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Original Research Article

Compliance to antihypertensive medication: a cross-sectional study in Aligarh

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ABSTRACT

Background: Hypertension is a global public health issue. Hypertensive heart disease is one of the top ten leading causes of death in the world. It was responsible for an estimated 1.1 million deaths worldwide in 2012. To prevent some of the complications of hypertension regular intake of the prescribed treatment in the form of medicines (pills) is essential. Poor compliance to anti-hypertensive therapy is usually associated with bad outcome of the disease and wastage of limited health care resources. With these viewpoints the study aimed to assess the level of compliance of hypertensive patients to their anti-hypertensive medications and to determine the socio-demographic correlates of compliance.
Methods: This was community based cross sectional study conducted in urban and rural areas in Aligarh. A total of 350 hypertensive patients were selected using simple random sampling. A pretested semi-structured questionnaire was used. Compliance was measured by Morisky 8-item Medication Adherence scale. Analysis was done using proportions and Chi-square test.
Results: The overall compliance of study population was 23.7%. It was found to be significantly associated with gender, education, social class and associated co morbidities. Education, higher social class and duration of hypertension were found to be the main facilitators to adherence. The barriers to adherence were cost of drug and more number of pills per day.
Conclusions: Patient education, family counselling and social support networks should be strengthened in health promotion programs in order to enhance compliance of hypertensive patients with the therapeutic regimen and to improve their quality of life.

Keywords: Hypertension, Compliance, Prevalence

INTRODUCTION

Poor adherence to medications is a major public health challenge. Adherence to medication 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.[1] Patients' medication adherence is influenced by a large number of interacting factors but their exact impact is not well understood, partly because it is difficult to measure adherence. Obtaining a medicine does not ensure its use; however, it has been established that patient self-report is a useful marker of adherence.[2]

Hypertension is one of the most common non-communicable diseases globally. More than 26% of the adult populations worldwide have been diagnosed as

having hypertension, and the prevalence of hypertension increases with age. Globally, it is also one of the major causes of premature death, and 7.1 million of people die from hypertension related diseases annually and the problem is still growing.[3]

Successful control of blood pressure is of paramount importance in the reduction of morbidity and mortality rates and many studies have demonstrated the impact of antihypertensive agents on improving clinical outcomes.[4-6] However, the effectiveness of antihypertensive agents must be achieved by optimal adherence to prescribed medications according to healthcare providers' instructions.[1]

Barriers to drug compliance consist of multiple factors that include complex medication regimens, dosing frequency, behavioral factors and side effects of treatment. The most typical barriers 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.[7] Various methods have been developed to measure medication adherence. Self-reported measures are a relatively simple and inexpensive method, and it could also include information on social, situational and behavioral factors that affect adherence.[2,8,9] Antihypertensive drug adherence has been extensively evaluated in many countries using self-report method of medication adherence measurement; however there is a scarcity of studies evaluating the adherence levels of antihypertensive pharmacotherapies among Indian population.[10-14]

Keeping the above outlooks in mind the present study was conducted with the following objectives:

1. To assess the level of compliance of hypertensive patients to their anti-hypertensive medications.
2. To determine the socio-demographic correlates of compliance.

METHODS

This was a cross- sectional study conducted in the urban and rural field practice areas of Department of Community Medicine, Jawaharlal Nehru Medical College, Aligarh. Aligarh is situated in Western Uttar Pradesh about 133 kms southeast of Delhi, on the Delhi Kolkata railway line and Grand Trunk road. Patients aged 30 years and above who had been diagnosed hypertension and were on antihypertensive for last 6 months were included in this study. Pregnancy induced hypertension patients were excluded from the study. Patients diagnosed with hypertension but of less than 6 months duration and those in an inpatient setting were also excluded. Furthermore excluded were hypertensive patients in an inpatient setting. Based on a previous study, prevalence for sample size calculation was taken as 15.3%.[15] At 95% confidence with a marginal error of 5% sample size and 10% non-response simple size was calculated as 356. Out of these 6 participants were excluded. A list of hypertensive patients in the study areas was prepared by door to door survey. After calculating the respective sample sizes to be drawn from each of the area by probability proportion to size (PPS), simple random sampling was done to draw the desired sample from each area.

Treatment compliance was measured by Morisky 8-item Medication Adherence Scale (MMAS-8) with a high reliability and validity, which has been particularly useful in chronic conditions like hypertension. Each of the 8 item was scored 0 or 1.[16] First seven items were recorded as a no (score 0) or yes (score 1). Last item was recorded on a five point scale where a score of zero was given to never/rarely. All other responses were scored as 1. A total score of ">2" suggested low adherence. Scores of "1-2" was reported as medium while "0" as high adherence. The socio-demographic and clinical characteristics evaluated were residence, sex, age, education and socio-economic class. Socio-economic class was assessed by Modified BG Prasad Classification of May 2016.[17]

The study was conducted for a period of 1 year (June 2015-July 2016). The rights of the patients during interview were well respected. The study protocol was approved by the institutional research Ethics Committee, Jawaharlal Nehru Medical College, AMU, Aligarh. Furthermore, written consent was obtained from the respondents prior to participation in the study.

RESULTS

A total of 350 participants were included in the study. The mean age of the participants was 58.95±10.24 with a range of 33-89 years. Almost half of the respondents (47.1%) were in the age group of >61 years. Females (30%) were almost twice the number of males (70%). There was almost a uniform distribution of participants among Hindus (52.3%) and Muslims (49.7%). More than half of the respondents were illiterate (59.7%). Majority (32.9%) belonged to social class IV. Most of the respondents were engaged (59.4%) in one of the other occupation.

Table 1: Prevalence of treatment compliance.

Adherence	Frequency (No.)	Percentage (%)
Low	267	76.3
Medium	83	23.7
Total	350	100.0

The prevalence of treatment compliance was assessed using Morisky medication adherence Scale (MMAS-8). As high level of compliance was not found in any of the participant, low compliance was taken as non-compliance while medium as compliance.[18,19] With the above considerations, it was found that, 76.3% participants were not compliant while 23.7% were compliant to antihypertensive medications (Table 1).

Table 2: Socio-demographic and disease characteristic of hypertensive patients by compliance level.

Variables	Compliant n=83 N (%)	Non-compliant n=267 N (%)	Total N (%)	Odds ratio (confidence interval)	P value
Age in years: Mean (SD)	60.33 (9.29)	58.53 (10.50)	58.95 (10.24)	-0.075 (-0.007-0.001)	NS[b] (p=0.163)
Gender					
Female	34 (32.4)	71 (67.6)	105 (100)	1.915 (1.145-3.205)	0.013[a*]
Male	49 (20.0	196 (80.0)	245 (100)		
Area					
Urban	41 (28.3)	104 (71.7)	145 (100)	1.530 (0.932-2.512)	NS[a] (p=0.092)
Rural	42 (20.5)	163 (79.5)	205 (100)		
Religion					
Hindu	36 (19.7)	146 (80.2)	182 (100)	0.635 (0.386-1.043)	NS[a] (p=0.072)
Muslim	47 (28.0)	121 (72.0)	168 (100)		
Marital Status					
Married	57 (23.8)	182 (76.2)	239 (100)	1.024 (0.602-1.740)	NS[a] (p=0.931)
Currently Single	26 (23.4)	85 (76.6)	111 (100)		
Education					
Not Educated	42 (19.3)	176 (80.7)	218 (100)	0.530 (0.322-0.873)	0.012[a]*
Educated	41 (31.1)	91 (68.9)	132 (100)		
Occupation					
Not Working	16 (36.4)	28 (63.6)	44 (100)	0.769 (0.436-1.357)	NS[a] (p=0.365)
Working	22 (27.5)	58 (72.5)	21 (100)		
Social Class					
I	20 (38.5)	32 (61.5)	53 (100)	0.186 (0.027-0.094)	0.000[a*]
II	22 (42.3)	30 (57.7)	52 (100)		
III	8 (11.9)	59 (88.1)	67 (100)		
IV	20 (17.4)	95 (82.6)	115 (100)		
V	13 (20.3)	51 (79.7)	63 (100)		
Duration of hypertension: Mean (SD)	5.710 (3.74)	5.670 (4.55)	5.680 (4.37)	-0.004 (-0.011-0.010)	NS[b] (p=0.941)
Associated Comorbidities					
Present	68 (33.0)	138 (67.0)	206 (100)	4.238 (2.306-7.787)	0.000[a*]
Absent	15 (10.4)	129 (89.6)	144 (100)		

[a]Pearsons Chi-Square test, [b]Independent t-test,*p<0.05, Significant

Females were twice more compliant than males (OR=1.915). Treatment compliance was reported to be 47% less than in those without any formal education (p= 0.012) (Table 2). A statistically significant association was found with social class (p=0.000). Presence of associated comorbidities increased treatment compliance by 4 times (OR=4.238). Area, marital status, religion and duration of hypertension were not associated significantly.

A significant strong negative correlation (r=-0.145, p=0.007) was found with treatment compliance. As depicted in Figure 1, as the age increases total compliance score approaches zero that is towards a high level of compliance**.** The possible reason might be that older people have more concern about their health than younger patients.[20] The mean duration of hypertension was 5.68±4.37 years.

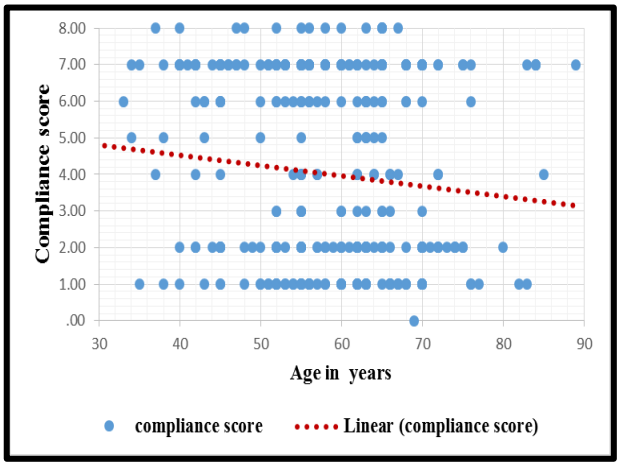

Figure 1: Correlation of treatment compliance score and age of the patients.

Table 3: Outcome of care of hypertensive patients by compliance level.

Variables	Compliant n=83 (%)	Non-compliant n=267 (%)	Total N (%)	Odds ratio (confidence interval)	P value
Outcome of care: mean (SD)					
Systolic BP	133.469 (12.851)	140.134 (14.223)	138.554 (14.179)	0.2 (0.003-0.009)	0.000[b*]
Diastolic BP	79.108 (9.0661)	80.831 (8.779)	80.422 (8.865)	0.083 (-0.001-0.009)	NS (p=0.122[b*])

[b]Independent t-test,*p<0.05, Significant.

A significantly strong negative correlation (r=-0.133, p=0.012) was found between total treatment compliance score and duration of hypertension (Figure 2). Better compliance levels were expected as duration of hypertension increase emphasizing the fact that longer duration of the disease helps the patient to accept the diseased state as well as to adapt to the adherence behavior over time. Longer duration of hypertension helped these patients build up a habit of regularly consuming their pills.[21]

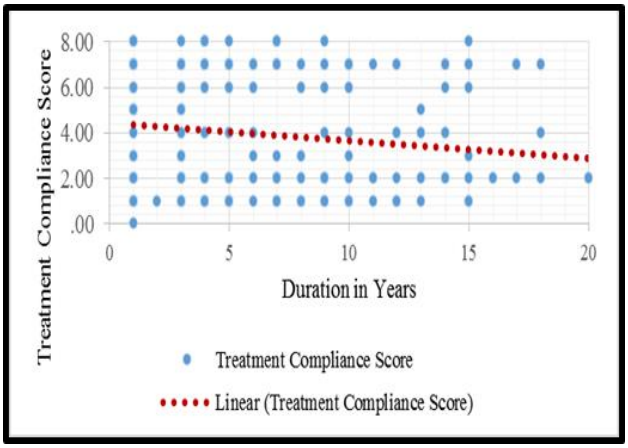

Figure 2: Correlation of treatment compliance and duration of hypertension.

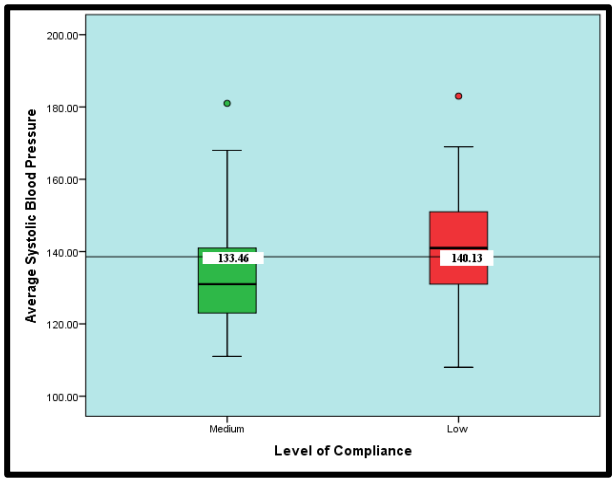

Figure 3: Average systolic blood pressure and level of compliance.

Figure 3, depicts systolic blood pressure across levels of treatment compliance. The mean Systolic Blood pressure for those patients with medium level of compliance was 133.46. About 75% of the patients with a better compliance had controlled systolic blood pressure levels (<140 mm Hg). Though the mean systolic blood pressure for those with low compliance level was comparable (140.13 mmHg), more than 50% of the participants in this group had an uncontrolled blood pressure. This difference was found to be statistically significant. However, no significant association was found with diastolic blood pressure.

DISCUSSION

The prevalence to treatment compliance was found to be 23.7% in the present study. Many studies reported far higher levels of prevalence. A prevalence of 73% has been reported in urban slums in Kolkata using a pill count method.[21] Adherence of 74.2% was reported from urban areas of Andhra Pradesh using an arbitrary method for measuring adherence.[22] The prevalence of compliance was still higher (82.2%) in a study in Karnataka, taking 80% of prescribed medications as a cut- off for compliance.[23] Compliance from study using Morisky Medication adherence Scale in a study in Sunderland was found to be 79%.[24] A slightly lower level of compliance (55.5%) was reported in a study in Ethiopia using the MMAS-8 scale.[25] Ajayi et al reported a prevalence of 44.7% from a study in Nigeria using MMAS-4 scale for measuring adherence.[13] About 57.2% of the 334 hypertensive patients were compliant in an OPD based study from Uttar Pradesh in 2015.[18] However, results similar to ours were reported in fewer studies. In a community based cross sectional study among rural population in Tamil Nadu, using the 4-item Morisky medication adherence scale (MMAS-4) prevalence of compliance was reported to be 24.1%.[26] The prevalence rates were still lower (15.3%) in an institutional based cross sectional study using MMAS-8, in Karnataka.[15]

These variations in the prevalence rates of treatment compliance might be due to difference in diagnostic instruments/criteria and population settings in-terms of age and place. The present study used 8-Item Morisky medication adherence scale. Variation may also be partly due to the different definitions of methods used to assess medication non-adherence. Most of the studies though

based on self-report, utilized different definitions for medication non-adherence.

Identification of factors affecting compliance to appropriate medical therapy for hypertension can result in controlled blood pressure and reduction in adverse outcomes. In this study, compliance was found to increase with increasing age. However the difference was not statistically significant. Adherence was reported to be higher in age group ≥55 years in a study in Kolkata in 2015.[21] Compliance was reported to be significantly higher in ≥50 years in a study in Uttar Pradesh in 2015.[18] However, age was not found to be significantly associated with treatment compliance in many studies similar to our study.[12,19,23,26,27]

This study found females to be more compliant to treatment as compared to males. In a study in Malaysia females were found to be one and a half times more compliant than males.[12] In a studies conducted in Karnataka and Andhra Pradesh states in India, females reported significantly higher compliance than males.[15,23] However, a cross- sectional study in rural reported that non-adherence to treatment was significantly higher among men than women.[28]

Absence of formal education was reported to significantly decrease compliance rates in the present study. In a study in Kingdom of Saudi Arabia educational status was found to have a statistically significant association with level of compliance.[29] In a study in Andhra Pradesh, illiterates had a higher odds of low adherence score as compared literates.[15] In contrast to this education was not found to have a significant association with treatment compliance in many studies.[23,30,31]

Similar to our study, significantly greater percentage of those with a lower household income showed non adherence in taking medication.[18,21,31] However, no significant association was reported in many other studies.[15,23,27,30,32,33] One explanation may be that in many of these studies, only a negligible number belong to the high socioeconomic class, making it difficult to access non adherence in the high socioeconomic class On the other hand the lack of association between income and non-adherence may reflect an interplay of other factors that contribute to medication adherence.[33]

Many studies did not report duration of hypertension to have a significant association with treatment compliance similar to our study.[12,34,35] There was no significant difference among patients with differing durations of disease, but compliance score was higher in those patients who had taken antihypertensive drugs for longer than 5 years in a cross-sectional study in Iran.[36] Compliance with a treatment regimen was positively correlated with duration of hypertension in study in Kingdom of Saudi Arabia.[29]

The present study reports a significant association of treatment compliance with systolic blood pressure. Similarly significant association was found in a study in Saudi Arabia in 2012.[29] However, the mean systolic and diastolic blood pressure was almost similar among patients with good and poor adherence in a cross-sectional study in Hong Kong.[32] No significant association was found between medication adherence and blood pressure control in a study among 46 Arab-Americans in the western coast of United States.[11] In a similar study in India patients who were adherent to their prescribed medications were 2 times more likely to achieve adequate control of their blood pressure compared with those who were not. This difference was reported to be significant.[21] An observational outpatient department based study in Uttar Pradesh reported a control of blood pressure to be four times more likely among patients who were complaint.[18]

From our study, as well as those reported from other studies, the multifactorial nature of the problem of non-adherence is evident. The interventions planned to combat the problem should be targeted towards social, economic, medical and behavioral factors. The limitation of our study would be that the Morisky adherence questionnaire used in this study has not been validated in the Indian population. Also the sample size of our study is small to generalize the findings to a large extent. However there is a paucity of literature on adherence to antihypertensive medications in the Indian subcontinent. Further studies are recommended across the country to assess the adherence level as well as the various factors influencing it. Health education plays an important role as well in creating awareness about the complications of hypertension among patients in general, with display of posters and flipcharts which can have an added effect. Patient self-help groups need to be formed and promoted where in the patients can discuss their reasons for non-adherence and try to solve it. The need of the hour is to recognize non-compliance as one of modifiable risk factor for complications of hypertension. By preventing this risk factor, the qualities of life for individuals with hypertension can be improved and will reduce the overall cardiovascular morbidity and mortality.

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