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Research Article

Assessing treatment adherence in hypertensive patients: a cross sectional study

Alka Dilip Gore*, Yugantara Ramesh Kadam

Department of Community Medicine, Bharati Medical College and Hospital, Sangli, Maharashtra, India

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***Correspondence:**
Alka Dilip Gore
Email: alkadilipgore@gmail.com

ABSTRACT

Background: The complications of hypertension are all related to the poor adherence to treatment. To prevent high blood pressure, one has to make modifications in lifestyle and diet along with medications. So the study is planned to assess the treatment adherence in hypertensive patients.
Methods: a hospital based cross-sectional study was conducted within 6 months to determine the level of adherence and to find out the risk factors associated with non-adherence to pharmacological & non-pharmacological treatment among the hypertensive patients attending a tertiary care hospital. Using a pre-tested proforma, information about adherence to antihypertensive therapy was collected from known 220 hypertensive patients, attending Medicine OPD and willing to participate in the study. Collected data was analysed using SPSS-22. Chi-square test and Binary logistic regression were used for analysing the data.
Results: Adherence to pharmacological treatment is 62.7%, while adherence to non-pharmacological therapy like reduction of salt (79.5%), reduction of oil (80.9%), increase in green leafy vegetables (59.3%), and regular exercise is (47.7%). When binary logistic regression was applied for different drug therapies, education and residence were found as best and significant predictors.
Conclusions: Non-adherence was seen in illiterates and rural resident hypertensive patients. Cost of medication is one of the important issues for non-adherence.

Key words: Hypertension, Adherence, Risk factors

INTRODUCTION

Hypertension (HTN) is one of the major public health problems in India and it is increasing. The Prevalence of HTN is estimated as 25% in urban and 10% in rural area of India.[1-5] Worldwide analysis to find global burden, 20.6% men and 20.9% women of India were suffering from HTN in 2005.[6]

Hypertension is too dangerous as it can lead heart and kidney diseases. To prevent high blood pressure, one has to make modifications in lifestyle and diet along with medications. Adherence can be defined as the extent to which a patient's behaviour; i.e. in terms of taking medication, following a diet, modifying habits or attending clinics; coincides with medical or health advice.[7-9]

When patient is adherent to treatment, he passively follows the doctor's advice. Non adherence does not necessarily mean failing to take prescribed doses of a medicine, but it may also be a matter of over consumption, a disrupted timing of the doses, or a discrepant behaviour with respect to the doctor's suggestion.[10] The prevalence of adherence to hypertensive treatment was 24.1%.[11]

It has been estimated that within the first year of treatment, 16-50% of hypertensive discontinue their antihypertensive medications and among the patients who remain on therapy for long term, missing medication is common.[12,13] Various studies were conducted to find out the reasons why patients do not take medicines and what can be done to change their behaviour to increase their adherence. Many factors may influence patient's decisions over adherence. Reasons for adherence to treatment include faith in the physician, fear of complications of hypertension and desire to control B.P. Non adherence has been associated with misunderstanding of the condition, perceived improvement in health, worsening in health, general disapproval of medications and concern over side effects.[14]

Present study was conducted to determine the level of adherence & also to find out the socio-demographic and other related factors associated with non-adherence to treatment among the hypertensive patients; so that doctor can give more attention to such patients, having different risk factors.

METHODS

A cross sectional study was conducted in tertiary care Medical College and Hospital, western Maharashtra, India. Data was collected by using pre tested and self-administered proforma. A proforma, suitable for study was developed with the help of experts & literature. A pilot study was conducted for appropriateness and to validate the proforma; and then it was modified accordingly. Data was collected by visiting hospital on daily basis and questions were asked to hypertensive patients. Each patient was interviewed once. After explaining the nature and purpose of the study to participants and with assurance of confidentiality, voluntary informed consent was obtained. The level of adherence was determined by self-reported assessment of hypertensive patients. Adherence to pharmacological remedy was considered by asking the patients about regular intake of medicines and attendance; and it was internally validated by checking the regularity in remembering and taking the prescribed medicines, purchasing all the medicines, refilling of drugs and visiting doctors regularly.

The questionnaire contained questions on demographic details, awareness regarding hypertension, reasons for adherence and non-adherence to pharmacological and non-pharmacological treatments and treatment response of patients. Patients' attendance at the time of appointments was also considered.

Study population includes patients, who were diagnosed, and suffering from the disease of HTN in the last one year and taking treatment. Patients with chronic complications, disabling diseases, were not included. The minimum sample size required was calculated to be 160 patients. Level of significance, alpha = 0.01 and a power of 90% was considered. Accordingly, in the study total 220 patients were included.

The data were entered and analyzed using Computer. Statistical analysis was done by using proportion and percentages to study the level of adherence; chi-square test was applied to check the association between different socio-demographic factors and pharmacological therapy as well as to check the association of the same factors with non-pharmacological therapy. z test (S.E. of difference between two proportions) was used to find out significant proportion of disease related factors. To find out the best and significant predictor and to establish the relationship between socio-demographic characters with pharmacological and non-pharmacological factors, binary logistic models were constructed. Statistical significance was predefined as $p \leq 0.05$ and highly significance as $p \leq 0.01$. The analysis was done with the help of Ms-Excel and SPSS-22.

Ethical consideration

This study was approved by the Scientific Research and Review Committee and Institutional Ethical Committee. The nature and purpose of the study was explained to patients and confidentiality was assured before obtaining voluntary informed consent.

RESULTS

In the study, maximum patients 87 (39.55%) were in the age group 51-60 years. Median age was 60 yrs. (Mean±SD: 59.76 ± 8.7yrs and Range: 38-80yrs). Maximum number of patients was males (163, 74.1%).There were 142 (64.5%) hypertensive patients from urban area and 78(35.5%) from rural area. 32 (78%) hypertensive patients from urban area; and 9 (22%) from rural area were of the age <50 years. Nearly half of the patients, 112 (50.9%), were living in nuclear family. Maximum 189 (85.9%) patients were married and 202 (91.8%) patients were known hypertensive (Table 1).

In the study, all known hypertensive patients were taken, but still 47.7% patients were unaware about their BP. Patients, who were aware about their BP (115, 52.3%), were significantly adherent to drug therapy (p = 0.000).

Patients were divided as adherent and non-adherent on the basis of taking the medicines continuously. For different therapeutic regimens adherence was- like taking drugs (62.7%), Consumption of salt (79.5%), consumption of oil (80.9%) and consuming green leafy vegetables (59.3%); but, for doing exercise (52.7%), non-adherence was more. There is statistically highly significant difference in proportion of adherent and non-adherent patients for pharmacological treatment and non-pharmacological treatment like consumption of salt, oil and GLV (p = 0.000), but not such significance was found for doing exercise (p = 0.295) (Table 1).

Out of total 220, 82 (37.3%) patients were non adherent to drugs. Non adherence was seen more in illiterate: 27 (58.7%), rural residents: 23 (57.5%), Joint family members: 45 (57.7%) and having age more than seventy; 11 (55%). Adherence was highly significantly dependent on these socio demographic characters (p = 0.000). It was found that males 62 (38%) were more non adherent than female for treatment adherence (Table 2).

Table 1: Distribution of patients according to adherence to different therapeutic regimen.

Therapeutic regimen	Adherent	Non Adherent	Total	z	p
Treatment	138	82	220	5.149	0.000
	62.70%	37.30%	100.00%		
Salt	175	45	220	12.49	0.000
	79.50%	20.50%	100.00%		
Oil	178	42	220	12.889	0.000
	80.90%	19.10%	100.00%		
GLV*	128	88	216	3.681	0.000
	59.30%	40.70%	100.00%		
Exercise	104	116	220	1.048	0.295
	47.30%	52.70%	100.00%		

* 4 missing values

Table 2: Adherence to pharmacological treatment.

Socio demographic characters		Adherent	Non adherent	Total	chi square	p
Education	Graduate	40 (88.90%)	5 (11.10%)	45 (100.00%)	22.983	0.000
	High School	44 (58.70%)	31 (41.30%)	75 (100.00%)		
	Higher Secondary	11 (68.80%)	5 (31.30%)	16 (100.00%)		
	Illiterate	19 (41.30%)	27 (58.70%)	46 (100.00%)		
	Primary	24 (63.20%)	14 (36.80%)	38 (100.00%)		
Residence	Rural	32 (41.00%)	46 (59.00%)	78 (100.00%)	24.343	0.000
	Urban	106 (74.60%)	36 (25.40%)	142 (100.00%)		
Type of family	Extended	22 (73.30%)	8 (26.70%)	30 (100.00%)	21.557	0.000
	Joint	33 (42.30%)	45 (57.70%)	78 (100.00%)		
	Nuclear	83 (74.10%)	29 (25.90%)	112 (100.00%)		
age group	<=50	31 (75.60%)	10 (24.40%)	41 (100.00%)	10.095	0.018
	51-60	60 (69.00%)	27 (31.00%)	87 (100.00%)		
	61-70	38 (52.80%)	34 (47.20%)	72 (100.00%)		
	71-80	9 (45.00%)	11 (55.00%)	20 (100.00%)		
Total		138 (62.70%)	82 (37.30%)	220 (100.00%)		

Patients, having education up to primary level and having age group ≤50 years were more non-adherent to salt and oil, which is statistically highly significant. Married patients (41, 21.7%), were significantly more non adherent to salt. For non-pharmacological treatment like consumption of green leafy vegetables, 27 (61.4%) illiterate patients, 43 (57.3%) rural residents, 48 (64%) patients, living in joint families and 13 (65%) older patients, were significantly more non adherent (Table 3).

For doing exercise, non-adherence was significantly more. Of the total 220 HTN patients, 116 (52.7%) were not doing a single type of exercise even if they were told to do that. Mainly 39 (68.4%) females, 37 (80.4%) illiterate patients, 51 (65.4%) rural residents were non adherent to exercise; which is statistically highly significant (p<0.01). Significantly high number of patients, 58 (74.4%) who were living in joint families; 23 (74.19%), who were not married and 15 (75%) older age group patients were also having non-compliance about doing exercise (p<0.01) (Table 4).

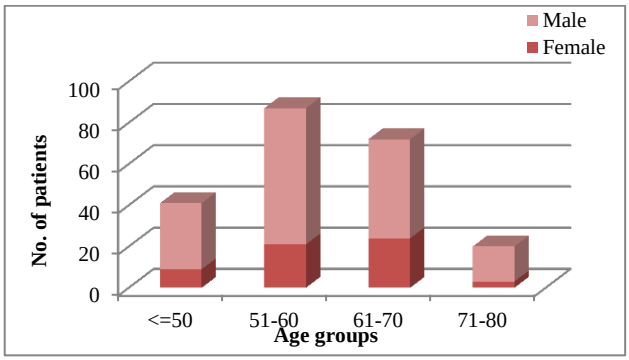

Figure 1: Age- sex distribution of hypertensive patients.

For non-pharmacological treatments like reduction of consumption of salt and oil, more number of females were non adherent (22.8% for salt and 21% for oil); whereas for consumption of GLV and doing exercise, maximum number of males were non adherent (GLV:59.4%, Exercise:52.8%).

Socio demographic characters, which were significantly associated with adherence ($p < 0.01$) were considered for binary logistic regression. Wald's backward method was used to find out the significantly best predictor. Total 4 regression models were considered: first for pharmacological treatment and remaining three for non-pharmacological treatments- salt, oil, GLV and exercise respectively.

For pharmacological treatment logistic regression model, residence, education, type of family and age groups were significant factors at this level. Model showed that non adherence was highly dependent on the residence and level of education of the patients ($p = 0.000$ for residence and $p = 0.000$ for education).

Table 3: Adherence to non-pharmacological treatment.

Therapy	Socio demographic characters		adherent	non adherent	Total	chi square	p
Salt	Education	Graduate	37 (82.2%)	8 (17.8%)	45 (100%)	21.787	0.000
		High School	62(82.7%)	13 (17.3%)	75(100%)		
		Higher Secondary	10(62.5%)	6(37.5%)	16 (100%)		
		Illiterate	44(95.7%)	2(4.3%)	46(100%)		
		Primary	22(57.9%)	16(42.1%)	38 (100%)		
	Marital status	Married	148 (78.3%)	41 (21.7%)	189 (100%)	19.527	0.000
		Single	27 (87.1%)	4 (12.9%)	31(100%)		
	Age group	<=50	26 (63.4%)	15 (36.6%)	41 (100%)	13.108	0.004
		51-60	77 (88.5%)	10 (11.5%)	87 (100%)		
		61-70	54 (75.0%)	18 (25.0%)	72 (100%)		
		71-80	18 (90.0%)	2 (10.0%)	20 (100%)		
	Total		175 (79.5%)	45 (20.5%)	220 (100%)		
Oil	Education	Graduate	39 (86.7%)	6 (13.3%)	45 (100%)	18.866	0.001
		High School	64 (85.3%)	11 (14.7%)	75 (100%)		
		Higher Secondary	10 (62.5%)	6 (37.5%)	16 (100%)		
		Illiterate	42 (91.3%)	4 (8.7%)	46 (100%)		
		Primary	23 (60.5%)	15 (39.5%)	38 (100%)		
	Age group	<=50	28 (68.3%)	13 (31.7%)	41 (100%)	11.585	0.009
		51-60	79 (90.8%)	8 (9.2%)	87 (100%)		
		61-70	54 (75.0%)	18 (25.0%)	72 (100%)		
		71-80	17 (85.0%)	3 (15.0%)	20 (100%)		
	Total		178 (80.9%)	42 (19.1%)	220 (100%)		
GLV	Education	Graduate	39 (86.7%)	6 (13.3%)	45 (100%)	22.964	0.000
		High School	40 (53.3%)	35 (46.7%)	75 (100%)		
		Higher Secondary	10 (62.5%)	6 (37.5%)	16 (100%)		
		Illiterate	17 (38.6%)	27 (61.4%)	44 (100%)		
		Primary	22 (61.1%)	14 (38.9%)	36 (100%)		
	Residence	Rural	32 (42.7%)	43 (57.3%)	75 (100%)	13.102	0.000
		Urban	96 (68.1%)	45 (31.9%)	141 (100%)		
	Type of family	Extended	27 (90.0%)	3 (10.0%)	30 (100%)	31.071	0.000
		Joint	27 (36.0%)	48 (64.0%)	75 (100%)		
		Nuclear	74 (66.7%)	37 (33.3%)	111 (100%)		
	Age group	<=50	21 (53.8%)	18 (46.2%)	39 (100%)	9.137	0.028
		51-60	59 (69.4%)	26 (30.6%)	85 (100%)		
		61-70	41 (56.9%)	31 (43.1%)	72 (100%)		
		71-80	7 (35.0%)	13 (65.0%)	20 (100%)		
	Total		128 (59.3%)	88 (40.7%)	216 (100%)		

Table 4: Adherence to exercise.

Socio demographic characters		adherent	non adherent	Total	chi square	p
Sex	Female	18 (31.60%)	39 (68.40%)	57 (100.00%)	7.602	0.006
	Male	86 (52.80%)	77 (47.20%)	163 (100.00%)		
Education	Graduate	34 (75.60%)	11 (24.40%)	45 (100.00%)	38.398	0.000
	High School	43 (57.30%)	32 (42.70%)	75 (100.00%)		
	Higher Secondary	8 (50.00%)	8 (50.00%)	16 (100.00%)		
	Illiterate	9 (19.60%)	37 (80.40%)	46 (100.00%)		
	Primary	10 (26.30%)	28 (73.70%)	38 (100.00%)		
Residence	Rural	27 (34.60%)	51 (65.40%)	78 (100.00%)	7.767	0.005
	Urban	77 (54.20%)	65 (45.80%)	142 (100.00%)		
Type of family	Extended	12 (40.00%)	18 (60.00%)	30 (100.00%)	28.285	0.000
	Joint	20 (25.60%)	58 (74.40%)	78 (100.00%)		
	Nuclear	72 (64.30%)	40 (35.70%)	112 (100.00%)		
Marital status	Married	96 (50.80%)	93 (49.20%)	189 (100.00%)	5.706	0.017
	Single	8 (25.81%)	23 (74.19%)	31 (100.00%)		
Age group	<=50	22 (53.70%)	19 (46.30%)	41 (100.00%)	12.745	0.005
	51-60	51 (58.60%)	36 (41.40%)	87 (100.00%)		
	61-70	26 (36.10%)	46 (63.90%)	72 (100.00%)		
	71-80	5 (25.00%)	15 (75.00%)	20 (100.00%)		
Total		104 (47.30%)	116 (52.70%)	220 (100.00%)		

Table 5: Logistic regression models.

	B	S.E.	Wald	d.f.	Sig.	Exp (B)	95% C.I. for Exp (B)	
							Lower	Upper
Treatment (Overall Percentage = 69.12)								
Residence	-1.33	0.307	18.823	1	0.000	0.264	0.145	0.482
Education	-0.9	0.36	6.232	1	0.013	0.407	0.201	0.824
Constant	0.994	0.352	7.971	1	0.005	2.703		
Salt (Overall Percentage = 79.5)								
Education	2.144	0.764	7.87	1	0.005	8.537	1.908	38.191
Type of family	0.335	0.353	0.898	1	0.343	1.397	0.699	2.793
Constant	-3.729	0.991	14.16	1	0.000	0.024		
Oil (Overall Percentage = 80.9)								
Education	1.326	0.581	5.197	1	0.023	3.764	1.204	11.767
Type of family	0.508	0.365	1.939	1	0.164	1.661	0.813	3.394
Constant	-3.321	0.876	14.369	1	0.000	0.036		
GLV (Overall Percentage = 65.3)								
Residence	0.895	0.306	8.553	1	0.003	2.448	1.344	4.461
Education	1.052	0.38	7.68	1	0.006	2.863	1.361	6.026
Marital status	-0.985	0.479	4.22	1	0.040	0.374	0.146	0.956
Constant	0.816	0.906	0.812	1	0.367	2.262		
Exercise (Overall Percentage = 66.8)								
Education	1.058	0.431	6.021	1	0.014	2.88	1.237	6.703
Type of family	-1.158	0.309	14.087	1	0.000	0.314	0.172	0.575
Constant	0.739	0.679	1.183	1	0.277	2.093		

For non-pharmacological logistic regression model of salt; education, marital status and age groups were found as significant factors. Model showed education as highly dependent factor (p = 0.005) for non-adherence. In univariate analysis of non-adherence to oil, education and age group were found significant factors; while in logistic regression model, illiteracy was the only best and significant predictor (p = 0.023). Education, residence,

type of family, marital status and age group were significantly associated with non-adherence to GLV; but logistic model gave residence, education and marital status as significant predictors (p = 0.003 for residence, p= 0.006 for education and p = 0.04 for marital status). Non adherence to exercise was highly associated with sex, education, residence, type of family, marital status and age group. Education and type of family were significant and best predictors after using binary logistic regression model (p = 0.014 for education, p = 0.000 for type of family) (Table 5).

From the patients who were known hypertensive, adherence was more and significant for treatment, salt, oil and GLV. Exercise was the only non-significant factor.

DISCUSSION

Adherence to the treatment is essential to avoid complications of the disease. In the study, adherence to pharmacological remedy was considered by patients' regular intake of medicines and it was internally validated by checking the regularity in remembering and taking the prescribed medicines, purchasing all the medicines and visiting doctors regularly. Adherence to pharmacological therapy was significantly high, (62.7%). Poor adherence to antihypertensive therapy is a major cause of lack of blood pressure control.[15]

In the present study, though 62.7% patients were adherent to antihypertensive therapy, only 80 (36.4%) have controlled BP, whereas 35 (15.9%) have uncontrolled and nearly half (105-47.7%) of the patients were unknown about their BP control.

It was found that education, residence, type of family and age was highly associated with adherence to antihypertensive therapy. Non adherence was more in illiterate, rural residents, joint families and age >60. Males 62(38%), were more non adherent than female for treatment adherence. J. Park also found the same result that adherence decreases in rural residential area as compared with metropolitan city.[16] R.D. Inka et al found that females and decreasing age patients were more non adherent.[10] Weingarten et al found that patients of < 55yrs & >65yrs were non-adherent and patients having age 55 years-64years are adherent.[17] The difference is present and can be attributed due to difference in attitude and locality.

11 Patients, who completed their graduation had highly significant adherence. Education was directly proportional to treatment adherence.

Percentage of non-adherence was more when patients live single or widow in rural (75%) as well as in urban area (33.3%). Morris AB also found the same results of non-adherence with married patients.[18] Patel RP and Bramley TJ found that medication was not significant.[19,20]

By doing life style modifications, one can achieve the targeted level of blood pressure; but it is more difficult and of course treatment with antihypertensive drugs is necessary.[21]

Adherence to salt and oil was considered, when patient decreased his/her intake of salt or oil. Dietary salt intake has a linear association with blood pressure.[16-21] 79.5% patients were adherent for salt and 80.9% for oil.

Patients from joint families were more adherent, since involvement of family members will likely enhance persistence with recommended lifestyle changes.[22] In the present study, patients from joint families were significantly adherent to antihypertensive drug therapy and intake of GLV.

100% adherence can be achieved by counselling patients about the regimen and the importance of adherence to pharmacological as well as non-pharmacological treatment, by giving instructions regarding intake of medicines orally and even written, by giving reminder packaging like calendar packs etc and by involving family members.

CONCLUSION

Hypertensive Illiterates, rural residents, unmarried and with age more than 60 patients should be given more emphasis. As it is a chronic and depressing disease, all the attempts should be done to increase the adherence to treatment, including the cost of treatment. Due to the cost of medication, maximum number of patients may not receive the treatment, which will affect their adherence.

The limitations of the study was to the questionnaire used is validated; but the adherence to treatment of patients was self-reported.

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