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FACTORS AFFECTING ADHERENCE TO ANTIHYPERTENSIVE MEDICATION REGIMEN AMONG HEMODIALYSIS PATIENTS ATTENDING A PRIVATE HOSPITAL IN MOMBASA, KENYA

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ABSTRACT: Introduction: Patients with chronic kidney disease undergoing hemodialysis are usually co-morbid with hypertension that contributes to increased cardiovascular morbidity and mortality if not controlled. A number of factors are targeted as influencing agents to uncontrolled hypertension but adherence to treatment is counted as a major factor contributing to poor control of hypertension. **Methods:** A cross-sectional study was conducted at the renal unit amongst a sample size of 144 hypertensive patients aged 18 years and above, respondents were identified using simple random sampling. Data was collected using semi structured questionnaires. Data analysis using Chi square test was applied to establish significant relationships between the dependent variable (adherence) and independent variables (knowledge and perception), logistic regression was used to predict independent variables that influence adherence, and results with p values ≤ 0.05 were considered statistically significant. Adherence was determined using Morisky's Medication Adherence Scale (MMAS-8). **Findings:** Overall, 83(57.6%) of the patients were found to have high adherence rate to their antihypertensive medication. Factors that influenced adherence to antihypertensive medication were; age p = 0.23 (OR = 1.02, CI = 0.98-1.07), female gender had better adherence than males p = 0.98 (OR = 2.58, CI = 1.09-6.16), patients with health insurance p = 0.92 (OR = 0.35, CI = 0.15-0.84), knowledge of side effects of medication p = 0.58 (OR = 2.02, CI = 0.44-9.27), perception of severity p = 0.69 (OR = 3.61, CI = 1.02-12.78), perception of benefit p = 0.30 (OR = 3.22, CI = 1.06-9.79), and perception of barriers p = 0.75 (OR = 0.23, CI = 0.08-0.64). **Conclusion:** Healthcare workers should formulate interventions tailored towards scaling up adherence in those subgroups of hypertensive patients mentioned above in order to avert morbidities and mortalities as informed by the study.

INTRODUCTION: Patients with chronic kidney disease undergoing hemodialysis are usually co-morbid with hypertension that is difficult to control and contributes to increased cardiovascular morbidity and mortality [1].

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Controlling blood pressure to target is seen as one of the most important ways of retarding the progress of chronic kidney disease [2]. Pharmacologic therapy is required to control blood pressure in hemodialysis patients.

However, due to co-morbidities that requires different medications and hemodialysis patients being required to take a combination of antihypertensive agents to achieve adequate blood pressure control. Complexity of the medication regimen has led to poor control of blood pressure in

hemodialysis patients due to non-adherence to anti-hypertensive medication [3]. Medication adherence has been found to be as low as 3 - 7% among patients with chronic kidney disease on hemodialysis to their prescribed regime of antihypertensive medications over a six-week period [4]. Poor adherence to medication regimens have accounted for worsening of disease states, death, and increased health care costs [5]. It is therefore vital to ensure adequate blood pressure control in chronic kidney disease patients on hemodialysis. This entails patients adhering to their antihypertensive medication which will guarantee better health outcomes. Factors affecting adherence to antihypertensive medication among chronic kidney disease have rarely been studied in Kenya. Therefore this study aimed to assess the adherence, knowledge and perception of hemodialysis patients attending a private hospital in Mombasa, Kenya.

MATERIALS AND METHODS:

Setting and Study Design: The study adopted a hospital based quantitative cross-sectional descriptive study design. The study took place in the renal unit of a private hospital in Mombasa, Kenya. The primary target populations in this study were patients undergoing hemodialysis with a co morbidity of hypertension. Out of the 290 patients in the renal unit undergoing hemodialysis 240 were identified to be having hypertension. Patients were recruited in the study if: They were 18 years and above and patients with chronic kidney disease who had also been diagnosed with hypertension. Simple random sampling technique was used to select the study respondents with the renal unit patient's register as the sampling frame.

Ethical Approval: The study objectives were explained to respondents and then they were given the informed consent and were requested to sign once they had read and agreed to participate in the study. Ethical clearance was sought and granted by the IRB committee and approval was sought from the hospital administrator of a private hospital in Mombasa, Kenya. Participation was voluntary and details of the objectives and benefits of the study were explained to the respondents, anonymity of the participants was ensured by not having any identification on the data collection tool. Confidentiality was guaranteed by storing the data safe and only the researcher having access.

Tools: Data was collected using a researcher administered structured questionnaire and the questions used were developed by the researcher according to the research objectives, the literature review, as well as the theoretical framework of the study using Health Belief Model.

Adherence in this study was measured using the Morisky's Medication Adherence Scale (MMAS-8) which has eight questions, with a yes or no response for items 1 through to 7 and item 8 has a five point Likert scale [6]. Each "no" response is rated as 1 and each "yes" response is rated as 0 except for item 5, in which each "yes' is a 1 an "no" is a 0. For item 8, the code (0 - 4) has to be standardized by dividing the result by 4 to 6 indicate low adherence [6].

Patient's perception of severity of hypertension was measured using four items on a four point Likert scale: 1- strongly disagree, 2- disagree, 3- agree and 4- strongly agree. Patient's perception of benefit of adhering to the medication regimen was measured using 5 items on a 4 point Likert scale: 1-strongly disagree, 2-disagree, 3- agree and 4-strongly agree. Patient's perception of barriers to adhering to the medication was asked using four items on a 4 point Likert scale: 1- extremely low, 2-low, 3- high and 4- extremely high and the patient's perception of cues to action was asked using four items on a four point Likert scale: 1-strongly disagree, 2- disagree, 3- agree and 4-strongly agree.

Data Analysis: Data were entered into the computer using SPSS software program 20.0 version. Data were cleaned before being subjected to analysis. Data analysis was performed using SPSS software program. Information was summarized using frequency and percentage tables. Bivariate analysis using chi-square test was used to ascertain associations between variables and logistic regression was used to identify independent predictors of adherence using adherence status as the outcome variable and the various factors as the predictor variable. A p-value of equal or less than 0.05 was considered as statistically significant.

RESULTS: A total of 144 participants were interviewed. The participants were made up of 75 (52%) males and 69 (48%) females, with 70

(48.6%) of them being between 45 - 64 years of age. 61 (42%) had no formal education, 48 (33%) had primary education and 35 (24%) had above secondary education. 95 (66%) were not employed while 49 (34%) were employed, and 62 (43%) had no health insurance policy while 82 (57%) had a health insurance policy. 83 (57.6%) of the patients had a high adherence, that is scores of >6 while 61 (42.4%) had low adherence that is scores of <6 using the Morisky's Medication Adherence Scale (MMAS-8).

Knowledge on Antihypertensive Medication: Respondents who had suffered from hypertension for more than 1 year had a high adherence of 60.2% while those who had hypertension for less than a year had 39.8% adherence. 68.7% of those who had adequate knowledge about the causes of hypertension had a high adherence while those with inadequate knowledge had 31.3% adherence. Those with adequate knowledge of the complications of hypertension had 80% adherence. Having an adequate knowledge about the name of the prescribed medication made the participants to have a high adherence of 80.5%. 97.6% of those with adequate knowledge on medication usage instructions had high adherence.

Participants with adequate knowledge of medication side effects had a high adherence of 84.3% while those with inadequate knowledge of side effects had 15.7% adherence, the results were statistically significant with p = 0.04 **Table 1**.

TABLE 1: KNOWLEDGE AND ADHERENCE TO ANTIHYPERTENSIVE MEDICATION REGIMEN

Characteristic	Frequency	MMAS Category (Score range)		p = value
	n = 144	High >6	Low >6	
		n = 83	n = 61	
Duration of Illness				0.59
< 1 year	60(41.7%)	33(39.8%)	27(44.3%)	
> 1 year	84(58.3%)	50(60.2%)	34(55.7%)	
Causes of Hypertension				0.16
Adequate	92(63.9%)	57(68.7%)	35(57.4%)	
Inadequate	52(36.1%)	26(31.3%)	26(42.6%)	
Complication of hypertension				0.76
Adequate	115(79.9%)	67(80%)	48(78.7%)	
Inadequate	29(20.1%)	16(19.3%)	13(21.3%)	
Name of their prescribed medication				0.63
Adequate	117(81.3%)	66(80.5%)	51(83.6%)	
Inadequate	27(18.7%)	17(19.5%)	10(16.5%)	
Medication usage instructions				0.11
Adequate	137(95%)	81(97.6%)	56(91.8%)	
Inadequate	7(5%)	2(2.4%)	5(8.2%)	
Side effects of the medication				0.04
Adequate	128(88.9%)	70(84.3%)	58(95.1%)	
Inadequate	16(11.1%)	13(15.7%)	3(4.9%)	
Adverse drug reaction				0.13
Adequate	141(97.9%)	80(96.4%)	61(100%)	
Inadequate	3(2.1%)	3(3.6%)	0	

Perception of Antihypertensive Medication Regimen and Adherence: 84% of the respondents who had a high perception of hypertension severity had a high adherence (78%) compared to those who had a low perceived severity (16%) who had an adherence of 21.7%, the results were statistically significant with p = 0.03. Respondents who had a high perception of benefitting from adhering to antihypertensive medication regimen (84.7%) had a high adherence (90.4%), the results were statistically significant with p = 0.03. Respondents whose perceptions towards barriers of adhering to antihypertensive medications to be low (79.2%) had a high adherence of 88%, and the results were statistically significant with p = 0.01. Respondents 87% with high cues to action had a high adherence (66.3%), **Table 2**.

TABLE 2: RELATIONSHIP BETWEEN PERCEPTION AND ADHERENCE TO ANTIHYPERTENSIVE MEDICATION

Characteristic	Frequency	MMAS Category (Score range)		p=value
	n = 144	High >6	Low >6	
		n = 83	n = 61	
Perceived Severity				0.03
Low	23(16%)	18(21.7%)	5(8.2%)	
High	121(84%)	65(78.3%)	56(91.8%)	
Perceived Benefits				0.03
Low	22(15.3%)	8(9.6%)	14(23%)	
High	122(84.7%)	75(90.4%)	47(77%)	
Perceived Barriers				0.01
Low	114(79.2%)	73(88%)	41(67.2%)	
High	30(20.8%)	10(12%)	20(32.8%)	
Cues to Action				0.09
Low	57(39.6%)	28(33.7%)	29(47.5%)	
High	87(60.4%)	55(66.3%)	32(52.5%)	

Factors that Affect Hypertensive Medication Adherence: In the initial analysis using chi square test to determine association between adherence and independent variables, the following factors were found to be statistically significant to adherence: gender (p = 0.05), age (p = 0.01), medical insurance policy (p = 0.03), knowledge of side effects (p = 0.04), perception of severity (p = 0.03), perception of benefit (p = 0.03), and perception of barriers (p = 0.01). Logistic regression was then done to identify the most important factors affecting adherence to antihypertensive medication the strength of association between those factors and adherence. No Variable was statistically significant ($p \leq 0.05$) to adherence on logistic regression, **Table 3**.

TABLE 3: LOGISTIC REGRESSION ANALYSIS OF HYPERTENSION MEDICATION ADHERENCE

Variables	OR	95% CI	p
Age	1.02	0.98 - 1.07	0.23
Gender (Female = 0; Male = 1)	2.58	1.09 - 6.16	0.98
Health insurance (No = 0; Yes = 1)	0.35	0.15 - 0.84	0.92
Knowledge of side effects of medication (Little or nothing = 0; Majority = 1)	2.02	0.44 - 9.27	0.58
Perception of Severity (Low = 0; High = 1)	3.61	1.02 - 12.78	0.69
Perception of Benefit (Low = 0; High = 1)	3.22	1.06 - 9.79	0.30
Perception of Barriers (Low = 0; High = 1	0.23	0.08 - 0.64	0.75

DISCUSSION:

Adherence to Antihypertensive Medication Regimen: The findings of the study showed (57.6%) of the patients had a high adherence, that is scores of >6 while (42.4%) had low adherence that is scores of <6 using the Morisky's Medication Adherence Scale (MMAS-8). This finding was similar to a study where 69% of the participants were reported to have appropriate adherence[7]. Other studies found patients who had low adherence to be 34% [8] and 37% [9].

Whereas another study found 28% of patients to be having a high adherence while 72% had a low adherence [10]. These variations may be due to patient's socio-demographic characteristics of the various countries, adherence measurement tool, study design, study population, patients' perception and self-care behavior, medical and social support.

Knowledge of Hemodialysis Patients on Anti-hypertensive Medication: Patients who had adequate knowledge of the side effects of antihypertensive medication (84.3%) had a high adherence, while those with inadequate knowledge of side effects had low adherence (15.7%). This could be attributed to lack of knowledge of the side effects which make the patients to fear taking medication. A study amongst hypertensive patients found 47.05% of the patients who feared the side effects had a low adherence [9]. Side effects, if present, can play a crucial role in deciding whether or not patients will take their medications as prescribed.

If attribution of a symptom to side effects reinforces concerns about adherence to anti-hypertensive medication, an appraisal of that outcome may then feedback to influence a change in perception in medication taking over time [11].

Perception of Antihypertensive Medication: In this current study hemodialysis patients who had a high perception of severity of hypertension had a high adherence (78.3%). Similarly a study to determine perception of hypertensive patients reported that patients who had a high perception of severity of hypertension significantly adhere to their medication and dietary changes, 5 times more likely adherent than those who had low perception [12].

This could be explained by improved perception of severity of hypertension may increase adherence status of patients. A study on prevalence of adherence in an Indian population was very low because of perceived susceptibility and severity of hypertension among their study population [13]. This could be attributed to low literacy levels to understand hypertension and its consequences if not controlled and also lack of continuous medical education to patients by health workers.

Patients who had a high perception of antihypertensive medication benefit had a high adherence (90.4%) than those with a low perception of benefit (9.6%). In a study among hemodialysis patient's findings revealed patients who perceived importance of treatment were having a higher adherence rate [14]. Similarly patients who had a low perception of barriers had a high adherence (88%) compared to those with a high perception of barriers (12%). Alike another study also found patients with low perceived barriers having a higher adherence to their antihypertensive medication [15].

According to the literature, perceived barriers in patients with chronic disease include forgetfulness, interference with daily life, lack of motivation, and family problems [16].

CONCLUSION: Adequate knowledge of anti-hypertensive medication side effects was found to be statistically significant to adherence rate of hemodialysis patients to their antihypertensive medication regimen. Based on health belief model, the respondents who perceived high severity, benefit had high adherence compared with low perceived severity, benefit. While patients with low perception of barrier had high adherence compared to those with high perception of barriers.

RECOMMENDATION: Interventions aimed at increasing patient's knowledge and perceptions on hypertension with emphasis on its causes, severity, types and side effects of the medications and the consequences of non-adherence with the anti-hypertensive treatment regimen should be made as informed by the study.

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