

Factors Associated with Adherence to Antihypertensive Treatment among Hypertensives in Urban Field Practicing Areas of Osmania Medical College, Hyderabad

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ABSTRACT

Background information: Chronic non-communicable diseases are posing a serious threat to public health throughout the world, irrespective of whether developed and developing, and thus deserve to be treated as a global health priority in this new millennium. Most common non-communicable diseases are cardio-vascular diseases, for which uncontrolled hypertension is a risk factor, which is due to poor adherence to anti-hypertensive medication.

Aims & Objectives:

Aim:-To study the factors associated with adherence to therapy among Hypertensive subjects in Harazpenta, the urban field practice area of Community Medicine Department, Osmania Medical College, Hyderabad.

Objectives:-

1. To determine the socio demographic profile among Hypertensive subjects in urban field practice area of Community Medicine Department, Osmania Medical College, Hyderabad.
2. To identify the factors associated adherence to therapy among the subjects.

Material & Methods:

Study design: Community based cross sectional study.

Study duration: One year from November 2015 to October 2016.

Study setting: Harazpenta, which is the urban field practice area of Community Medicine Department, Osmania Medical College, Hyderabad.

Sample technique: Cluster Sampling.

Sample size:

$$N = \frac{Z^2 p \times q}{L^2}$$

P = prevalence of adherence to therapy given by WHO., P=50% Allowable Error of 7.5%, Final sample size= 376 rounded off to 400 (after adding 10% sample loss).

Selection criteria: Diagnosed Hypertensive subjects who were on treatment for more than 1 year.

Data analysis: Data entry done using Microsoft Excel 2007 and analysis done using EPI INFO Version 7.

Results: Out of 376 study participants, 232(61.70%) were highly adherent to their anti-hypertensive medication according to Morisky Medication Adherence Scale-8. Out of the total study population majority of them were females(65.1%), illiterates(64.89%) and were belonging to Lower middle(38.56%) and Upper Lower(35.90%) class according to modified B.G, Prasad's classification. Better adherence and a statically significant association were found in married people 243(64.62%), illiterates 244(64.8%). Individuals belonging to upper socio-economic status 217(57.71%) and those

who had family history of hypertension 158(42.02%) had better adherence and the association was statistically significant .Frequency of Blood Pressure monitoring, Cost of medication and No. of pills per day were also statistically significant.

Conclusions: More than half of the Hypertensive subjects showed good adherence patterns to their prescribed medications. The Health system should give priority to the low income families and provide free supply of all classes of antihypertensive medicines. Recently detected hypertensive patients should be closely monitored for adherence to their prescribed antihypertensive medications.

Key words: Adherence, Anti hypertensive medication.

INTRODUCTION

Hypertension is an important public-health challenge worldwide. Prevention, detection, treatment, and control of this condition should receive high priority. Hypertension is defined as an average systolic blood pressure 140 mm Hg or greater, diastolic blood pressure 90 mm Hg or greater. The World Health Organization (WHO) has estimated that about 62% of cerebrovascular disease and 49% of ischemic heart disease burden worldwide are attributable to suboptimal blood pressure levels where by high blood pressure is estimated to cause 7.1million deaths annually, accounting for 13% of all deaths globally.

Uncontrolled hypertension is caused by non adherence to the antihypertensive drugs, patients understanding their drug regimens help to improve their adherence, thus will help prevent the complications of hypertension which are debilitating and if not prevented can increase the burden of a disease that is already on the increase. Non-adherence to prescribed drugs schedule has been and continues to be a major problem the world over. Studies on this subject show that adherence is about 50% for medications in chronic diseases including hypertension and much lower for lifestyle prescriptions.

Poor adherence to long-term therapies severely compromises the effectiveness of treatment making this a critical issue in population health both from the perspective of quality of life and of health economics. Interventions aimed at improving adherence would provide a significant positive return on investment through primary prevention (of risk factors) and secondary prevention of adverse health outcomes.

Need For the Study

According to WHO the adherence to therapy among long term chronic illness is 50%¹. Adopting lifestyle modifications or non-compliance with prescribed medications can also be associated with uncontrolled hypertension as well as the risks of developing complications. Compliance with antihypertensive drug therapy (AHT) has been shown to reduce the risk of stroke and coronary heart disease by an estimate of 34% and 21%, respectively. However studies revealed medication therapy improves life expectancy and quality of life. Several studies have shown that patients with chronic conditions such as hypertension adhere only to 50-60 percent of medications as prescribed. Little has been documented on the cause of poor compliance, therefore this study aimed to investigate the factors affecting treatment compliance.

Factors affecting adherence to therapy for the control of Hypertension ^[1]:

1. **Socio economic related factors:** includes cost of care, social support, family support.
2. **Health care team/Health system related factors:** includes relationship between patient and physician, availability and accessibility of the physician
3. **Condition related factors:** includes duration of disease
4. **Therapy related factors:** includes duration of treatment, complexity of treatment, and the side effects of medicines
5. **Patient related factors:** includes demographic (age, gender, education level, marital status) and psychological (patient's beliefs, negative attitude, motivation towards the disease, patients knowledge)

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RESULTS

Table 1: Age and sex wise distribution of Hypertensive subjects in Harazpenta, urban field practice area of Community Medicine Department, Osmania Medical College, Hyderabad:

Age (in years)	Male		Female		Total	
	Number	Percent	Number	Percent	Number	Percent
≤30	0	0	8	3.26	8	2.12
31-40	16	12.21	34	13.8	50	13.2
41-50	32	24.42	59	24.08	91	24.2
51-60	35	26.71	78	31.8	113	30.05
61-70	35	26.71	54	22.04	89	23.6
71-80	13	9.92	12	4.8	25	6.64
Total	131	100	245	100	376	100

Mean age (in years) = 54.48, Standard deviation (SD) ± 11.03

Table 2: Socio demographic characteristics of study population:

VARIABLE	NUMBER	PERCENTAGE
RELIGION		
Hindu	310	82.45
Muslim	66	17.45
TYPE OF FAMILY		
Nuclear	171	45.48
Joint	84	22.34
Three Generation	121	32.18
EDUCATION		
Illiterates	244	64.89
Primary School	12	3.19
Secondary School	60	15.96
Intermediate	48	12.77
Graduation & above	12	3.19
OCCUPATION		
Clerical, Shop-owner, Farmer	12	3.19
Skilled & Semi Skilled Worker	49	13.03
Unskilled worker	48	12.77
Unemployed	267	71.01
SOCIO ECONOMIC STATUS – BG PRASADS (APRIL 2016)		
Class I (Upper)	12	3.19
Class II (Upper Middle)	60	15.96
Class III (Lower Middle)	145	38.56
Class IV (Upper Lower)	135	35.90
Class V (Lower)	24	6.38

Table 3: Prevalence of adherence to medication among study population

Adherence to medication	Number	Percent
Good	232	61.70
Poor	144	38.30
Total	376	100

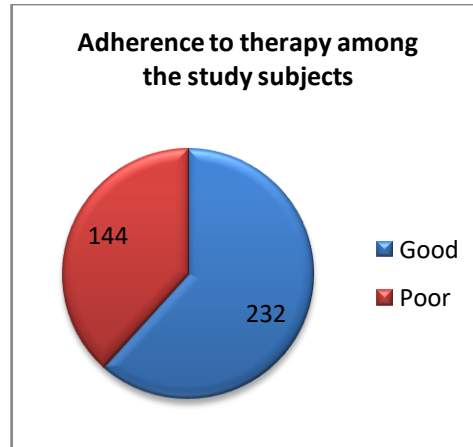


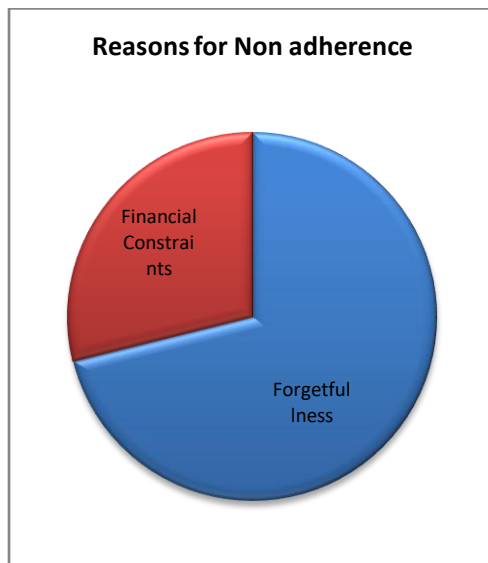
Table 4: Association between different factors and adherence to medication

Factors		Adherence to medication Number (%)	Non adherence to medication Number (%)	Total Number (%)	P value
Age	< 60	158 (42.02)	104 (27.6)	262(69.6)	P value = 0.39 Odds Ratio=0.8212 (CI:0.5198-1.297)
	≥ 60	74(19.6)	40 (10.6)	114 (30.3)	
Sex	Male	80(21.2)	51 (13.5)	131 (34.8)	P value = 0.9415 Odds Ratio =0.9598 (CI:0.6207-1.484)
	Female	152 (40.4)	93 (24.7)	245 (65.1)	
Marital status	Married	159 (42.2)	84 (22.34)	243 (64.62)	P value = 0.04431 Odds Ratio=1.556 (CI:1.01-2.39)
	Single	73 (19.41)	60(15.95)	133 (35.37)	
Type of family	Nuclear	111(29.52)	60(15.95)	171 (45.47)	P value = 0.242 Odds Ratio=1.2843 (CI:0.88-1.99)
	Joint/ Three generation	121 (32.18)	84(22.34)	205 (54.52)	
Literacy Status	Illiterates	172 (45.74)	72 (19.14)	244(64.8)	P value < 0.0001 Odds Ratio=2.867 (CI:1.847- 4.448)
	Literates	60 (15.95)	72 (19.14)	132 (35.10)	
Total family income	<10000	99 (26.32)	72 (19.14)	171 (45.47)	P value = 0.1656
	≥10000	133 (35.37)	72 (19.14)	205 (54.52)	
Socioeconomic status	Upper	121 (32.18)	96(25.53)	217 (57.71)	P value = 0.005
	Lower	111 (29.52)	48 (12.76)	159 (42.28)	
Duration of hypertension in years	1-5	170 (45.21)	108 (28.72)	278 (73.9)	P value = 0.7112
	>5	62 (16.48)	36(9.57)	98(26.06)	
No. of pills/day	1	220 (58.5)	144 (38.30)	364 (96.8)	P value= 0.013**
	2	12 (3.19)	0	12 (3.19)	
Family history of hypertension	Yes	86 (22.87)	72 (19.14)	158 (42.02)	P value = 0.01353
	No	146 (38.8)	72 (19.14)	218 (57.97)	
Blood pressure monitoring	≤1month	123 (32.7)	24 (6.38)	147 (39.09)	P value <0.0000001 Odds Ratio=5.64 (CI=3.393-9.3817)
	>1month	109 (28.9)	120 (31.9)	229 (60.90)	
Knowledge on complications	Adequate or some knowledge	49 (13.03)	30 (7.97)	79 (21.01)	P value = 0.946 Odds Ratio=1.0175 (CI:0.6104-1.6961)
	No knowledge	183(48.67)	114 (30.31)	297 (78.98)	
Cost of medication	Free of cost	37 (9.8)	12(3.19)	49 (13.03)	P value = 0.03299 Odds Ratio=2.087 (CI=1.04-4.15)
	Purchased	195 (51.8)	132 (35.10)	327 (86.96)	
Blood pressure measurement	≤120/80	93 (24.7)	63(16.75)	156 (41.48)	P value = 0.4833
	>120/80	139 (36.9)	81 (21.54)	220 (55.51)	

****Applied Yates correction

Table no 5: Reasons for non adherence to medication

Reasons	Number (%)
Forgetfulness	133 (35.3)
Financial constrains	54 (14.3)



DISCUSSIONS

Demographic associations on adherence to medication:

Age: Age wise, 42.02% of the subjects in the age group of <60 years were adherent to medication and 19.6% in ≥ 60 years age. Association between age and adherence to medication was statistically not significant.

This is in concurrence with Dr. R. C. Kumaraswamy et al (2015)^[2] in South India stated that there was no significant association between age and adherence ($P = 0.06$). Similar results were obtained in various other studies done Venkatachalam J., et al (2015),^[3] Kancheepuram District, Tamil Nadu, Nithin Kumar et al.,(2014)^[4] in Mangalore, South India and Mayckel da Silva Barreto et al.,(2014)^[5] in Mandaguari, Brazil with P value > 0.05

In contrast to the present study, Dr. Babu Rao et al (2014)^[6] studied the factors associated with adherence to anti hypertensive medication in urban slum of Hyderabad in which association between age and adherence was statistically significant with P value 0.02, OR= 1.91, CI=3.40-1.08. Similar associations were found in the studies done by Dr.K.Hema et al(2014),^[7] in tertiary care hospital Guntur,

Siraj Ahmed (2015)^[8] in North India with P value < 0.05.

Sex: It was observed in the present study that 152 (40.4%) females and 80 (21.2%) males were adherent to medication. Association between sex and adherence to medication was not statistically significant ($P=0.9415$).

Similar findings were observed in a study by Dr.Babu Rao et al (2014)^[6] in urban slum of Hyderabad, found that females (64.2%) were comparatively more adherent than males (55.4%) but it was not statistically significant. In a study by Saman K. Hashmi et al (2007)^[9] in Pakistan documented that association between gender and adherence to medication was not statistically significant. Similar results were obtained in various other studies done by Siraj Ahmed (2105)^[8] in North India ($P=0.314$, OR=1.25(0.81-1.94)), Venkatachalam J., et al (2015),^[3] Kancheepuram District, Tamil Nadu ($P=0.45$), Nithin Kumar et al(2014)^[4] in Mangalore, South India ($P=0.48$, OR=0.8 with CI=0.3-1.6)

In contrast to present study, Dr.K.Hema et al (2014)^[7] in tertiary care hospital Guntur observed that sex was significantly associated with adherence ($P<0.001$, OR = 3.113, 95% CI)

Literacy status:

In the present study association between literacy status and adherence to medication was found to be statistically significant ($P<0.00001$) where in literates 15.95% were adherent to medication and in illiterates 45.74% were adherent to medication.

Similar findings were observed in a study by Dr.R.C.Kumaraswamy et al (2015)^[2] in South India found that there was a significant association between Education status and Literacy status with $P=0.034$. This is in concurrence with study done by Dr.K.Hema et al (2014)^[7] in tertiary care hospital Guntur with $P<0.001$ and OR=2.208

Marital status:

Association between marital status and adherence to medication was found to be statistically significant, wherein 42.2% of the married individuals were adherent to medication and the association between marital status and adherence was statistically significant with $P=0.04$.

Similar findings were observed in study by Dr.R.C.Kumaraswamy et al (2015)^[2] in South India with $P=0.017$, study by Siraj Ahmed (2015)^[8] in North India with $P=0.015$, $OR=1.95(1.13-3.36)$, and in a study by Dr.Babu Rao et al (2014)^[6] in urban slum of Hyderabad, with $P=0.04$, $OR=3.45(1.37-8.43)$.

In contrast to the present study Venkatachalam J., et al (2015),^[3] Kancheepuram District, Tamil Nadu observed that marital status was not statistically significant with adherence with $P=0.49$, A study by Dr.Hema et al (2014)^[7] with $P=0.22$ $OR=0.7025$ with 95% CI.

Type of family:

The present study observed that 45.47% were belonged to nuclear family, 32.18% to three generation family and 22.34% to joint family among them adherence to medication was 29.52%, 22.84%, 9.57% respectively. This study showed association between type of family and medication adherence was not significant with $P=0.242$. $OR=1.28$

In contrast to present study, a study conducted by Dr.Hema et al (2014)^[7] in tertiary care hospital in Guntur showed that association between type of family with adherence is statistically significant with $P<0.001$, $OR=0.36$. Similar results were results obtained in a study done by Aarti M Nagarkar et al (2013)^[10] in district hospital of Pune Maharashtra showed that family type is associated with adherence to medication with P value 0.004 and $OR=2.670(1.378-5.175)$.

Monthly income:

Among the study population 45.47% had monthly income of Rs. ≥ 10000 , among them 26.32% were adherent to medication and the association between monthly

income and adherence to medication was not significant statistically ($P=0.16$).

In contrast to the present study, study done by Subhasis Bhandari (2011)^[11] in urban slums of Kolkatta showed that monthly income is associated with adherence to medication with $P<0.001$, $OR=2.79(1.71-4.54)$ on bivariate analysis.

Socio-economic status:

It was observed that majority (32.18%) from the upper class were adherent to medication and majority (29.25%) from lower middle class were adherent. Association between socio-economic status and adherence to medication was found to be statistically significant ($P=0.005$).

This is in concurrence with Dr. R.C. Kumaraswamy et al (2015)^[2] in South India stated that there was significant association between socio- economic status and adherence ($P = 0.000$). Similar results were obtained in various other studies done by Siraj Ahmed., (2015)^[8] in North India with $P<0.001$

In contrast study by Nithin Kumar et al (2014)^[4] in Mangalore, South India, stated that there was no significant association between socio-economic status and drug adherence ($P=0.153$). Similar results were shown in study done by Dr.Hema et al (2014)^[7] in Guntur with $P=0.09$.

Factors associated with adherence to medication:

Duration of Hypertension:

In present study majority 73.9% had ≤ 5 years duration, 26.06% had >5 years of duration. 45.21% of the subjects who had Hypertension for ≤ 5 years were adherent to medication compared to 16.48% in those who had >5 years duration and the association was not significant statistically with $P=0.7112$ and $OR=0.914(0.5677-1.472)$

Similar findings were observed in study by R. C. Kumaraswamy et al (2015)^[2] in south India in which the association between duration of Hypertension and adherence to medication was not significant

statistically ($P=0.5$) and another study by Mayckel da Silva Barreto et al., (2014) [5] in Brazil revealed that the association was not significant statistically ($P=0.64$).

In contrast study by Siraj Ahmad et al (2015), [8] in Moradabad, North India stated that patients with duration of treatment with Hypertension ≤ 5 years were more compliant to their medication than those with duration of treatment with Hypertension > 5 years, which was found to be statistically significant with $P = 0.048$, $OR=4.12$ (2.58-6.59)

Another study by Subhasis Bhandari (2011) [11] in Kolkata found that there was a significant association between duration of disease and adherence to therapy with P value <0.001 , $OR = 2.93$ (1.78 - 4.82).

Another study by Dr.Dennis Thomas et al (2011) [12] in Bangalore also revealed that the association between the duration of disease and adherence to therapy was statistically significant with $P=0.04$.

Number of prescribed medications per day (pills/day):

In the present study majority of them 96.8% of them were on only one medication per day, out of which 58.5% of them were adherent to medication. 38.3% were not adherent to their prescribed anti hypertensive medication. The other group comprised of only 3.19% of the study population who were taking two anti hypertensive medications twice a day out of which all of them were adherent. The association couldn't be drawn out of this as the sample was less for further analysis.

There are a study which has shown the association between number of anti-hypertensive medications and adherence statistically significant. A study done by Siraj Ahmad et al (2015) [8] in Moradabad, North India stated that the association between the frequency of medications and adherence was statistically significant with $P=0.003$, $OR= 1.96$ (1.25-3.08) Similar findings were observed in study done by Dr.Babu Rao et al (2014) [6] in urban slums of Hyderabad, found that adherence was significantly ($P=0.006$) associated with

number of anti-hypertensive medications prescribed.

Another study done by Dr.Hema et al (2014) [7] in Guntur, showed that the association was statistically significant with $P<0.001$

In contrast to the above studies, study done by Nithin Kumar et al (2014) [4] in Mangalore, South India, observed that frequency of medications were not significantly associated with adherence levels among study population with $P=0.645$, $OR=0.8$ (0.4-1.9)

Another study done by Aarti M Nagarkar et al (2013) [10] in district hospital of Pune Maharashtra showed that frequency of medication and adherence levels were not associated significantly with $P >0.05$.

Family history of Hypertension

Among the study population majority(57.97%) of them didn't had the family history of hypertension, out of them 38.8% were adherent to medication. 42.02% had family history of Hypertension, among them 22.87% were adherent to medication and the association between family history of Hypertension to adherence to medication was found to be significant statistically with $P=0.01$, $OR=0.59$ (0.3-0.8)

This is in concurrence with study done by R. C. Kumaraswamy et al (2015) [2] in south India which gave the association between family history of Hypertension and adherence with $P=0.798$ $OR=0.066$.

Another study done by Nithin Kumar et al (2014) [4] in Mangalore, South India, observed that family history of Hypertension and adherence levels in the study population were not significantly associated ($P=0.605$, $OR=0.8$)

In contrast to the above the studies, study done by Siraj Ahmad et al (2015). [8] In Moradabad, North India stated that the association between family history of Hypertension and adherence levels were statistically significant with $P=0.008$, $OR=1.82$ (1.16-2.85)

Knowledge on complications

The present study observed that among the study population 29.01% (79)

had adequate or some knowledge regarding complications of Hypertension and 78.98% (297) had no knowledge. Association between knowledge on complications to adherence to medication had no statistical significance $P=0.946$, $OR=1.0175(0.6104-1.6961)$.

This is in line with the study done by R. C. Kumaraswamy et al (2015) [2] in south India gave the association between knowledge regarding complications of Hypertension and adherence was not statistically significant with $P=0.874$.

Frequency of Blood Pressure monitoring:

In the present study, among the study population 39.09% (147) of the study subjects were monitoring blood pressure levels frequently (≤ 1 month). Frequency of blood pressure levels monitoring had statistically significant association with adherence to medication with P value <0.0000001 , $OR=5.64(3.393-9.3817)$

This is in concurrence with study by Siraj Ahmad et al (2015) [8] in Moradabad, North India stated that the association between frequency of blood pressure levels monitoring had statistically significant association with adherence to medication with P value 0.001, $OR=2.08(1.33-3.24)$

Another study done by Nithin Kumar et al (2014) [4] in Mangalore, South India, observed that the association between frequency of blood pressure levels monitoring had statistically significant association with adherence to medication with P value of 0.034, $OR=0.5(0.2-0.9)$

Cost of medication

The present study observed that among the study population, only 13.03% (49) of the subjects had free of cost medication among those 9.8% (37) were adherent to medication & the association between cost of medication and adherence to medication was found to be significant statistically with $P = 0.032$, $OR=2.087(CI=1.04-4.15)$

This is in line with the study done by Venkatachalam J., et al (2015) [3]. In Kancheepuram district, Tamil Nadu showed that the association between cost of the

medication and adherence levels were statistically significant with $P=0.02$, $OR=2.59$

Another study done by Siraj Ahmad et al (2015) [8] in Moradabad, North India stated that the association between cost of medication and adherence levels were statistically significant with P value < 0.001 , $OR=3.80(2.39-6.04)$

Another study done by Nithin Kumar et al (2014) [4] in Mangalore, South India, observed that the association cost of medication and adherence levels were statistically significant with P value 0.03, $OR=0.4(0.2-0.9)$

Another study by Subhasis Bhandari (2011) [11] in Kolkata found that there was a significant association between cost of medication and adherence to therapy with P value 0.001, $OR = 3.80(2.39-6.04)$.

Reasons for non adherence to medication:

In the present study, the most common reason behind the Non-adherence to medication was found to be forgetfulness (35.3%) followed by financial constraints (14.3%)

In the study done by R. C. Kumaraswamy et al (2015) [2] in south India, showed that the most one of the reasons for non adherence was forget fullness (14%).

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