orders due to the side-effects of the medications which may have been intolerable to the individual patient. Financial constraints are an important barrier to adequate management of hypertension. Patients with low incomes may be unable to make out-of-pocket payments for their healthcare including chronic medication (Karakurt & Kasikci, 2012; Luehr et al., 2012). Drug stock-outs and shortages in public health facilities also complicate hypertension treatment and may compromise patient outcomes (Steyn, Fourie, & Temple, 2006).

The current study indicated that most participants were aware of the duration of their hypertension. Most had a ≤ 5 years' duration of hypertension. Findings (Liberia Institute of Health Metrics and Evaluation, 2017) have shown the rate of hypertension awareness (21%) of those having HTN. Majority of the participants occasionally adhered to diet recommendations and that they regularly take their antihypertensive medications. More participants responded that they occasionally adhere to exercise recommendations given by their healthcare provider. The prevalence of co-morbidity was low. The predominant co-morbidities were diabetes mellitus, peptic ulcer disease, glaucoma, and stroke. In spite of the increasing emphasis on drug therapy, lifestyle modification was reported to be an important part of BP control (Appel et al., 2003; Khoshdel et al., 2012). Patients who adhered to medication and lifestyle regimens had better health outcomes. Hence, healthcare professionals were advised to encourage hypertensive patients regarding lifestyle habits (Beigi et al.,

2014). Over-weight and obese people were encouraged to get involve in at least 150 minutes of moderate-intensity physical activity per week(Weiret al.,2000). Most hypertensive patients had other medical conditions, the most common of which being overweight or obesity(Liberia Institute of Health Metrics and Evaluation, 2017). However, patients self-reported rates of adherence to medication, diet and exercise are often low (Liberia STEPS survey, 2011).

Based on the scoring system of MMAS-8, the mean score of the participants was < 6. The level of significance between patients and medication adherence was $P = 0.922$ [95% CI: 0.848 – 0.993]. This inferred that the level of medication adherence was low among hypertensive patients in this study. Factors that contributed to treatment interruption among hypertensive patients were non-adherence to medication and follow-up visits(Thinyane et al., 2015). Hypertensive patients with higher medication adherence and regular follow-ups are more likely to achieve blood pressure targets than non-adherent patients(Liberia Institute of Health Metrics and Evaluation, 2017; Thinyane et al., 2015).Some predictors that have been consistently associated with poor adherence included complexity of the regimen, the treatment of asymptomatic disease, the presence of psychological problems like depression and medication side effects(Neutel & Campbell, 2008).

3. Conclusion

Hypertensive patients at the John F. Kennedy Memorial Hospital were non-adherent to their anti-hypertensive medications and did not comply with lifestyle adjustments recommended by healthcare provider. Educational interventions would have significantly desirable effects on medication adherence and lifestyle modification when provided to patients. Patient's education should become an integral part in the management of the patients with hypertension. Thus, a public educational program for promoting hypertension awareness, medication adherence and lifestyle modification is an urgent need.

3.1. Limitations

The absence of blood pressure control such as levels of systolic and diastolic blood pressure, were not investigated as variables of interest or even considered in the process of patient inclusion. Further studies with larger sample sizes and patient's follow-ups are therefore recommended to be conducted among hypertensive patients at the JFK Memorial Hospital.

3.1.1. Conflict of Interest

The authors declared no conflict of interest. Funding was provided by the African Center of Excellence in Phytomedicine Research and Development (ACEPRD), University of Jos, Nigeria.

3.3.2. Author's Contribution

GFS conceived the study and MPD provided technical inputs. All authors read the document for academic content and approved final version for publication.

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