Research Article

Factors affecting compliance to hypertension medication: A study from North India

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ABSTRACT

Background: Hypertension is an important health problem globally. One of the main causes of uncontrolled hypertension is the failure on the part of the patient for not taking the prescribed drugs. **Objectives:** This study was conducted to study the level of adherence to antihypertensive medication and to determine multiple factors which affect it. **Materials and Methods:** This community-based cross-sectional study was conducted in the field practice area of the department of community medicine. The study subjects were 700 patients aged 18 years and above diagnosed with hypertension for at least 1 year who had been prescribed antihypertensive treatment. **Results:** In this study, it was found that of the 700 participants, 57.3% were adherent to antihypertensive drugs. Factors significantly associated with adherence to hypertensive medication included being literate, socioeconomic Classes 1 and 2, taking only one hypertensive medication, monthly cost of drugs <500, being aware of hypertensive complications and complications of not taking drugs regularly, perception of current health status, and knowledge about worsening of health condition on stopping the treatment. **Conclusions:** Many factors such as literacy, socioeconomic factors, and awareness of consequences impact the adherence to treatment and hence the treatment outcomes. Community support and financial help can improve the same. It is imperative that all hypertensive patients receive repeated counseling to continue therapy. Financial support is an important issue which needs to be addressed.

KEY WORDS: Adherence; Antihypertensive Medication; Determinants

INTRODUCTION

Hypertension is an important health problem globally and its increasing epidemicity is becoming a major threat.[1] It is estimated that the number of cases of hypertension will show a rise of 60% globally until 2025, as per the study conducted by Kearney *et al*.[2] A study done by the Chennai Urban Rural Epidemiology Study cohort reports that every fifth person in India is hypertensive.[3] Hypertension exhibits an iceberg phenomenon, even in most developed countries, where only half of hypertensive patients are aware of their condition. Submerged portion is much more in a developing country like India with poor literacy, awareness, and medical services.[4]

The WHO defines medication adherence as "The degree to which the person's behavior corresponds with the agreed recommendations from a health-care provider."[5] Furthermore, the WHO has stated 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 treatments."[6] Noncompliance to medications is an upcoming challenge in the public health field and appropriate control of blood pressure is of utmost importance in reducing the mortality rates. Good treatment results can be achieved if the patient shows optimal adherence to the given medications.

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Although much is known about the adverse effects of medication non-adherence, the determinants of medication adherence are less well defined. Only a few studies have been carried out to know the various causes of poor compliance in hypertensive patients. Hence, this study was planned with the objective of finding the level of adherence to antihypertensive medication and to determine factors which affect it.

MATERIALS AND METHODS

This cross-sectional study was conducted in the field practice area of the Department of Community Medicine of Maharishi Markandeshwar Institute of Medical Sciences and Research, Mullana, District Ambala. The study subjects were 700 patients aged 18 years and above diagnosed with hypertension for at least 1 year who had been prescribed antihypertensive treatment. A sample size of 694 subjects was calculated on the basis of the expected proportion of adherence of 60.6% as reported by Rao *et al*.[7] at 95% confidence level and relative precision of 6% of the expected proportion. Approval from the Institutional Ethics Committee was obtained before the start of the study. Compliance as a percentage was computed as follows: (number of pills the patient consumed in the last week/Number of pills that were prescribed for that week) ×100.[8]

Strategy

The department of community medicine has four field practice areas (Ambala, Barara, Mullana, and Nahoni). The study subjects were equally selected from each area. One subcenter each was selected from the primary health center and house-to-house survey was done. The households in the selected area were taken randomly. In each house, it was enquired if there is a known hypertensive patient fulfilling the inclusion criteria; until the required sample size was achieved. The subjects were explained the purpose of the study and invited to participate. Those willing were interviewed using a semi-structured and pre-tested questionnaire. Patients who were unable to respond, for example, too sick to be interviewed were excluded from the study. Informed consent was obtained from each participant. The time used to complete one form was approximately 20 min. The data collection was completed over a period of 1 year from January to December 2016.

Study Tool

A self-designed semi-structured questionnaire consisting of both open- and close-ended questions was used. The questionnaire included information regarding sociodemographic profile, knowledge about hypertension, questions about hypertension, treatment and risk factors, and questions pertaining adherence to antihypertensive medication. Modified BG Prasad classification was used to assess socioeconomic status.[9]

Statistical Analysis

The data were analyzed by IBM SPSS version 20 statistical software. Chi-square test was used to determine any statistical significance between various variables and treatment adherence. Variables that were found to be statistically significant ($P < 0.05$) were entered into the binary logistic regression analysis (forward stepwise method).

RESULTS

In our study, we found that of the 700 participants, 57.3% were adherent to antihypertensive drugs. Males were more adherent (61.2%) compared to females (52.8%). On analyzing the adherence with respect to sociodemographic parameters, it was found that patients age <55, male gender, unmarried/divorced, literate, being either employed or in business, living in the nuclear family, having social Classes 1 or 2, and belonging general caste were more likely to be adherent. Similarly, on analyzing the adherence vis-a-vis the risk factors of hypertension, it was found that exercising daily was associated with increased adherence, whereas having fried food, being alcoholic and smoker were correlated with being non-adherent to antihypertensive medication [Table 1].

When we analyzed adherence according to disease and treatment-related factors, it was found that those who were taking only one antihypertensive tablet or only one type of antihypertensive were more adherent than those taking more than one tablet/type. Furthermore, those who were self-reliant for getting drugs, cost of drugs was <500 rupees and distance of medical facility <5 km, were more adherent to antihypertensive medication. Our study also revealed that awareness about various aspects of hypertension like knowledge of complications, perception of current health status and stopping treatment can worsen health were associated with higher odds of being adherent [Table 2].

In the logistic regression analysis, seven variables were found to be significantly associated with adherence to hypertensive medication. These included being literate, socioeconomic Classes 1 and 2, taking only one hypertensive medication, monthly cost of drugs <500, being aware of hypertensive complications and complications of not taking drugs regularly, perception of current health status, and knowledge about worsening of a health condition on stopping the treatment [Table 3].

DISCUSSION

Our study revealed that 57.3% of patients were adherent to antihypertensive drugs. Males were more compliant compared to females. Being literate, having socioeconomic Classes 1 and 2, taking only one hypertensive medication, monthly cost of drugs <500, being aware of hypertensive complications

Table 1: Association of adherence to antihypertensive treatment with sociodemographic and various risk factors of hypertension

Variables	Adherent		Non-adherent		Odds ratio	*P*-value
	n	%	*n*	%		
Age (years)						
<55	237	62.20	144	37.80	1.555	0.004
≥55	164	51.40	155	48.60		
Gender						
Female	172	52.80	154	47.20	0.707	0.024
Male	229	61.20	145	38.80		
Marital status						
Married	374	60.40	245	39.60	3.049	<0.001
Others	27	33.30	54	66.70		
Education						
Illiterate	65	34.40	124	65.60	0.273	<0.001
Literate	336	65.80	175	34.20		
Occupation						
Employed/business	218	65.90	113	34.10	1.961	<0.001
Others	183	49.60	186	50.40		
Type of family						
Nuclear	200	65.60	105	34.40	1.838	<0.001
Joint/third generation	201	50.90	194	49.10		
Socioeconomic status						
1 and 2	252	67.40	122	32.60	2.454	<0.001
Above 2	149	45.70	177	54.30		
Caste						
General	344	63.90	194	36.10	3.268	<0.001
Others	57	35.20	105	64.80		
Religion						
Hindu/Muslim	274	53.00	243	47.00	0.497	<0.001
Sikh/Christian	127	69.40	56	30.60		
Snacks consumption						
Yes	292	59.20	201	40.80	1.305	0.109
No	109	52.70	98	47.30		
Fried food consumption						
Yes	133	52.40	121	47.60	0.73	0.047
No	268	60.10	178	39.90		
Alcoholic						
Yes	81	43.80	104	56.20	0.654	0.017
No	280	54.40	235	45.60		
Smoker						
Yes	53	39.80	80	60.20	0.417	<0.001
No	348	61.40	219	38.60		
Do you exercise daily						
Yes	204	61.40	128	38.60	1.383	0.035
No	197	53.50	171	46.50		

and complications of not taking drugs regularly, perception of current health status, and knowledge about worsening of health condition on stopping the treatment were the factors which were found to significantly affect compliance.

The prevalence of adherence to antihypertensive in the present study was found to be 57.3%. Similar findings were reported by a study conducted at a tertiary care hospital in Mangalore, India, where the adherence to antihypertensive medication

Table 2: Association of adherence to antihypertensive treatment with treatment, medical facility, and awareness related factors

Variables	Adherent		Non-adherent		Odds ratio	*P*-value
	n	%	*n*	%		
Duration of hypertension						
Up to 5 years	300	57.80	219	42.20	1.085	0.639
Above 5 years	101	55.80	80	44.20		
Any chronic health problem						
Present	106	45.70	126	54.30	0.493	<0.001
Absent	295	63.00	173	37.00		
Antihypertensive tablets taken in a day						
1	315	59.00	219	41.00	1.339	0.102
>1	86	51.80	80	48.20		
Types of antihypertensive drugs taking						
1	383	58.60	271	41.40	2.198	0.01
>1	18	39.10	28	60.90		
Source of the treatment						
General practitioner	179	47.00	202	53.00	0.387	<0.001
Specialist	222	69.60	97	30.40		
Side effect of medicines						
Yes	27	48.20	29	51.80	0.672	0.152
No	374	58.10	270	41.90		
Monthly cost of drug						
≥500	201	46.20	234	53.80	0.279	<0.001
<500	200	75.50	65	24.50		
Financial support for buying medicine						
Self	243	63.90	137	36.10	1.818	<0.001
Others	158	49.40	162	50.60		
Distance of medical facility from home						
<5 km	229	54.70	190	45.30	0.764	0.086
≥5 km	172	61.20	109	38.80		
Awareness of hypertensive complications						
Yes	341	69.20	152	30.80	5.495	<0.001
No	60	29.00	147	71.00		
Awareness of the consequences of not taking drugs regularly						
Yes	338	69.70	147	30.30	5.556	<0.001
No	63	29.30	152	70.70		
Perception of current health status						
Unhealthy	365	63.10	213	36.90	4.098	<0.001
Healthy	36	29.50	86	70.50		
Stopping treatment can worsen your health status						
Yes	395	59.30	271	40.70	6.803	<0.001
No	6	17.60	28	82.40		
Are you benefited from your pharmacological treatment						
Yes	394	58.90	275	41.10	4.902	<0.001
No	7	22.60	24	77.40		

was found to be 54.4%[10], and another study conducted in the urban slums of Hyderabad reported an adherence at 60.6%.[7] A study carried out in the rural community of Ludhiana depicted an adherence level of 53.3%.[11] A study carried out in the Northern United Arab Emirates revealed that 54.4% of hypertensive subjects were adherent to antihypertensive medication.[12] Literacy and socioeconomic class were found to be significant sociodemographic

Table 3: Determinants of adherence to antihypertensive drugs by binary logistic regression analysis

Variables	Adjusted odds ratio for adherence	*P*-value
Education		
Illiterate	0.551	0.006
Literate		
Socioeconomic status		
1 and 2	1.649	0.027
Above 2		
Types of antihypertensive medicine taken		
1	2.533	0.009
More than 1		
Monthly cost of drugs		
<500	1.973	0.001
≥500		
Awareness of hypertensive complications		
Yes	2.010	0.042
No		
Awareness of the consequences of not taking drugs regularly		
Yes	1.790	0.009
No		
Perception of current health status		
Unhealthy	2.544	<0.001
Healthy		
Stopping treatment can worsen health status		
Yes	4.232	0.005
No		

determinants in our study. About 34.4% of the illiterate were adherent, while 65.8% of the literate population were adherent ($P < 0.001$, odds ratio [OR] = 0.273). These findings are justified as the literate population is more likely to understand the implications of the disease and the effect of treatment on the disease. In concordance to our findings, the study from Guntur, India, depicted a similar significant association between these two parameters ($P < 0.001$).[13] Similarly, a study by Shrivastav *et al*. reported similar findings ($P = 0.002$),[14] thus emphasizing the role of education as a determinant of adherence. Patients who belonged to Classes 1 and 2 of socioeconomic status scale showed adherence of 67.4%, whereas participants who belonged above Class 2 of socioeconomic scale showed adherence of 45.4%. Similarly, a study conducted by Ahmed showed 65.1% adherence in upper-middle class and 42.2% adherence in lower-middle class and another study by Hema and Padmalatha also revealed higher adherence in upper class.[13,15] In our study, we found that those who took one type of antihypertensive medication were more adherent than those who took more than one type per day ($P = 0.010$, OR = 2.198). This was consistent with a study carried out in Mangalore, India, with similar findings ($P = 0.03$)[10] and also with another study from Goa which reported that adherence levels to the antihypertensive drugs decreased with increasing number of other drugs prescribed to the patient.[16] Apart from the above-elaborated factors, some other factors that impacted adherence were financial burden due to the medicine, with higher adherence in patients in whom cost of drug monthly <500 rupees. Subjects who spent <500 rupees/month on medication had higher adherence to antihypertensive medication (75.5%) compared to those who spent >500 rupees/month (46.2%). In consensus with our finding, Ahmed also reported significantly higher adherence to medication who spent less money on drugs compared to those who spent more ($P < 0.001$).[15] The perception of current health status had significant association with adherence in our study group ($P < 0.001$). A similar result was seen regarding this association by Ahmed ($P = 0.002$, OR = 1.99).[15] Stopping treatment could worsen the health status and had direct association with adherence ($P < 0.001$, OR = 6.803). A similar result was seen by Hashmi *et al*. ($P < 0.001$).[17]

This study has used the pill count method to calculate compliance. One of the limitations of this method is that it assumes that the numbers of pills absent were actually taken by the patients. Further, this method may not be representative of long-term adherence patterns.

CONCLUSIONS

This study concludes that not just identifying hypertensive patients and prescribing antihypertensive medicines suffice but many other factors, pertaining to literacy, socioeconomic factors, and awareness of consequences impact the adherence to treatment and hence the treatment outcomes. Community support and cost of medicines also play a role in the same. It is imperative that all hypertensive patients receive repeated counseling to continue therapy. Financial support is an important issue which needs to be addressed.

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