



Adherence to Anti-Hypertensive Drugs: A Clinic Based Study among Geriatric Hypertensive Patients in Rural, India

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ABSTRACT

Background: Hypertension is a common chronic health condition, more among the elderly and is the most important risk factor for all subtypes of vascular disease and death. A medication's success in producing the desired benefit depends on a person's adherence with the therapeutic regimen. The World Health Organization (WHO) describes poor adherence as the most important cause of uncontrolled blood pressure and estimates that 50% of people do not take their antihypertensive medication as prescribed. Objectives of this study were to assess the adherence to anti-hypertensive therapy and also to elicit the determinants of poor adherence among geriatric hypertensives.

Methodology: An observational, cross-sectional, descriptive study was conducted among geriatric hypertensive attended the OPD during the study period in the rural health centre of West Bengal, India.

Results: 44.63% of the respondents adhered to anti-hypertensive drugs. The most common reasons for poor adherence were due to irregular supply from government pharmacy (72.3%) followed by forgetfulness (67.5%) and non-affordability (66.3%). Poor adherence to drugs was significantly ($p < 0.05$) associated with contextual variables like age, literacy, socio-economic status, duration of treatment and presence of comorbidities.

Conclusion: Advocacy of adherence to antihypertensive drugs should be inculcated in each and every hypertensive patient along with regular and uninterrupted drug supply and high quality health care service in all health care organisations where health education and counselling gets the highest priority.

Key words: hypertension, geriatric, adherence, antihypertensive drugs

INTRODUCTION

Ageing is a natural process. As commented by sir James Sterling Ross: "You do not heal old age. You protect it; you promote it; you extend it". With advancement of medical sciences and improved social conditions during past few decades life expectancy has increased which has resulted in increase in geriatric population of a nation. India too is experiencing this trend.

According to the Census 2011, the population of the elderly people (aged 60 years and older) in In-

dia is around 100 million (i.e., 8.3% of the total population) ¹. The elderly people, by themselves, are a vulnerable group, and non-communicable diseases (NCDs) are clearly a major morbidity in this age group. Developing countries, such as India, are likely to face an enormous burden of NCDs in future; of these diseases, hypertension is one of the most important preventable and treatable causes of mortality and morbidity in the elderly population. Furthermore, high blood pressure (BP) is a modifiable risk factor for cardiovascular disease (CVD).

Hence hypertension among elderly constitutes an important public health concern.

The WHO defines adherence to long-term therapy as “the extent to which a person’s behaviour—taking medication, following a diet, and/or executing lifestyle changes corresponds with agreed recommendations from a health care provider².” In its 2003 report on medication adherence, the World Health Organization (WHO) quoted the statement by Haynes et al that “increasing the effectiveness of adherence interventions may have a far greater impact on the health of the population than any improvement in specific medical treatments². Adherence is an important factor in achieving blood pressure control³. Patients that were adherent to the full regimen of their hypertension treatment were often significantly less likely to have elevated blood pressures^{3,4,5,6}.

In the elderly, failure to adhere to medical recommendations and treatment has found to increase the likelihood of therapeutic failure and to be responsible for unnecessary complications, leading to increased spending on health care, as well as to disability and early death².

Though there are numerous studies regarding adherence of antihypertensive drugs but very few were done among geriatric population who are the most neglected group of the society. With this backdrop a study was conducted to assess the compliance to anti-hypertensive therapy among geriatric population suffering from hypertension and to elicit the causes of poor adherence among geriatric hypertensives also to find out relationship if any of poor adherence with different contextual variables.

MATERIALS AND METHOD

The study was a descriptive, cross-sectional and clinic based which was conducted in two health centres in Singur block, West Bengal which is the rural field practice area of All India Institute of Hygiene & Public Health, Kolkata for a period of 2 months. 186 geriatric (>=60 years) hypertensive patients, who were on anti-hypertensives medications for at least last 6 months and attended the clinic during the study period were interviewed using a predesigned, pretested, semi-structured schedule. The schedule used for data collection had two parts: The first part consist of Background information of the study population (i.e Demographic and socio-economic profile, co-morbidities, treatment history and the causes for poor adherence. The second part consist of Morisky Medication Adherence Scale (MMAS-8)^{7,8,9} (r=0.83) which is a standardised scale to measure the drug adher-

ence (permission was obtained from the author for its use in this study).

The tool consists of 8 items focussing on the drug taking behaviour of the individual. The adherence level is categorized as Low adherence (<6), Medium adherence (6 to <8) and High adherence (=8). For the purpose of comparison, participants with medium and low level of adherence were considered to have a poor adherence and those with high level of adherence were considered to be having good adherence to medication.

RESULTS

Out of total 186 study subjects majority i.e. 46.8% belonged to 60-64 years age group, followed by 22.6% in 65-69 years age group and mean age \pm SD of the population was 66.88 \pm 6.65 years. Most of the study subjects i.e 66.1% were females and 33.9% were males. 91.2% belonged to joint family. 45.2% of the study population were illiterate Majority of them i.e 77.5% belonged to low socio-economic status (class-IV & class-V) as per modified B.G Prasad scale-2014. (Table-1)

Table-1: Background information of study population (n=186)

| Variables | Cases (%) |
|---------------------|-----------|
| Age group* | |
| 60-64 | 87(46.8) |
| 65-69 | 42(22.6) |
| 70-74 | 27(14.5) |
| 75-79 | 12(6.5) |
| >=80 | 18(9.7) |
| Sex | |
| Female | 123(66.1) |
| Male | 63(33.9) |
| Family type | |
| Nuclear | 15(8.1) |
| Joint | 171(91.9) |
| Education | |
| Illiterate | 84(45.2) |
| Primary(1-4) | 54(29) |
| Middle(5-8) | 39(21) |
| Secondary and above | 9(4.8) |
| PCI# | |
| Class-II | 12(6.5) |
| Class-III | 30(16.1) |
| Class-IV | 108(58.1) |
| Class-V | 36(19.4) |

* Mean age 66.88 years and SD 6.65; #As per modified B.G PRASAD scale-2014

As per MMAS score 55.4% were highly adherent (score=8) and 32.3% and 12.3% belong to the category of medium (6 to <8) and low adherence (<6) respectively.

Table 2: Distribution of population according to duration of treatment and presence of co-morbidities (n=186)

| Variables | Frequency (%) |
|--|---------------|
| Duration of treatment(in months)* | |
| 6-12 | 57 (30.6) |
| 13-24 | 24 (12.9) |
| 25-36 | 48 (25.8) |
| 37-48 | 15 (8.1) |
| 49-60 | 21 (11.3) |
| >=60 | 21 (11.3) |
| Co-morbidities | |
| DM | 54 (29) |
| Cardiac problems | 2 (1.1) |
| Thyroid diseases | 3 (1.6) |
| No co-morbidities | 127 (68.3) |
| Adherence | |
| High Adherence | 103 (55.4) |
| Poor Adherence | 83 (44.6) |

*Mean 36.13 months and SD 29.44

In the study it was found that non-adherence to the anti hypertensive treatment was higher among those with co-morbidities (72.9%) comparing to those without co-morbidities (31.5%).The most common co-morbid condition associated with hypertension was found to be diabetes mellitus(29%).In 30.6% population the duration of treatment with antihypertensive drugs was 6-12 months and 11.3% were on treatment for ≥60months with mean duration (SD) was found to be 36.13 (9.44) (Table-2 & 3)

Table 3: Adherence to anti-hypertensives in frequency and percentage as per MMAS Score (n=186)

| Level of adherence | Cases (%) |
|----------------------------|------------|
| Low adherence (<6) | 60 (32.3) |
| Medium adherence (6 to <8) | 23 (12.3) |
| High adherence (=8) | 103 (55.4) |

Table-4: Causes of poor Adherence (n=83) *

| Factors | Cases (%) |
|---|-----------|
| Non-affordability | 55 (66.3) |
| Forgetfulness | 57 (67.5) |
| Irregular supply of drugs | 60 (72.3) |
| Symptoms subsided | 35 (42.2) |
| Felt better without medications | 14 (16.9) |
| Blood pressure normalized | 6 (7.2) |
| Lack of time to come regularly to the health centre | 45 (54.2) |
| Wages lost | 3 (3.6) |

*Multiple Responses

Most common reasons for poor adherence were due to irregular supply from government pharmacy (72.3%) followed by forgetfulness (67.5%) and non-affordability (66.3%).(Table-4)

Age [OR=4.35 (2.35-8.08)], Per capita income [OR=7.22 (3.66-14.11), education level [OR=8.83 (3.52-22.15), Duration of treatment [OR=3.58 (1.9-6.47)] and presence of co-morbid conditions [OR=5.84 (2.94-11.59)] were significantly associated with poor adherence to the anti-hypertensive treatment in a bivariate regression model (Table-5).

Table 5: Bi-variate and multivariate logistic regression model adjusting for covariates considered to influence the adherence to anti-hypertensive treatment

| Covariates | Poor Adherence (%) | OR (CI) | Adjusted OR (CI) |
|--------------------------------------|--------------------|------------------|-----------------------|
| Age(Years) | | | |
| >65 | 55(63.2) | 4.35(2.35-8.08) | 16.62(5.64-48.70) ** |
| ≤65 | 28(28.3) | Ref | Ref |
| PCI | | | |
| ≤1250 | 66(64.7) | 7.22(3.66-14.11) | 6.44(2.33-17.70)** |
| >1250 | 17(20.2) | Ref | Ref |
| Education | | | |
| ≤Primary | 77(55.8) | 8.83(3.52-22.15) | 8.07(2.52-25.76) ** |
| >Primary | 6(12.5) | Ref | Ref |
| Duration of treatment(months) | | | |
| ≤30 | 58(58.6) | 3.51(1.9-6.47) | 4.75(1.72-13.07) ** |
| >30 | 25(28.7) | Ref | 1 |
| Co-morbidity | | | |
| Present | 43(72.9) | 5.84(2.94-11.59) | 31.69(8.38-119.86) ** |
| Absent | 40(31.5) | Ref | Ref |

Foot Notes:

The variables already found significant in bi-variate analysis were entered into the multivariate logistic model.

** Significant variables in multivariate analysis

For the multivariate model, the Hoser-Lemeshow test gave a Chi-square value of 9.44 with d.f=8 (p=0.307, not significant) indicating good model fit

Nagelkerker R² was 0.657 showing that the variables included in the model predicted65.7% of noncompliance, though this parameter has got its own limitations in a logistic regression.

The variables already found significant in bivariate analysis were entered into a Multivariate Logistic model (binary logistic: link function=Logit), by "Enter" method. Strength of association of variables like Age, Duration of treatment and presence of co-morbid conditions were augmented and that of per capita income and education level were attenuated when adjusted with other variables in the multivariate analysis. All the variables stayed significant in the multivariate analysis as found in bivariate analysis (Table-5).

DISCUSSION

In the current study the prevalence of poor adherence to their anti-hypertensive treatment was found to be 44.6% which was quite similar to the findings of the studies done in Kasturba Hospital, Manipal by Sheilini M et al.¹⁰ and in Mangalore by Kumar N et. al¹¹ where prevalence were 49.2% and 45.8% respectively.

In the study by Khanam M A et al¹² among people of rural Bangladesh the prevalence of non-adherence to treatment hypertension was 26.2% in the study population (25 years and above) which was low in comparison to this study. This wide difference in the prevalence of non adherence compared to our study could be because the study participants were aged 25 years above and in our study the age of the participants was 60 years and above.

Our study findings are similar to studies from China¹³ and Malaysia¹⁴ where overall 52% and 53.4% of the participants were found to be adherent to their anti-hypertensive medication respectively. Similar studies from other parts of the globe have reported the prevalence of adherence to hypertensive medications to be ranging from 60% to 77%.¹⁵⁻²¹

Different factors for poor adherence highlighted in this study were similar to that found in the study by Sheilini M et al.¹⁰ except for the irregular drug supply from the government pharmacy which is an important determinant considering the socio-economic status and dependence on government pharmacy of the study population. In the study by Susan R²², one of the major factor associated with noncompliance was found to be non-availability of free-of-cost drugs from the local health centre pharmacy. Our study also highlighted that irregular drug supply from government pharmacy was the most common cause for poor adherence to anti-hypertensive drugs.

In the study by Khanam M A et al¹² Non-adherence to treatment was higher among men (29.2%) than women (24.3%) but in our study no such associa-

tion could not be established. In the same study by Khanam M A et al¹² Non-adherence to treatment decreased with age this finding was not consistent with the current study in which poor adherence increased with age. Non-adherence was less common among the wealthy people in a study by Khanam M A et al¹² which is consistent to the finding of our study.

Newly diagnosed hypertensive patients are usually less persistent in taking medicine than the established hypertensives. Problems with perseverance with treatment often occur in the first 6 months of starting hypertensive therapy and persistence with antihypertensive therapy declines over the next 4 years.²³

In our study, patients were mainly "established" hypertensives, with a mean duration of treatment was 36.13 months. Our data suggests that with increase in the "duration of treatment adherence improved

It was observed in this study that not a single patient was properly advised to take the antihypertensive drugs regularly by the health personnel. As a result poor adherence was found to be quite high among the study population. It is noteworthy to mention except for advice regarding low salt diet none were advised for any other lifestyle modifications like regular exercises, healthy dietary habits, and giving up of tobacco use etc.

There is no denying the fact that non-adherence to medication is a matter of huge concern. It is evident from our study as well as from others mentioned above; the problem of non-adherence is universal and not just limited to developed or developing countries. But its impact may be more on those countries with limited resources since poor adherence poses a huge challenge for improving health in poor populations, and also results in underutilization of already limited treatment resources.

In order to encourage and ensure more effective blood pressure control, it is important understand the factors that might influence medication adherence in hypertensive patients. The current study highlighted some important determinants of poor adherence for which further research is needed on a large scale basis simultaneously in community setting and facility based settings targeting the geriatric populations. In this way effective measures may be planned and implemented to improve the adherence of antihypertensive drugs. In the long run this will help in reducing hypertension and its co-morbidities among the geriatric population. It is strongly felt that advocacy of adherence to antihypertensive drugs should be inculcated in each and every hypertensive patient along with

regular and uninterrupted drug supply and high quality health care service in all health care organisations where health education and counselling gets the highest priority.

Limitations of the study

Measurement of medication adherence is challenging because adherence is an individual patient behavior. The different methods for measurement of medication adherence as shown in the study by Brown M T, and Bussell J K: Medication Adherence: WHO Cares?^[10] are (I) Subjective measurements obtained by asking patients, family members, caregivers, and physicians about the patient's medication use; (II) objective measurements obtained by counting pills, examining pharmacy refill records, or using electronic medication event monitoring systems; and (III) biochemical measurements obtained by adding a nontoxic marker to the medication and detecting its presence in blood or urine or measurement of serum drug levels.

In the current study only subjective measurements were taken because of constraints of funding and time. Study also has certain limitation due to clinic based study and small sample size.

REFERENCES

- Indian's Elderly Population: Some Fundamentals©2009–2013. Available at: <http://gktoday.in>
- Sabaté E, editor. , ed. *Adherence to Long-Term Therapies: Evidence for Action*. Geneva, Switzerland: World Health Organization; 2003.
- Fung V, Huang J, Brand R, Newhouse JP, Hsu J. Hypertension treatment in a Medicare population: adherence and systolic blood pressure control. *Clin Ther*. 2007;29(5):972–984.
- Krousel-Wood M, Thomas S, Muntner P, Morisky D. Medication adherence: a key factor in achieving blood pressure control and good clinical outcomes in hypertensive patients. *Curr Opin Cardiol*. 2004; 19(4):357–362
- Thinking Outside the Pillbox: A System-wide Approach to Improving Patient Medication Adherence for Chronic Disease [full report; PDF file on the Internet]. NEHI Publication. 2009 Aug. Available from: http://www.nehi.net/publications/44/thinking_outside_the_pillbox_a_systemwide_approach_to_improving_patient_medication_adherence_for_chronic_disease. Accessed March 27, 2015.
- Brown M T, and Bussell J K: Medication Adherence: WHO Cares?
- Morisky DE, Ang A, Krousel-Wood M, Ward H. Predictive Validity of a Medication Adherence Measure for Hypertension Control. *Journal of Clinical Hypertension* 2008; 10(5):348–354
- Krousel-Wood MA, Islam T, Webber LS, Re RS, Morisky DE, Muntner P. New Medication Adherence Scale Versus Pharmacy Fill Rates in Seniors With Hypertension. *Am J Manag Care* 2009;15(1):59–66.
- Morisky DE, DiMatteo MR. Improving the measurement of self-reported medication poor adherence: Final response. *J ClinEpidemio* 2011; 64:258–263. PMID:21144706
- Sheilini M et al. Antihypertensive Treatment, Medication-Non-Adherence and Factors Leading to Non-Adherence Among Elderly Manipaluniversity, manipal
- Kumar N et. al. Factors associated with adherence to anti-hypertensive treatment among patients attending a tertiary care hospital in Mangalore, South india
- Khanam M A, Lindeboom W, Koehlmoos T L P, Alam D S, Niessen L and Milton A H Hypertension: adherence to treatment in rural Bangladesh findings from a population-based study in Bangladesh.
- Hsu YH, Mao CL, Wey M. Antihypertensive Medication Adherence among Elderly Chinese Americans. *J Transcult-Nurs* 2010; 21(4):297–305.
- Ramli A, Ahmad NS, Paraidathathu T. Medication adherence among hypertensive patients of primary health clinics in Malaysia. *Patient Prefer Adherence* 2012 ; 6:613–22
- Dessie A, Asres G, Meseret S, Birhanu Z Adherence to anti-hypertensive treatment and associated factors among patients on follow up at University of Gondar Hospital, Northwest Ethiopia. *BMC Public Health* 2012; 12:282.
- Lowry KP, Dudley TK, Oddone EZ, Bosworth HB. Intentional and unintentional nonadherence to antihypertensive medication. *Ann Pharmacother*. 2005; 39(7–8):1198–203.
- Lee GK, Wang HH, Liu KQ, Cheung Y, Morisky DE, Wong MC. Determinants of medication adherence to antihypertensive medications among a Chinese population using Morisky Medication Adherence Scale. *PLoS One* 2013; 8 (4): e62775. doi:10.1371/journal.pone.0062775
- Patel RP, Taylor SD. Factors affecting medication adherence in hypertensive patients. *Ann Pharmacother* 2002; 36 (1):40–5.
- Atulomah NO, Florence MO, Oluwatosin A. Treatment adherence and risk of non-compliance among hypertensives at a Teaching Hospital in Ogun state, southwest Nigeria. *acta SATECH* 2010; 3(2):143–149.
- Chelkeba L, Dessie S. Antihypertension medication adherence and associated factors at Dessie Hospital, North East Ethiopia, Ethiopia. *Int J Res Med Sci* 2013;1(3):191–197.
- Hashmi SK, Afridi MB, Abbas K, Sajwani RA, Saleheen D, Frossard PM et al. Factors associated with adherence to anti-hypertensive treatment in Pakistan. *PLoS One*. 2007 Mar 14;2 (3):e280.
- Susan R, Anu K, Achu T, Soumya G, Vijayakumar K, Anish TS. Antihypertensive Drug Compliance across Clinic and Community Settings, in Thiruvananthapuram, South India.
- Caro JJ, Salas M, Speckman JL, Raggio G, Jackson JD. Persistence with treatment for hypertension in actual practice. *CMAJ*. 1999;160(1): 31–37

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