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Revalance and Determinants of Adherence to Antihypertensive Medication among Hypertensive Patients Attending a Tertiary Care Hospital of Bangladesh

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Abstract

➢ ***Introduction***

Non-adherence to antihypertensive drugs is the most important cause of uncontrolled blood pressure. Uncontrolled blood pressure leads to the development of complications of hypertension. This study was conducted in order to identify factors associated with non-adherence to antihypertensive drugs among hypertensive patients attending in outdoor department of internal medicine, Rajshahi Medical College Hospital in order to provide improved management plans suited for them.

➢ ***Methods***

Hospital records at Rajshahi Medical College Hospital, Rajshahi from January 2015 to June 2016 were analyzed. One hundred hypertensive patients were participated after met the inclusion and exclusion criteria. Patients were selected by systematic sampling. Ethical clearance was obtained from the National Health Research Ethics Committee, Rajshahi Medical College Hospital. The Morisky Green test for non-adherence was used to assess non-adherence to drugs. Information was collected regarding socio-demographic, drug related and healthcare service delivery factors to patient non-adherence using an interviewer administered questionnaire. Univariate, bivariate and multivariate analysis was conducted using SPSS-20 software.

➢ ***Results***

The level of non-adherence was 71%. Factors that were independently associated with non-adherence and adherence were; adherence was found to higher above 50 years group and among females 25%.Similarly adherence was more among literates 26%. No significant association was found between religion, marital status, socioeconomic condition, family history of HTN, nuclear or joint families. There is no significant association was found between smoker, jorda/Tamak, or alcohol consumption for adherence to anti HTN durgs. Adherence was found more in patient having history of HTN symptoms (35%) and more(35%) in who was suffering from HTN for more than 5 years. (18%) of patients non-adherence was found due to experience drug adverse effects. Significant (24%) non adherence was found due to drugs changed by the physician more than 2 times. Majority of the (12%) non adherence was found due to free sources of drug, 45% adherence was found due to affordability of the drugs. Patients who received counselling for less than 5 minutes were 2.69 times more likely to be non-adherent (95% CI, (1.5827-8.5160) compared to patients counselled for five minutes or more. patients whose last visit to the doctors were likely to be adherent 3 times more compared with whose last visit by drug seller or pharmacy man. Patients who had received counselling by doctors were more adherent 95% CI, (0.1003-0.5470) 1.97 times compared with who were counselled by drugs seller or pharmacy man and others. Patients who were aware of physician instruction more likely to be adherent 2.63 times compared with others instruction.31% patients were high adherence to medication, 29% were medium adherence, 40% patients were low adherent to anti-HTN medication.

➢ ***Conclusion***

Ensuring patients come back to the hospital to refill their drugs, improving counselling techniques and making prescribed antihypertensive drugs constantly available in the hospital, could improve the level of non-adherence to antihypertensive drugs among patients attending in indoor and outdoor department of hospital and clinics.

Keywords:- *Nonadherence, Antihypertensive, Blood Pressure.*

I. INTRODUCTION

Hypertension is recognized as a major contributor to the disease burden globally. Hypertension and its complications account for an estimated 9.4 million deaths every year.[1] It has become a significant problem in many developing countries undergoing epidemiological transition.[2] The higher the blood pressure, the greater the chances of heart attack, heart failure, stroke and kidney disease.[3]

Apparently, the use of drug therapy for treating hypertension is popular and they are often costly drugs for a long-term therapy, but monitoring on the usage to ensure

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optimal use of these health care resources is lacking in patients. It was found that 50% of patients receiving long-term drug therapy in a general medical clinic were non-compliant or only partially compliant. The reasons for poor adherence to treatment included appearance, disappearance or worsening of symptoms, concomitant medications from other physicians, forgetfulness due to lifestyle factors, working conditions or the complexity of the treatment regimen.

The American National Heart, Lung and Blood Institute (NHLBI) had spent 30years to increase the hypertension control rate from 10% to 34%. There are many reasons for the difficulty to control blood pressure, and inadequate adherence to medications is usually cited as the main cause. There are many methods to define "adequate adherence", one of the most commonly used definition is "the patient takes 80% or more of the prescribed medicines". A review of literature showed a rate of medication adherence in elderly hypertensives ranging from 25% to 85%.Poor adherence to medications is a major public health challenge. Adherence to medication has been defined as the extent to which patients' behaviors coincide with health care providers'. It can be defined as the extent to which a patient's behavior, with respect to taking medication, corresponds with agreed recommendations from a healthcare provider.

Poor adherence has been attributed to unnecessary over-prescription of drugs, substantial worsening of diseases, avoidable increases in hospital admission rates, longer hospital stays, leading to a significant medical burden. It is a crucial public health agenda to improve adherence with antihypertensive medications by improvements of medication-taking behavior. Barriers to drug adherence consist of multiple factors that include complex medication regimens, dosing frequency, behavioral factors and side effects of treatment. The most typical barriers to drug adherence are under the patient's control, Including patient's knowledge and attitudes towards medications. Therefore, attention to these barriers is a necessary and important Step to improve adherence. However, the effectiveness of antihypertensive agents must be achieved by optimal adherence to prescribed medications according to healthcare providers 'instructions. Although the control of blood pressure has improved considerably, poor adherence with medication treatment remains a major problem among hypertensive patients, and has been identified as one of the main causes of failure in achieving blood pressure control. Only 29% of hypertensive patients in the United Stated achieved good control, and even worse rates have been reported in Canada and European countries. It is estimated that the overall adherence rates of medications were approximately 50%. Among hypertensive patients who have poor blood pressure control; poor drug adherence is one of the causes, and accounts for increasingly significant and substantial public health burden. Self-reported medication adherence was measured by the eight item Morisky Medication Adherence Scale (MMAS-8). TheMMAS-8 has been proven reliable (alpha= 0.83) for assessment of adherence in patients with hypertension, and is significantly associated with blood pressure control[4-6]. Using a cut-off of6, its sensitivity or identifying low vs. higher adherers was estimated to be 93%. and the specificity was 53%[6]. TheMMAS-8 has been demonstrated to have good concurrent and predictive validity and might function as a screening tool in outpatient settings with different patient groups. MMAS-8 Scores can range from zero to eight in integers. So a cross-sectional design was employed to find out the Prevalence and Determinants of adherence to antihypertensive medication among hypertensive patients. This study would reveal the information that would be helpful for the physician as well as the policy makers for better understanding of the anti-hypertensive drugs

II. METHOD AND MATERIALS

This was a prospective cross sectional study carried out in outpatient department of Internal Medicine of Rajshahi Medical College Hospital, Rajshahi over the period of 6(six) months, dated from July-2016 to December-2016. Study population, patients attending at the outpatient department of medicine during the study period. A total 100 patients by using sample size formula were included in the study and sampling technique was purposive. Patients with known history of hypertension, and patients who has given informed written consent were included in the study and terminally ill patients, disoriented, drowsy and unconscious patients and pregnant women were excluded. Non adherence was defined as the extent to which the patient doesn't follows the recommendations of the prescriber. After collection, data were checked for inadequacy, irrelevancy, and inconsistency. Irrelevant and data were discarded. After editing and coding, the coded data were directly entered into the computer by using SPSS software, version 20.0. Data cleaning validation and analysis were performed using the SPSS software. Categorical data presented as frequency, percentage and continuous variable were expressed as mean±SD (standard deviation). An independent sample Student's t-test were used for comparison of means of continuous variables with normal or approximately normal distributions. The Chi-square test were used to analyze discrete variables. The statistical significance threshold were set top≤0.05 (two-tailed). confidence interval was set at 95% level. Determinants of adherence to medication were assessed by logistic regression analysis. Statistical significance was set at $p<0.05$.

III. RESULTS AND OBSERVATIONS

The observation and results have been shown in different tables and figures.

Variable	Frequency	Percentage (%)
Age (years)		
<50	84	84
>60	16	16
Gender		
Male	57	57
Female	43	43
Marital status		
Single	25	25
Married	75	75
Religion		
Muslim	85	85
Hindu	15	15
Christian/ Others	00	00
Household member		
0-4	65	65
>4	35	35
No of children		
0-1	14	14
>2	86	86
Education level		
Primary	16	16
Secondary	34	34
Higher secondary	22	22
Higher education	28	28
Profession		
Service	24	24
Business	18	18
Day labourer	08	08
Farmer	10	10
Housewife	30	30
Unemployed	10	10
Monthly income		
<10000	09	09
10000-30000	55	55
>30000	36	36

Table 1:- Baseline characteristics of the study population

Table-1 shows that most of the population were <50 years of age, 57% were male, majority of them were married 75% and Muslim 85%. Up to 50% had tertiary level of education. majority of them 40% were unemployed and lower middle class family.35% patients had comorbidities and 40% had family history of hypertension.

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Variable	Frequency	Percentage (%)
Visit to health care facility in last twelve month		
Yes	58	58
No	42	42
Visited last time by whom		
Doctors	64	64
Drug seller/Pharmacy man	36	36
Frequency of check ups		
Regular	46	46
Occasional	54	54
Ever had health care advice		
Yes	78	78
No	22	22
Counselled by		
Doctors	43	43
Nurse	20	20
Both doctors and Nurses	20	20
Drug seller/Pharmacy man	17	17
Total time spent during counselling		
<5 minutes	67	67
>5 minutes	33	33
Understood the advice given		
Yes	86	86
No	14	14
Choice of antihypertensive drug by		
Doctor alone	54	54
Doctor and patient	20	20
Drug seller/ Pharmacy man	26	26
Aware of physician instruction		
Yes	76	76
No	24	24

Table 2:- Health care service delivery factors of the study population

Table-2 shows that 58% patient had visited to health care facility in last twelve month, most of them 64% had visited by docors, regular check ups only 46%,counselled by doctors only 43%. Total time spent during counselling less than 5 minutes were (67%). Majority of the drug (54%) choose by the doctors.

**For the purpose of further analysis, lower adherence category was merged with medium and compared with high adherence category. Score 8 on scale was categorized as high adherence, those who scored below 8as low adherent.

Variable	Adherence status		OR(95% CI)	P value
	Low adherence Score<7	High adherence Score=8		
Age			3.3000(0.9841-11.0655)	**0.053**
<50	44	40		
>50	04	12		
Sex				
Male	40	17	3.268(1.424-7.495)	**0.005**
Female	18	25		
Marital status				
Single	17	08	1.5814(0.6074-4.1171)	0.347
Married	43	32		
Religion				
Muslim	60	25	2.100(0.687-6.414)	
Hindu	08	07		0.192
No of children				
0-1	08	06		
>2	40	46	1.533(0.490-4.795)	0.462
Household member				
0-4	35	30	1.101(0.483-2.509)	0.817
>4	18	17		
Education level				
Primary/ Secondary/HSC	44	28	20.4286(4.4936-92.8719)	**0.0001**
Higher education	02	26		
Profession				
Employed/Business/Farmer/labourer	36	24	0.6429(0.2745-1.5050	
Unemployed	28	12		0.308
Monthly income				
<30000	40	24	2.0833(0.9088-4.7760)	
>30000	16	20		0.082
Family history of HTN				
Yes	22	18	1.0694(0.4789-2.3880)	0.869
No	32	28		
Presence of comorbidities				
Yes	12	23	0.4203(0.1792-0.9856)	0.046
No	36	29		

Table 3:- Association between baseline characteristics and adherence to medication

Table-3 shows that adherence was found to higher above 50 years group and among females 25%.Similarly adherence was more among literates 26%. No significant association was found between religion, marital status, socioeconomic condition, Family history of HTN, nuclear or joint families.

Variable	Adherence status		OR(95% CI)	P value
	Low adherence Score<7	High adherence Score=8		
Smoker				
Yes	25	20	1.0417	0.919
No	30	25	(0.4718-2.3001)	
Jorda/Tamak				
Yes	20	16	1.1029	
No	34	30	(0.4855-2.5055)	0.814
Alcohol consumption				
Yes	04	01	4.4444	0.189
No	45	50	(0.4788-4.252)	

Table 4:- Association between lifestyle habitus variable and adherence

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Table-4 shows that there is no significant association was found between smoker, jorda/Tamak,or alcohol consumption for adherence to anti HTN durgs.

Variable	Adherence status		OR(95% CI)	P value
	Low adherence Score<7	High adherence Score=8		
Having HTN symptom Yes No	 20 30	 35 15	 0.2857 (0.1248-0.6541)	 **0.003**
Duration of treatment(years) <5 years >5 years	 26 25	 14 35	 2.600 (1.136-5.950)	 **0.023**
Frequency of drug intake/ Number of drugs intake 0-2 >2	 48 04	 36 12	 4.000 (1.191-13.431)	 **0.024**
Experience adverse effects Yes No	 18 35	 07 40	 2.938 (1.098-7.8607)	 **0.031**
No of times drug changed by physicians/drug seller or pharmacy man **≤1** **>1**	 30 24	 38 08	 0.2632 (0.1036-0.6686)	 **0.005**
Forgetting to take the drugs Yes No	 30 20	 15 35	 3.500 (1.528-8.012)	 **0.00**3
Taking alternative medicine Yes No	 05 40	 10 45	 0.5625 (0.1772-1.7853)	 0.328
Taking regular medication Yes No	 20 28	 45 07	 0.1111 (0.0416-0.2965)	 0.000
Exhaustion or stopped the drug Yes No	 18 40	 06 36	 2.700 (0.9660-7.546)	 0.058
Source of drugs Free Paid	 12 35	 03 50	 5.714 (1.500-21.755)	 **0.010**
Affordability of the drugs All the drugs Some/None of the drugs	 26 30	 45 09	 0.1733 (0.0713-0.4211)	 **0.000**

Table 5:- Drug related factors associated with adherence to antihypertensive drugs

Table-5 shows that adherence was found more in patient having history of HTN symptoms (35%) and more(35%) in who was suffering from HTN for more than 5 years. (18%) of patients non-adherence was found due to experience drug adverse effects. Significant (24%) non adherence was found due to drugs changed by the physician more than 2 times. Majority of the (12%) non adherence was found due to free sources of drug, 45% adherence was found due to affordability of the drugs.

Variable	Adherence status		OR(95% CI)	P value
	Low adherence score<7	High adherence score=8		
Visit to health care facility in last twelve month				
Yes	28	30	0.5744	0.178
No	26	16	(0.2560-1.2887)	
Getting information from Doctors				
Nurse/Drug seller	24	40	0.3000	0.006
/Pharmacy man/others	24	12	(0.1272-0.7076)	
Visited last time by whom				
Doctors	22	42	1.497	
Drug seller/Pharmacy man	28	08	(0.0585-0.3831)	**0.000**
Frequency of check ups				0.088
Regular	16	30	0.4952	
Occasional	28	26	(0.2207-1.1112)	
Ever had health care advice				
Yes	34	40	0.3778	**0.044**
No	18	08	(0.1461-0.9769)	
Counseled by				
Doctors	13	30	0.2342(0.1003-	**0.000**
Drug seller/Pharmacy man	37	20	0.5470)	
Total time spent during counseling				
<5 minutes	35	22	3.6713	**0.002**
>5 minutes	13	30	(1.5827-8.5160)	
Understood the advice given				
Yes	46	40	1.1500	0.778
No	10	06	(0.4344-3.0445)	
Choice of antihypertensive drug by				
Doctor alone/ doctor-patient	32	40	0.4444	
Drug seller/ Pharmacy man	18	10	(0.1803-1.0954)	0.078
Aware of physicians instruction				
Yes	26	50	0.1733	
No	18	06	(0.0614-0.4896)	**0.000**

Table 6:- Association between healthcare service delivery factors and adherence to antihypertensive drugs

Table -6 shows that patients who received counseling for less than 5 minutes were 2.69 times more likely to be non-adherent (95% CI, (1.5827-8.5160) compared to patients counseled for five minutes or more. patients whose last visit to the doctors were likely to be adherent 3 times more compared with whose last visit by drug seller or pharmacy man. Patients who had received counseling by doctors were more adherent 95% CI, (0.1003-0.5470) 1.97 times compared with who were counseled by drugs seller or pharmacy man and others. Patients who were aware of physician instruction more likely to be adherent 2.63 times compared with others instruction.

MMAS Category	Frequency	Percentage
Low adherence (0-6)	40	40
Medium adherence (6 to <8	29	29
High adherence (8)	31	31
Total	100	100

Table-7: Categories of adherence to anti-hypertensive drugs based on MMAS Scale

Table-7 shows that 31% patients were high adherence to medication, 29% were medium adherence, and 40% patients were low adherent to anti-HTN medication.

IV. DISCUSSION

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[6]. It is therefore important to ensure that patients adhere to their prescribed drugs as given to them by their doctors. Ensuring antihypertensive drugs are taken, will decrease the complications of hypertension as well as decrease over all health care costs.[7] In this study 69% of the respondents were non-adherent to antihypertensive drugs. This is lower compared to findings in a previous study done in Bangladesh which showed that the level of non-adherence among study subjects was up to 85%[8]. The result in this study is however higher than what has been reported in other studies, Kano 45.8%,[9] Ethiopia 35.4%[10] and Zambia 17%.[9]This study was conducted among patients attending in outdoor department of Rajshahi Medical College Hospital, most of them living in an urban setting. It may be that the participants in this study led bussier life styles because of their occupation and where they lived. The studies that had lower levels of non-adherence mentioned above were conducted among the general population. Patients who were in the younger age bracket of (<50) were more likely to be non-adherent compared to the older age group of (>50). This is in keeping with previous studies such as those done in Iraq,[11] South India [12] and Iraq Duhok[13] It may be that older patients have a more severe course of the disease with complications which may have set in and makes them adhere to drugs more. Also younger patients may be afraid of taking a lifelong medication which may pose them to be non-adherent.

However other studies did not find any significant association between age and non-adherence to antihypertensive drugs.[14] In this study a significant association was found between sex and non-adherence to antihypertensive drugs. Men were more likely to be non-adherent compared to females. Reasons may be because men tend to lead busier life styles than women. They are considered bread winners and carry the responsibility of providing for their families. They are always outdoors in search of income which may make them forget to take their drugs.[15] Men have other life concerns rather than spending time to follow up on health care issues.[16] Also women generally take care of their health compared to men.[21]This result is similar to the research done in Ethiopia[9] and Iraq.[17] On the other hand, in a different study done in Zambia, sex had no bearing on adherence to treatment. No significant association was found between religion, marital status, socioeconomic condition, Family history of HTN, nuclear or joint families.Patients with unsatisfactory knowledge about hypertension and its management were more likely to be non-adherent to drugs compared to patients with good knowledge. Having right knowledge about hypertension and its treatment was positively associated with adherence behaviour in Ethiopia. It created a clear understanding about the disease and avoided confusion.[9]

Similar findings to this study were also obtained in Bangladesh. Patients who had been educated about the disease process, the goal of blood pressure control and the fact that drugs can be changed due to side effects were found to be more adherent to their medication.[8] In Kano, poor adherence was found mainly due to ignorance on need for regular treatment. Adherence was found more in patient having history of HTN symptoms (35%) and more (35%) in who was suffering from HTN for more than 5 years. (18%) of patients non-adherence was found due to experience drug adverse effects. Significant (24%) non adherence was found due to drugs changed by the physician more than 2 times. Majority of the (12%) non adherence was found due to free sources of drug, 45% adherence was found due to affordability of the drugs.1440Patients, who had been on treatment for less than five years, were more likely to be non-adherent compared to patients who had been on medication for five years or more. Our finding in this study is similar to that done in Iraq, Kirkuk. In that study, adherence rate increases as the duration of hypertension increases[17]. A different finding was however obtained in the Indian study where the result was not significant. [18] It may be possible that patients who have had hypertension for a longer period are older patients and tend to be more adherent. It may also be possible that younger patients are afraid of taking lifelong medications compared to older patients. Also the disease may be more severe in older patients making them more adherent to their medications.[19] Patients experiencing side effects from their antihypertensive drugs were more likely to be non-adherent to treatment. A similar result was obtained in Zambia.[20]

Several studies on the other hand did not yield significant results such as two separate studies done in India.[19] The reason may be those patients who experience side effects from their drugs would rather do without the drugs and remain with the subtle symptoms of hypertension. Also some of the side effects of the drugs may interfere with their lifestyle to the extent that patients would rather not adhere to the drugs as prescribed. Patients who took alternative medicine were more likely to be non-adherent compared to patients who did not in this study. In India however taking alternative medicines was not significantly associated with non-adherence[19]. It may be because patients who take alternative drugs assume that the alternative drugs act as a substitute for their antihypertensive drugs. It may also be assumed that patients do not take the required dosages of their antihypertensive drugs thinking that alternative medication will make up the difference in the required dose. The implications of this being that patients would be non-adherent to their medications since taking an incorrect dose is considered as form of non-adherence.[21] Patients whose drugs got exhausted before their next clinic appointment were more likely to be non-adherent compared

those whose drugs did not get exhausted. It is possible that patients‟ not willing to refill their drugs in good time means that they are not taking their prescribed drugs as they should. In Kano similar results were obtained.[10] Patients who received counselling for less than 5 minutes were 2.69 times more likely to be non-adherent (95% CI, (1.5827-8.5160) compared to patients counselled for five minutes or more. Patients whose last visit to the doctors were likely to be adherent 3 times more compared with whose last visit by drug seller or pharmacy man. Patients who had received counselling by doctors were more adherent 95% CI, (0.1003-0.5470) 1.97 times compared with who were counselled by drugs seller or pharmacy man and others. Patients who were aware of physician instruction more likely to be adherent 2.63 times compared with others instruction. Patients counselled for less than five minutes were more likely to be non-adherent compared to patients who were counselled for five minutes or more. This result is similar to the Zambian study, where being counselled for more than five minutes about how to take medication was associated with decrease in the level on non-adherence.[20] Patient- centred‟ communication between patients and health care providers contributes to increase patients‟ understanding about their illnesses and adherence to treatment. [16] Increasing the time for counselling sessions can be addressed by hiring nurses who specialise in counselling for hypertensive disease.

Each hypertensive patient to have a minimum of 5 minutes for each counselling session. Patients whose last visit to the hospital for follow up was 12 months or more were more likely to be non-adherent compared to patients whose last visit was less than 3 months ago. In India the risk of non-adherence was increased among patients who had taken a longer time since their last visit to a health care facility.[2] This is in agreement with the Iraqi study [17] and the Kano study.[10] The observed good adherence among regular clinic attendees was because they were also more likely to follow other instructions.[10] However in Zambia the spacing of clinical reviews did not affect adherence.[20] Patients who bought their drugs in private pharmacies and open markets and not affordable were more likely to be no adherent compared to those who bought their drugs in the hospital. It may be possible these patients may delay buying their drugs outside the hospital environment if they become distracted by other actives upon leaving the hospital. Not buying their drugs at the right time may leave room for non-adherence to drugs. Medication non-adherence to antihypertensive drugs constitutes a major problem in the management of hypertension. Addressing the factors associated with non-adherence in this study may improve adherence to drugs. This would in turn improve the general wellbeing of the patient and prevent complication and thereby improve productivity at the work place. In addition there would be reduced spending in health care costs that results from unnecessary adjustments of medication.

V. CONCLUSION

The level of non-adherence to antihypertensive drugs was found to be high among hypertensive patients in outpatient department. Socio-demographic factors that were associated with non- adherence included age, sex and grade level. Unsatisfactory knowledge of hypertension and its treatment was association with non-adherence. Among drug related factors, duration of treatment, side effect of drugs, taking alternative drugs, and exhaustion of drugs before next clinic appointment were found to be significantly associated with non-adherence. The total time spent counselling, last visit to the health care facility, and place of buying the drugs were the health care delivery factors that were associated with non-adherence.

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