Original Research Article

Antihypertension medication adherence and associated factors at tertiary care hospital, Gujarat, India

Dinkar Goswami*

Department of Medicine, GMERS Medical College, Gandhinagar, Gujarat, India

Received: 07 April 2019
Accepted: 02 May 2019

*Correspondence:
Dr. Dinkar Goswami,
E-mail: dngo081067@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: According to world health organization (WHO) describes poor adherence as the identical cause of uncontrolled blood pressure and estimates that 50-70% of people do not take their antihypertensive medication as prescribed. The objectives of this study were to investigate the adherence and persistence of antihypertensive drugs in Indian rural population as well as monitoring adverse drug reactions and its relation to compliance.

Methods: This cross-sectional study conducted among 300 hypertensive patients taking treatment at tertiary care hospital in Gujarat, India. Structured questionnaires consisting of open and closed ended questions on the antihypertensive drug adherence were distributed to patients for those found on the study area at time of data collection and the left-over pills of individual patient were counted to strengthen the consistency of the research.

Results: Prevalence of non-adherence found in 24.3% participants. Present study found statistically significant association between socio-demographic factors (age, religion, marital status, occupation, substance abuse, education and family history of HT) with treatment adherence of hypertension among study participants. The other factor associated to non-adherence was therapy factor 32.9% (P=0.001) from the total non-adherence, in this case patients were supposed to unwanted effect of the drug and they were not able to take the medication.

Conclusions: The main possible reasons for non-adherence were ‘refuse to take regular treatment’, ‘cost of treatment’, ‘poor patient-doctor relation’, ‘unwanted side effect of drugs’ and other factors like age, marital status, occupation, education level, family H/O, substance abuse and religion are also playing supporting role to develop non-adherence to treatment.

Keywords: Hypertension, Medical compliance, Patient-physician interaction, Treatment adherence

INTRODUCTION

Hypertension is a most frequent disorder among all cardiovascular disorder, which is an identical risk factor for coronary artery disease.¹,² Many researchers found that despite the availability of effective medical therapy, more than 50% hypertensive do not take any treatment and more than 50% of those on treatment have blood pressures remain constant over the 140/90 mmHg threshold. According to world health organization (WHO) describes poor adherence as the identical cause of uncontrolled blood pressure and estimates that 50-70% of people do not take their antihypertensive medication as prescribed.³,⁴

A special case of noncompliance is the primary noncompliance, patients not compensating their prescriptions.⁵ Number of doses plays a valuable part;
single dose has been found to improve compliance, but 24-hour antihypertensive activity should be provided by the drug. Individual’s risk of heart disease and stroke is increases due to uncontrolled blood pressure. High blood pressure is one of the most prevalent chronic diseases for which treatment is available.

Adherence for treatment affected by factors such as age, gender, low socioeconomic status and severity of disease, class of drug prescribed, number of pills per day, side effects of medication, patient’s inadequate understanding of the disease and importance of the treatment, co-morbid medical conditions, lack of social support, poor patient provider relationship, cost, forgetfulness, and presence of psychological problems, especially depression.

Patient’s noncompliance with the therapeutic regimen has long been a challenge for practitioners, hence this study has been undertaken to investigate the adherence and persistence of antihypertensive drugs in Indian rural population as well as monitoring adverse drug reactions and its relation to compliance.

METHODS

This cross-sectional study was conducted at general medicine department, GMERS medical college and civil hospital, Gandhinagar, Gujarat, India among all hypertensive patients attended outpatients’ department (OPD) at general medicine department after taken ethical permission from Institutional ethical committee (IEC) of GMERS Medical College, Gandhinagar, Gujarat, India.

Study included all the patients who fulfilled the inclusion criteria like age greater than 18 years old, patients who have started antihypertensive medication at least for the last three months, hypertensive patients who were willing to respond, patients who had the left-over pills at the time and/or complete the whole dispensed pills during March 2015 to May 2016. Study included all the patients of hypertension who fulfil the inclusion criteria and visited to the study setting area during study period.

Study variable

Dependent variable

Non-adherence to antihypertensive medication.

Independent variable

Age, sex, patients’ factor, therapy factor, socio-economic factors, health care provide and health system factors.

A sample size of 300 is obtained by using the hypothesis testing method and based on following assumptions: 95% confidence intervals, prevalence of hypertension in urban area of Gujarat, India 44.0% and 10% margin of error.

The calculated minimum sample has been inflated by 10% to account for anticipated subject non-response.

Data collection technique

Structured questionnaires consisting of open and closed ended questions on the antihypertensive drug adherence were distributed to patients for those found on the study area at time of data collection and the left-over pills of individual patient were counted to strengthen the consistency of the research.

Statistical analysis

After collecting data, it was processed using statistical package for social services (SPSS 19.0). Adherence and non-adherence were calculated by the percentage of total missed doses over the total dispensed medications and at a cut off value of 80% was considered as adherence to their antihypertensive medication. Chi-square (p-value) was used to see determine the level of significance of association between adherence and different factors.

RESULTS

Table 1 shows that 35.7% participants were belonged to age group of more than 65 years. Study included 56.0% male participants and 65.3% Hindu participants. Almost 32.7% participants were widow or widower. Around 18.7% participants engaged with agriculture field and shop owners and 26.0% worked as construction worker.

Almost 35.3% participants have any type of addiction. Around 22.0% participants got education up to primary level and 11.3% were graduate and above. Almost 30.3% were residing alone in study setting area and 37.7% participants have family history of hypertension.

Table 2 shows association between socio-demographic factors and treatment adherence of hypertension. More non-adherence observed in age group of ≥65 years and 55 to 65 age group and association also statistically significant (p<0.05). Non-adherence observed more among female participants (52.1%) than male (47.9%) but association statistically non-significant (p>0.05).

Regarding religion of participants, non-adherence observed more among Muslims (58.9%) than Hindus (41.1%) and association also statistically significant (p<0.05). Non-adherence observed less among married (19.2%) and divorcee (16.4%) participants than widow/widower (64.4%) and association also statistically significant (p<0.05).

Treatment adherence observed more among professionals, semi-professionals and semi-skilled workers than farmers, clerical workers, unskilled workers and association also statistically significant (p<0.05).
Table 1: Socio-demographic information of participants (N=300).

| Variable                      | Number (%)   |
|-------------------------------|--------------|
| **Age (in years)**            |              |
| 25-35                         | 23 (7.7)     |
| 35-45                         | 21 (7.0)     |
| 45-55                         | 56 (18.7)    |
| 55-65                         | 93 (31.0)    |
| ≥65                           | 107 (35.7)   |
| **Mean age (Mean ± SD)**      | 44.6±7.6     |
| **Gender**                    |              |
| Male                          | 168 (56.0)   |
| Female                        | 132 (44.0)   |
| Male: female ratio            | 1.27:1       |
| **Religion**                  |              |
| Hindu                         | 196 (65.3)   |
| Muslim                        | 104 (34.7)   |
| **Marital Status**            |              |
| Married                       | 172 (57.3)   |
| Widow/widower                 | 98 (32.7)    |
| Divorcee                      | 30 (10.0)    |
| **Occupation**                |              |
| Profession                    | 12 (4.0)     |
| Semi-profession               | 20 (6.7)     |
| Clerical, shop owner, farmer  | 56 (18.7)    |
| Skilled worker                | 78 (26.0)    |
| Semi-skilled worker           | 53 (17.7)    |
| Unskilled worker              | 55 (18.3)    |
| Unemployed                    | 26 (8.7)     |
| **Substance abuse**           |              |
| Chikhani                      | 19 (6.3)     |
| Tobacco chewing               | 65 (21.7)    |
| Drinking                      | 43 (14.3)    |
| None                          | 194 (64.7)   |
| **Education**                 |              |
| Profession or honours         | 13 (4.3)     |
| Graduate or postgraduate      | 21 (7.0)     |
| Post high school diploma      | 47 (15.7)    |
| High school certificate       | 82 (27.3)    |
| Middle school certificate     | 36 (12.0)    |
| Primary school certificate    | 66 (22.0)    |
| Illiterate                    | 35 (11.7)    |
| **Family history of hypertension** |          |
| Present                       | 113 (37.7)   |
| Absent                        | 187 (62.3)   |
| **Family member**             |              |
| Present                       | 209 (69.7)   |
| Alone                         | 91 (30.3)    |

Study observed higher non-adherence among participants with substance abuse than non-substance abuser and association also statistically significant (<0.05). Higher treatment adherence observed among participants without family history of hypertension than participants with family history and association also statistically significant (<0.05).

Study observed statistically non-significant association between adherence and presence of family member (>0.05). From the total non-adherence of respondents 28.8% (P=0.04) comprises of poor patient-physician relationship that patients didn’t get enough information from the health care provider and not satisfied with the health facility. Almost 42.5% participants had financial problem, 32.9% had drug related side effect.

These were the existing factors expected to be influential the adherence to anti-hypertensive medication, (Table 3) shows that, some patients respond to more than one factor so that the value seems to be more than the total non-adherence value. From the total non-adherence of respondents 28.8% (P=0.04) comprises of poor patient-physician relationship that patients didn’t get enough information from the health care provider and not satisfied with the health facility. Almost 42.5% participants had financial problem, 32.9% had drug related side effect.
### Table 2: Association between anti-hypertensive medication non-adherence according to age group distribution among study participants (N=300).

| Variable                  | Level of adherence |  | P value  |
|---------------------------|--------------------|---|----------|
|                          | Adherence (227)    | Non-adherence (73) |          |
| Age (in years)            |                    |                      | <0.05    |
| 25-35                     | 18 (7.9)           | 5 (6.8)              |          |
| 35-45                     | 14 (6.2)           | 7 (9.7)              |          |
| 45-55                     | 47 (20.7)          | 9 (12.3)             |          |
| 55-65                     | 76 (33.5)          | 17 (23.3)            |          |
| ≥65                       | 72 (31.7)          | 35 (47.9)            |          |
| Gender                    |                    |                      | 0.14     |
| Male                      | 133 (58.6)         | 35 (47.9)            |          |
| Female                    | 94 (41.4)          | 38 (52.1)            |          |
| Religion                  |                    |                      | 0.0001   |
| Hindu                     | 166 (73.1)         | 30 (41.1)            |          |
| Muslim                    | 61 (26.9)          | 43 (58.9)            |          |
| Marital status            |                    |                      | 0.0001   |
| Married                   | 158 (69.6)         | 47 (64.4)            |          |
| Widow/widower             | 51 (22.5)          | 14 (19.2)            |          |
| Divorced                  | 18 (7.9)           | 12 (16.4)            |          |
| Occupation                |                    |                      | 0.001    |
| Profession                | 11 (4.8)           | 1 (1.4)              |          |
| Semi-profession           | 17 (7.5)           | 3 (4.1)              |          |
| Clerical, shop-owner, farmer | 40 (17.6)     | 16 (21.9)            |          |
| Skilled worker            | 59 (26.0)          | 19 (26.0)            |          |
| Semi-skilled worker       | 47 (20.7)          | 6 (8.2)              |          |
| Unskilled worker          | 32 (14.1)          | 23 (31.5)            |          |
| Unemployed                | 21 (9.3)           | 5 (6.8)              |          |
| Substance abuse           |                    |                      | 0.002    |
| Chikhani                  | 14 (6.2)           | 5 (6.8)              |          |
| Cigarette / Bidi          | 42 (18.5)          | 7 (9.6)              |          |
| Tobacco chewing           | 52 (22.9)          | 13 (17.8)            |          |
| Drinking                  | 22 (9.7)           | 21 (28.8)            |          |
| None                      | 145 (63.9)         | 49 (67.1)            |          |
| Education                 |                    |                      | 0.0001   |
| Profession or Honours     | 12 (5.3)           | 1 (1.4)              |          |
| Graduate or postgraduate  | 18 (7.9)           | 3 (4.1)              |          |
| Post high school diploma  | 38 (16.7)          | 9 (12.3)             |          |
| High school certificate   | 70 (30.8)          | 12 (16.4)            |          |
| Middle school certificate | 24 (10.6)          | 12 (16.4)            |          |
| Primary school certificate| 47 (20.7)          | 19 (26.0)            |          |
| Illiterate                | 18 (7.9)           | 17 (23.3)            |          |
| Family history of hypertension | 53 (23.3)  | 60 (82.2)            | 0.0001   |
| Present                   | 163 (71.8)         | 46 (63.0)            | 0.20     |
| Absent                    | 174 (76.7)         | 13 (17.8)            |          |
| Family member             |                    |                      |          |
| Present                   | 163 (71.8)         | 46 (63.0)            | 0.0001   |
| Alone                     | 64 (28.2)          | 27 (37.0)            | 0.20     |

### Table 3: Reason for antihypertensive medication non-adherence with respect to the existing factors among study participants (N=300).

| Factors                                           | Contribution of each factor for non-adherence N (%) |
|---------------------------------------------------|-----------------------------------------------------|
| Patients refuse to take the drug regularly as prescribed (patient factors) | 45 (61.6) |
| Interruption due to financial constraints (Socio-economic factor) | 31 (42.5) |
| Drug related, unwanted effect (Therapy factors) | 24 (32.9) |
| Pain due to B/P not felt and stop medication (Condition factors) | 49 (67.1) |
| Poor patient-physician relationship               | 21 (28.8) |

**DISCUSSION**

The findings of the present study suggest that the medication adherence was poor among hypertensive
patients at a tertiary care teaching hospital in Gujarat, India. The results of this study showed that non-adherence was found among 24.3% participants and remaining participants were taking prescribed pills and visiting hospital regularly to maintained satisfactory compliance to medication over a period of 12 months. This finding is correlate with similar study done by PM Ho et al. (34.0%), Newby LK et al. (29.0%) and Chelkeba L et al. (26.0%).1,3-10 But higher non-adherence was found in similar study done by Jackievicius CA et al. (40.0%), Venketchakem J et al. (75.9%), Santra G et al. (79.2%), Thakur JS et al. (52.7%), Ramli A et al. (46.6%), Bhusal A et al. (41.1%) and Kale S et al. (58.0%).11-16 Higher non-adherence in above mentioned studied observed might be due to use difference methods or tools to measure treatment adherence of hypertension.

Studies done in Colombia, USA (2009) showed that the levels of medication adherence among the elderly ranging from 26% to 59%. Adherence to a medication regimen requires a set of behaviors that include obtaining the medication; timely administration of the correct drug, dose, and route; and persisting with taking the medication as long as the medication is needed.17 Many factors were found associated with low compliance which included male gender, young age, initial drug choice, education level, living alone, religion, marital status, unemployment including others.18 Education was tied to better compliance since they have a better understanding of the long term consequences.19 Cost of the antihypertensive drug therapy was found to be inversely proportional to compliance.20 Patients on multiple therapy were more likely to develop adverse drug reaction as compared to patients on monotherapy.21

Present study found statistically significant association between socio-demographic factors (age, religion, marital status, occupation, substance abuse, education and family history of HT) with treatment adherence of hypertension among study participants. The patient-physician encounter has consistently been identified as an ideal avenue for delivery of interventions to improve adherence behavior because of one-on-one opportunities for discussing adherence during the initial diagnosis of disease, while physicians are reviewing existing or new medicine prescriptions, and at follow-up visits.22-23 On the other way patients suffering from unwanted effect of the medication (side effect) supposed to stop taking the drugs were 32.9% (P<0.05) still there was statistical significant (association) with non-adherence to antihypertensive medication this problem was able to overcome through good counseling procedure and advising the patient how to minimize these effects.

CONCLUSION

Present study found higher prevalence of non-adherence (24.3%) among study participants. The main possible reasons were ‘refuse to take regular treatment’, ‘cost of treatment’, ‘poor patient-doctor relation’, ‘unwanted side effect of drugs’ and other factors like age, marital status, occupation, education level, family H/O, substance abuse and religion are also playing supporting role to develop non-adherence to treatment. The low level of compliance to antihypertensive medication found in this study, is consistent with findings in other countries and studies in India, emphasizing the need of population wide primary prevention of elevated blood pressure and cardiovascular disease. Such measures include educational, legislative, and fiscal actions to encourage the adaptation of a healthy diet and to increase the facilities and opportunities for physical activity at leisure.

Funding: No funding sources
Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee of GMERS Medical College, Gandhinagar, Gujarat, India

REFERENCES

1. Pardeshi M, Dange SV. Comparison of Efficacy and Safety of Amlodipine and Felodipine-ER in Patients of Essential Hypertension. Bomb Hosp J. 2004;46(2).
2. Nissinen A. Hypertension in developing countries, World Health Stat Quatr. 1998;41:141-54.
3. 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):101-7.
4. Tal H. Assessment to antihypertensive medication association with patient and practice factors. J Human Hypertens. 2006(20):295-7.
5. Praveen K, eds. Cardiovascular disease, Kumar and Clarke’s clinical medicine. 5th Ed. 2002:818.
6. Boon NA, eds. Cardiovascular disease. Davidson’s principals and practice of medicine. 19th Ed. 2002:392.
7. Kale S, Patil A, Mandlecha RH. Compliance and adverse drug effects of antihypertensives in rural India. J Clin Diag Res. 2011;5(4):775-9.
8. Verma A, Patel P, Patel JR, Chaudhary H. Relation of BMI and hypertension in natives of Gujarat. GCSMC J Med Sci. 2013;2(1):17-20.
9. Ho PM, Spertus JA, Masoudi FA, Reid KJ, Peterson ED, Magid DJ, et al. Impact of medication therapy discontinuation on mortality after myocardial infarction. Arch Inter Med. 2006;166(17):1842-7.
10. Newby LK, LaPointe NMA, Chen AY, Kramer JM, Hammill BG, DeLong ER, et al. Long-term adherence to evidence-based secondary prevention therapies in coronary artery disease. Circ. 2006;113:203-12.
11. Jackievicius CA, Mamdani M, Tu JV. Adherence with statin therapy in elderly patients with and without acute coronary syndromes. JAMA. 2002;288:462-7.
12. Venkatachalam J, Abrahm SB, Singh Z, Stalin P, Sathyya GR. Determinants of patient's adherence to hypertension medications in a rural population of Kancheepuram District in Tamil Nadu, South India. Indian J Community Med. 2015;40:33-7.

13. Santra G. Assessment of adherence to cardiovascular medicines in rural population: An observational study in patients attending a tertiary care hospital. Ind J Pharm. 2015;47(6):603-4.

14. Thakur JS, Vijayvergiya R, Jaswal N, Ginsburg A. Assessment and barriers to medication adherence for secondary prevention of cardiovascular disease among patients with coronary artery disease in Chandigarh, India. Int J Noncommunic Dis. 2016;1(1):37.

15. Ramli A, Ahmad NS, Paraidathathu T. Medication adherence among hypertensive patients of primary health clinics in Malaysia. Patient Prefer Adher. 2012;6:613.

16. Bhusal A, Jadhav PR, Deshmukh YA. Assessment of medication adherence among hypertensive patients: a cross-sectional study. Int J Basic Clin Pharmacol. 2016;5:1606-12.

17. Todd M. Medication adherence in hypertension study. J Human Hypertens. 2009;3:840.

18. Premier collaborative research group, effects of comprehensive lifestyle modification on blood pressure control: main results of the premier clinical trial. J Am Med Assoc. 2003;289:2083-93.

19. The colombo plan for cooperative economic development in south and southeast Asia. Annual report of the consultative committee. 22nd consultative committee. Sri Lanka, Colombo Plan Bureau. 1972; 990-998. Available at: https://catalog.hathitrust.org/Record/009530262.

20. Lesaffre E. A retrospective analysis of the effect of noncompliance on time to first major adverse cardiac event in LIPS. Clin Ther. 2003;25:2431-47.

21. Guidelines committee. 2003. European society of hypertension European society of cardiology guidelines for the management of arterial hypertension. J Hypertens. 2003;21:1011-53.

22. Lewis LM, Askie P, Randleman S, Shelton-Dunston B. Medication adherence beliefs of Comm Dwelling Hyper African Am. J Cardiovasc Nurs. 2010;25:199-206.

23. Harmon G, Lefante J, Krousel-Wood M. Overcoming barriers: the role of providers in improving patient adherence to antihypertensive medications. Curr Opin Cardiol. 2006;21:310-5.

Cite this article as: Goswami D. Antihypertension medication adherence and associated factors at tertiary care hospital, Gujarat, India. Int J Adv Med 2019;6:895-900.