

# Drug Adherence and Status of Blood Pressure Control among Hypertensive Patients

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**Abstract:** ***Background:** Hypertension is a major public health concern world-wide. WHO reports (2008) that approximately 40% of adults aged  $\geq 25$  years have been diagnosed with hypertension with increased deaths from heart diseases and stroke. Objectives: To estimate the level of drug adherence, identify factors affecting drug adherence and determine blood pressure control among hypertensive patients. Methods: Quantitative approach with prospective study design was used to study 75 hypertensive patients in Vellore, South India using consecutive sampling technique. Drug adherence was checked using Medication Adherence Scale [MAS] and Pill Count. BP control was determined by analyzing six blood pressure readings. Data were analyzed using descriptive and inferential statistics. Results: 66.7% of the subjects were adherent by MAS and only 38.7% by Pill Count. Blood Pressure was well-controlled in 97.0% of those who were adherent by pill count. The main factors affecting drug adherence were forgetfulness and daily work routines. Conclusion: Innovative strategies to promote drug adherence among patients with long term medications are to be implemented by health workers.*

**Keywords:** drug adherence, factors affecting drug adherence, blood pressure control

## 1. Introduction

Hypertension is a major non-communicable disease with greater public concern world-wide. WHO defines hypertension as systolic blood pressure elevated to 140 mm Hg /above and/or diastolic blood pressure to 90 mm Hg/above [9]. With more and more of life style changes, more number of people even among the younger age group is affected with hypertension leading to increased risk of morbidity and mortality due to cardiovascular, cerebrovascular or renal diseases. World Health Organization reports that in 2008, approximately 40% of adults aged 25 and above had been diagnosed with hypertension; the number of people rising from 600 million in 1980 to 1 billion in 2008. Of these, at least 45% of deaths are due to heart disease and 51% of deaths due to stroke [9]. According to the NFHS -4, National fact sheet of India, the prevalence of hypertension is more widespread in men (13.6%) than female (8.8%) population and also it is higher among urban population than rural [3]. In a systematic review on hypertension in India, it is reported that hypertension is prevalent in 33% among urban population and 25% among rural population in the year 2014. Of these only 38% of urban and 25% of the rural population is treated of which one-tenth of rural and one-fifth of urban population have their blood pressure under control [7]. In order to minimize the complications of hypertension and improve the quality of life among hypertensive patients, adherence to anti-hypertensive therapy is highly important. It is suggested that a 2 mm Hg population-wide decrease in systolic blood pressure can lead to prevention of more than 151,000 stroke and 153,000 coronary heart disease deaths in India [8].

Drug adherence is defined as “the extent to which the medication-taking behavior of a patient corresponds with

agreed recommendations from a health care provider.” World Health Organization reports that adherence to medications, in patients with chronic conditions averages around 50% in developed countries and the same is worse in developing countries due to poor accessibility to medications and health care services [9]. Also, the status of blood pressure control among hypertensive patients is dependent on their drug adherence pattern to anti-hypertensive medication. In a study carried out by Thomas, P et al on Medication adherence among hypertensive patients of primary health clinics in Malaysia, it was observed that drug adherence rate was only 53.4% and poor drug adherence rate was found to negatively affect blood pressure control. The factors that hindered adherence were identified as poor knowledge of medication, increasing number of medications being taken and increasing dose frequencies [2].

## 2. Objectives

- 2.1 To estimate the level of drug adherence
- 2.2 To identify factors affecting drug adherence
- 2.3 To determine the status of blood pressure control

## 3. Materials and Methods

The study was conducted in an Urban area served by Community Health Nursing Department of Christian Medical College, Vellore, Tamil Nadu, South India. The services rendered for patients with chronic illness in the study setting includes home care services, morbidity clinic services, health education, health counseling and referral services. Patients with hypertension are evaluated in the Morbidity Clinic by a physician at monthly intervals and are prescribed routine anti-hypertensive medicines. Drugs are dispensed to the patients in the clinic as per the

physician's prescription for four weeks at an affordable cost with an entry made into the patient's morbidity card. The patients are cared at home by Community Health Nurses on a monthly basis following the clinic visit. This system of health care services has provided an opportunity to conduct this study.

Based on the visit to Morbidity Clinic and drug collection of anti-hypertensive medicines, 75 patients with essential hypertension were visited two weeks later at their homes. Those on anti-hypertensive medication for more than three years were interviewed after an informed written consent. Information on demographic characteristics, drug adherence and factors affecting drug adherence were collected. Drug adherence and factors affecting drug adherence was elicited by using a Four-point Likert Medication Adherence Scale [MAS] with 7-items developed by Thomas, P et al [2]. The total score obtained by each patient was calculated. The scores could range from a minimum of 7 to a maximum of 28. A score of 28/27 [1 score deducted for unintentional adherence from question 1 or 6] was interpreted as adherence and a score  $\leq 26$  was interpreted as non-adherence. Pill Count was taken to substantiate the actual intake of each anti-hypertensive medication which was verified against the actual prescription and collection of medicines. Percentage of adherence globally and for each anti-hypertensive drug was calculated based on the number of doses received by the patient during follow-up visit, prescribed number of dosage unit per day and number of doses remaining in hand with the patient on the day of the study. A percentage of  $< 60$ ,  $60 - 79.99$ , and  $80.00 - 100$  were interpreted as low, medium and high adherence respectively based on the pill count. Blood pressure was checked for the patient on the day of the study and past five blood pressure readings taken at monthly intervals during the clinic follow up were noted from their morbidity card to analyze the status of blood pressure control. Blood pressure was interpreted to be controlled if the average reading was  $< 140/90$  mm Hg. Ethical approval to conduct this study was obtained from the Research Committee of the College of Nursing.

## 4. Results

### 4.1 Demographic and Clinical Information

Among the 75 subjects, more than half (77.3 %) were females. The age of subjects ranged from 28 to 90 with a mean age of 57.6 years. The duration of anti-hypertensive therapy ranged from 3 to 27 years with mean duration of 7.2 years. Patients were treated for hypertension with Tab. Amlodipine, Tab. Atenolol, Tab. Envas and Tab. Hydrochlorthiazide. The amount spent on receiving drugs ranged from Rupees 10 to 160 per month. The family support was found to be adequate (80%) in terms of reminder for clinic visit and drug collection, reminder for drug intake, reminder to take medicines when away from home with 40.5% of them living in joint families. Women were found to be better drug adherers (86.2%) than men.

### 4.2 Drug Adherence Scores

The drug adherence scores obtained from Medication Adherence Scale ranged from 23 to 28.

**Table 1:** Frequency distribution of adherers and non-adherers using MAS

Adherence Scores	Adherent Status	Frequency (N)	Percentage (%)
Full Score of 28/27	Adherent	50	66.7
Score $\leq 26$	Non-adherent	25	33.3
Total		75	100.0

Among the 75 subjects, 66.7% were adherent with the prescribed drug regimen and 33.3% were non-adherent. These findings were closely consistent with the medication adherence study done in Malaysia among hypertensive patients [2].

**Table 2:** Frequency distribution of treatment-wise adherers and non-adherers

Treatment Regimen		Adherent Status			
		Adherent [Score 28/27]		Non-adherent [Score $\leq 26$ ]	
		No	%	No	%
Tab. Amlodipine [n = 38]	OD	16	66.7	8	33.3
	BD	7	50.0	7	50.0
Tab. Atenolol [n = 23]	OD	10	66.7	5	33.3
	BD	6	75.0	2	25.0
Tab. Envas [n = 22]	OD	9	69.2	4	30.8
	BD	6	66.7	3	33.3
Tab. Hydrochlor Thiazide [n = 31]	OD	23	79.3	6	20.7
	BD	1	50.0	1	50.0

The above table depicts that the drug adherence was considerably greater among subjects who were treated with once-a-day medication than with twice-a-day. Also, subjects on thiazides were more compliant (79.3%) with once-a-day drug regimen.

### 4.3 Pill Count Rate

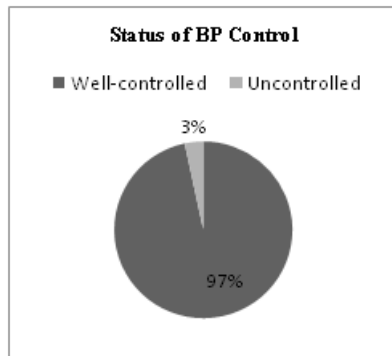
The pill count rate was quite alarming as most patients 46 (61.3%) had either excess/less medicines at hand on the day of the study. The reasons for excess medicines were that they had forgotten to take occasionally over a period of time and also omitted taking medicines when prescribed on antibiotics for acute illness or any other short-term medications before the period of study for the fear of drug interaction. On the contrary, some patients had fewer medicines at hand since they had taken extra doses on certain days forgetting that they had already taken the scheduled dose of medicine for those days. These factors posed difficulty in calculating the pill count rate. Among the 29 subjects for whom the pill count rate was possible, 72.4% had a high global drug adherence. The following table shows the treatment-wise level of drug adherence.

### 4.4 Factors affecting drug adherence

The most common factors affecting drug adherence were identified as forgetfulness (49.3%), busy with domestic work / occupation and getting older.

#### 4.5 Status of Blood Pressure Control

Blood pressure control was found to be better among drug adherers than those with non-adherers.



**Figure 1:** Status of blood pressure control among drug adherers

The mean systolic and diastolic blood pressures among adherers were within normal limits [120-140/80-90 mm Hg] among 97.0% of the subjects who were adherent to the drugs.

#### 5. Discussion

With the drug adherence level of 66.7% found in this study, it is clearly evident that the drug adherence behavior of hypertensive patients needs to be improved a lot to minimize the complications of the disease. Women were found to have a better adherence (86.2%) than men (13.8%) though they were more engaged in domestic work. Patients treated with once-a-day regime had better compliance (79.3%). These findings are supported in the study done by Azuana, R [2]. Most of the patients (82.0%) had no separate container for medicines. Though the pill count rate was possible for only 38.7%, all patients were very regular and positive about attending the Morbidity Clinic and getting the prescribed medicines. Similar findings were reflected in a study done by Aziz, [1] which documents that patient who conform their refill dates are not drug compliers. Looking into the reasons of non-adherence, it was obvious that missing a dose occasionally/ taking extra dose occasionally was considered not all that bad by patients. These patterns of behavior were attributed to their forgetfulness (49.3%) owing to being busy at home, at work and getting older. Forgetfulness was also found as a reason for non-adherence in the above mentioned study. This finding was also seen in the study done on and medication adherence among hypertensive patients [2]. Interventions by health care workers need to focus on improving the memory of patients by relating their medicine intake with their daily routines, setting an alarm using mobile phones, creating medication alert systems, encouraging patients to own an organized medication kit, involving responsible family members for medication monitoring and promoting sustainable self-supportive strategies.

Patients who were adherent to the drug as prescribed had a well-controlled blood pressure (97.0%). This finding is supported by the study done on medication adherence

among hypertensive patients [2] which states that poor drug adherence had a negative effect on blood pressure. Whereas, another study done on medication adherence using pill count and electronic methods observed that only 50% of the patients had blood pressure within goal [5]. Uncontrolled blood pressure can lead to serious health concerns reflecting higher morbidity and mortality. Slight improvement in the adherence behavior can go a long way in ensuring positive effect on the individual, family and country. Therefore, innovative efforts should be taken by health care providers to improve the adherence among patients involving the active participation of the patient and the family.

#### 6. Conclusion

The drug adherence rate among hypertensive patients attending Morbidity Clinic in an Urban area of Vellore, South India was estimated using Medication Adherence Scale and Pill Count Method. The drug adherence was found to be 66.7% with Medication Adherence Scale and 38.7% by Pill Count Method with women being more adherent than men. The adherence was significantly better among subjects on once-a-day medication. The most common factor that affected drug adherence included forgetfulness owing to being busy at home, at work and getting older. Also, most patients had an unorganized way of keeping their medicines which also contributed to being unsure if medication was consumed as scheduled. Patients should be assisted and encouraged to possess a medication kit, offered counseling on importance of drug adherence, offered information on drug interactions as needed and responsible family member/s involved to aid in drug adherence as prescribed by the physician. Innovative efforts like creating medication alarm/ medication alert using technology can be tried by health care providers to prevent patients forgetting drug intake.

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#### Conflicts of Interest

The authors declare that there are no conflicts of interest in the publication of this work.

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## Author Profile



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