

Original Research Article

A study to evaluate risk factors and factors associated with non-adherence to the prescribed treatment among essential hypertensive patients attending tertiary care hospital

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ABSTRACT

Background: Prevalence of hypertension is on rising trend with rise in life style and behavioral changes. It is also a major risk factor for most of the dreadful conditions like coronary artery disease, stroke, etc. Medication adherence would help in reducing the chance of occurrence of such complications. Thus objectives of study are 1) to evaluate the risk factors of hypertension among the diagnosed essential hypertensive patients; and 2) to assess the magnitude and the factors associated with non-adherence to the prescribed treatment.

Methods: A hospital based cross-sectional study among 71 participants was conducted, using a pre-structured questionnaire and physical examination to assess risk factors of hypertension and CULIG's 16 questionnaire medication adherence scale to assess the non-adherence. Data analysed with proportions and Chi square test.

Results: Out of 71 participants, 60 (84.5%) were found to be non-adherent to their anti-hypertensive medication and factors like being male ($p=0.0055$), alcohol consumption ($p=0.0485$) and paid medication ($p=0.0091$) were found to be significantly affecting the medication non-adherence. Positive family history, sedentary life style, preference of extra salt and smoking/tobacco products usage were the most common risk factors of essential hypertension observed along with others.

Conclusions: The participants who experienced the complications/ill effects of hypertension were more adherent as compared to others. Factors which are responsible for non-adherence need to be addressed and appropriate interventions required to improve adherence by educating the people about its importance in prevention of complications.

Keywords: Behavioural changes, CULIG's scale, Essential hypertension, Life-style, Non-adherence

INTRODUCTION

Hypertension is a chronic condition and is the leading risk factor for death and disability globally and disproportionately impacts low-and middle-income countries (LMICs), where more than two-thirds of people with hypertension live.¹ In 2010, an estimated 9.4 million deaths and 162 millions of life were lost due to hypertension.^{1,2} Hypertension is the major cause for more than half of the cardiovascular diseases (CVD), stroke

and heart failure and is a leading risk factor for fetal and maternal deaths in pregnancy, dementia and renal failure.³⁻⁵ The prevalence of hypertension is increasing globally and is predicted to affect more than 500 millions people by 2025.^{6,7} Hypertension is a significant public health challenge and has a major impact on health care costs, contributing to around 10% of total health care spending globally.^{8,9} Hypertension imposes a serious economic burden on individuals, households, healthcare systems and entire nation as a whole.¹⁰ Thus

the need becomes evident to evaluate the risk factors of hypertension for better understanding and in planning required interventions.

In addition, the adherence to the prescribed rational treatment also becomes important to counteract or minimize the ill effects (complications) of hypertension. The World Health Organization defines adherence as “the extent to which a person’s behavior, such as taking medications, following a prescribed diet, executing lifestyle changes, corresponds with agreed recommendations from a health care provider”.¹¹ Measurement of patient medication adherence and use of interventions to improve adherence are rare in routine clinical practice and hence for this reason, medication adherence has been called “the next frontier in quality improvement” and is an important part of cardiovascular outcomes research.¹² Despite decades of attention to fight noncompliance with treatment of hypertension, the problem remains a significant factor in the control of blood pressure. Considering this fact it is intended to know the magnitude of non-adherence to the treatment and its associated factors.

Objectives

To evaluate the modifiable and non-modifiable risk factors of hypertension among the diagnosed essential hypertensive patients and to assess the magnitude of non-adherence to the prescribed treatment of the hypertension, its causes and the associated factors.

METHODS

A cross-sectional study was conducted in a tertiary care teaching hospital (ESIC Medical College and PGIMS, Bengaluru) on participants with inclusion criteria of being diagnosed with essential hypertension for more than 6 months (of all grades with or without comorbidities/complications that are caused due to hypertension) and on medication and attending OPD/IPD of Medicine department and aged >18 years and had given written consent to participate in the study in the months of July and August 2018. Secondary hypertension patients and severely debilitated patients admitted in the wards were excluded from the study. The sample size (n) was calculated to be 71, considering 76% of non-adherence based on the previous study¹³ and margin of error of 10% using formula: $n = Z_{1-\alpha/2}^2 p(1-p)/d^2$. The data was collected by interviewing the participants with the help of pre-structured questionnaire and general examination and use of CULIG's scale¹⁴ for assessment of medication non-adherence. The data was analyzed by calculating proportions, range, mean and median. Chi square test was applied to discrete variables by using open “EPI INFO” software. Ethical consideration obtained from institutional ethical committee.

Data variables

Risk factors of hypertension

Non-modifiable: Age, gender, Family history (known history of hypertension in father, mother and/or siblings).

Modifiable: Physical activity, BMI, salt intake, saturated fat, dietary fibre, alcohol Consumption, smoking, Occupational stress.

Factors associated with non-adherence:

Education, socio-economic status and the variables of CULIG's scale like, busy with routine works, expensive medicines, taking a number of drugs several times a day, fear of adverse effects, fear of dependence, feeling depressed/broken, problem with medication timing etc.

Operational methods

SES (socio-economic status) was calculated using Modified Kuppuswamy Scale (updated 2014).

As the perception and management of stress is different in every individuals, the participants were asked to grade themselves in a scale of 0 to 10 regarding the assessment of occupational stress.

Positive leisure activity is considered when the participants do physical activities like walking, jogging, gym etc. for at least 30 minutes a day for at least 5 days in a week.

Vegetables and fruits intake was calculated using 24 hours semi quantitative recall method on an ideal day (on an average 160 gm of vegetables and fruits contain recommended dietary fibres of 40 gm a day).

Alcohol:

No. of units = $1 \text{ unit}/10 \text{ ml} \times (\% \text{ of alcohol by volume}) \times \text{amount consumed per week (in ml)}$.

Average % of alcohol by volume is considered, in Beer=5%, whisky=54% and Brandy=47.5%.

Smoking:

Pack years = $\text{No. of cigarettes per day}/20 \times \text{No. of years}$

Knowledge about hypertension is assessed to be good if they tell the normal BP that has to be maintained and tells at least two of the complications of the hypertension.

The complexity of the therapy is assessed on the basis of the number of anti-hypertensive drugs that they were on to control their BP.

Monitoring is assessed based on how often that they get their BP checked.

Comorbidities like cardiovascular diseases, chronic kidney disease, etc. that are resulted as the complications of essential hypertension were taken into consideration.

RESULTS

A total of 71 essential hypertensive patients (participants) participated in this study ranging from 35 years to 80 years. The mean age of the participants was 56.94 years (SD= ± 9.99 years) and rest of the socio-demographic characteristics of the participants are given in Table 1.

Table 1: Socio-demographic characteristics of the participants (n=71).

Variables	Frequency	%
Sex		
Male	40	56.3
Female	31	43.7
Age (I years)		
<40	3	4.2
40-60	33	46.5
>60	35	49.3
Education		
Illiterate	24	33.8
Primary	9	12.7
Secondary	10	14.1
SSLC	14	19.7
PUC	6	8.5
Graduate, post graduate	8	11.3
Occupation		
House wife	20	28.2
Retired/dependent	9	12.7
Unskilled	9	12.7
Semiskilled	23	32.4
Skilled, farmer	8	11.3
Professional, semi-professional	2	2.8
Socioeconomic status		
Upper class	1	1.4
Upper middle	14	19.7
Lower middle	24	33.8
Upper lower	32	45.1
Lower lower	0	0

Life style and behavioral characteristics of the participants

25 (35.2%) had the habit of alcohol consumption for an average period of 25.76 years (SD- ± 14.21) and 31 (43.7%) of them were either smokers or tobacco product users for an average period of 28.32 years (SD- ± 13.55). Rest of the risk factors that were recorded are given in detail in Table 2. 47 (66.2%) had co-morbidities along with hypertension and pattern observed is given in Table 3.

Table 2: Risk factors of hypertension in participants (n=71).

Variables	Frequency	%
Family history of hypertension	26	36.6
BMI		
<25	43	60.6
25-30	21	29.6
>30	7	9.9
Work type		
Mild	33	46.5
Moderate	35	49.3
Heavy	3	4.2
Stress score		
0 to 3	32	45.1
4 to 7	34	47.9
8 to 10	5	7.0
No leisure activity	43	60.6
Sitting sedentarily ≥ 5 hours a day	34	47.9
Preference of extra salt in food	24	33.8
Salty foods intake like pickle, chips, papad, etc.		
Daily	17	23.9
Weekly	15	21.1
Monthly	21	29.6
Occasionally	18	25.4
Saturated fats intake like poultry, meat, dairy products, cheese, etc.		
Daily	1	1.4
Weekly	44	62.0
Monthly	16	22.5
Occasionally	10	14.1
Vegetables and fruits intake (in grams/day)		
<80	26	36.6
80-160	38	53.5
>160	7	9.9
Alcohol consumption	25	35.2
Smoking/tobacco products use	31	43.7

Table 3: Comorbidity pattern among the participants (n=71).

Variable	Frequency	%
Diabetes mellitus	42	59.2
Cardiovascular diseases	15	21.1
Respiratory diseases	5	7
Chronic kidney diseases	10	14.1
Others (thyroid, prostate, hearing problems, etc.)	15	21.1

* Responses are mutually exclusive

Medication-related characteristics, knowledge and monitoring of BP of the participants

These are given in Table 4 and the detailed frequency of SBP levels of the participants at time of interview is shown in Figure 1, according to JNC 7 classification.

About 8.5% of them were in hypertensive crisis (SBP $\geq$ 180 mmHg).

Table 4: Medication related characteristics in participants (n=71).

Variable	Frequency	%
Number of medications		
<2	65	91.5
$\geq$ 2	6	8.5
Knowledge about hypertension		
Good	12	16.9
Poor	59	83.1
BP Monitoring		
$\leq$ 1 month	45	63.4
>1 month	26	36.6
BP level at time of interview		
Control	39	54.9
Uncontrolled	32	45.1

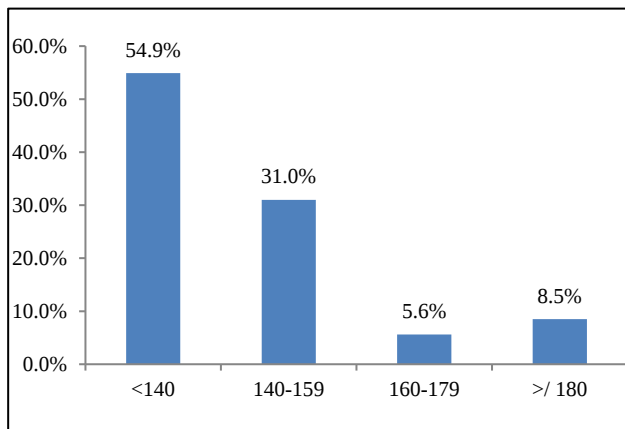


Figure 1: SBP (in mm Hg) levels of the participants at the time of interview.

Table 5. Response sheet of participants (n=71), to the CULIG's scale.

Cause of non-adherence	Frequency	%
1 I was not at home	28	39.4
2 The drug was not available due to short supply	8	11.3
3 I just forgot	16	22.5
4 I take a number of drugs several times a day	9	12.7
5 I wanted to avoid side effects	11	15.5
6 I did not want other people seeing me taking drug	2	2.8
7 My doctor frequently changes my therapy	10	14.1
8 I felt the drug to be toxic/harmful	11	15.5
9 I was sleepy at medication time	32	45.1
10 I had cold	18	25.4
11 I felt depressed or broken	26	36.6
12 I had problems with medication timing	18	25.4
13 I consumed all of it	32	45.1
14 I felt well	42	59.2
15 I was afraid of developing drug dependence	8	11.3
16 The drug was too expensive	31	43.7

Non-adherence to the prescribed treatment and factors associated with it

Out of the 71 participants, 60 (84.5%) were found to be non-adherent to their antihypertensive medications with the help of CULIG's-16 questionnaire medication adherence scale and the frequency of their causes of non-adherence are given in Table 5. Certain variables between adherent and non-adherent groups are compared to see any significant difference in them (Table 6).

Table 6: Factors associated with non-adherence to the anti-hypertensive medication.

Variables	Non-adherent Frequency (n=60)	%	Adherent Frequency (n=11)	%	Chi square	Degree of freedom	P value
Sex							
Male	38	95	2	5	7.704	1	0.0055*
Female	22	71	9	29			
Age (in years)							
<40	2	66.7	1	33.3	1.089	2	0.5802
40-60	29	87.9	4	12.1			
>60	29	82.9	6	17.1			
Alcohol consumption							
Yes	24	96	1	4	3.8929	1	0.0485*
No	36	78.3	10	21.7			
Use of tobacco products							
Yes	29	93.5	2	6.5	3.436	1	0.0638
No	31	77.5	9	22.5			

Continued.

Variables	Non-adherent		Adherent		Chi square	Degree of freedom	P value
	Frequency (n=60)	%	Frequency (n=11)	%			
Years of hypertension							
< 5	19	86.4	3	13.6	0.084	1	0.772
>/ 5	41	83.7	8	16.3			
Family history of hypertension							
Yes	22	81.5	5	18.5	0.107	1	0.744
No	38	84.4	7	15.6			
No. of medications for hypertension							
<2	56	86.2	9	13.8	1.593	1	0.2069
>/ 2	4	66.7	2	33.3			
Obtaining of anti-hypertension medication							
Paid	31	96.9	1	3.1	6.806	1	0.0091*
Free	29	74.4	10	25.6			
Knowledge about hypertension							
Yes	11	91.7	1	8.3	0.565	1	0.4521
No	49	83.1	10	16.9			
Co-morbidities							
Yes	38	80.9	9	19.1	1.42	1	0.2335
No	22	91.7	2	8.3			

Chi-square test is applied and *p value <0.05 is considered significant.

DISCUSSION

Among the study participants 26 (35.2%) had positive family history, 34 (47.9%) had sedentary life style, preference of extra salt found in 24 (33.8%) and smoking/tobacco products usage among 31 (43.7%), these were the most common risk factors of essential hypertension found among participants. This study is in near concordance with the previous studies done in a rural Indian community and in urban Varanasi.^{15,16} To prevent rise in prevalence of hypertension, general public has to be educated about the role of life style and behavioural changes.

In this study only 11 (15.5%) were found to be adherent to their medication and a significant number of 60 (84.5%) were non-adherent. The medication adherence magnitude of this study is in near match of studies that were done in Guntur, Andhra Pradesh (15.3% adherence) and a study in Kanchepuram district of Tamil Nadu (24.1% adherence).^{13,17} However, the reported adherence rate in Indian literature varies widely, ranging from 15.3%-82.2% and studies conducted outside India too show an extensive variation in adherence rates from 57.6%-75%.^{13,17-25} This variation could have been resulted due to various methods and considerations in deciding the adherence. Most studies took Morisky's medication adherence 4 or 8 questionnaire scale, but this study used CULIG's 16 questionnaire scale which is extensive and considers 16 most causes of non-adherence and would give better results.¹⁴ Also level of knowledge and treatment pattern and hypertension being asymptomatic would have influenced adherence among study participants.

The factors like being the male sex (p value=0.0055), alcohol consumption (p=0.0485) and paid medication (p=0.0091) were found to be significantly associated with medication non-adherence. The participants who has hypertension for ≥ 5 years, positive family history, comorbidities and on multiple drugs were found to be more adherent as compared to others, which suggest that participants who experienced the complications/ill effects of hypertension understood the importance of medication adherence. Factors which are responsible for non-adherence need to be addressed and appropriate interventions required to improve adherence by educating the people about their hypertensive state, its treatment and likely complications if not adhered to the treatment. In this study out of the total participants only a meagre number of 12 (16.9%) had the knowledge about the hypertension. But only 8.3% who had good knowledge about hypertension were found to be adherent, the possible reasons are the same factors mentioned above i.e., being the male sex (10 out of 12 were males), alcohol consumption (8 out of 12 had alcohol consumption habit) and paid medication (4 out of 12 got their medication by paying).

With regard to complexity of the therapy, only 6 (8.5%) of them were on ≥ 2 anti-hypertensive medications as compared to a study done by Teshome et al where a large number about 66.8% were on ≥ 2 anti-hypertensive medications.²¹ And 36.6% of the participants were monitoring their BP(blood pressure) irregularly i.e., ≥ 1 month, ranging from 2 months to 6 months. Constant support and motivation would help improve the monitoring and curbing the rise of complications.

CONCLUSION

The participants who experienced the complications/ill effects of hypertension were more adherent as compared to others. Factors which are responsible for non-adherence need to be addressed and appropriate interventions required to improve adherence by educating the people about its importance in prevention of complications.

The study findings would help as an add-on data to better understand changing lifestyle and behavioural characteristics and also the factors associated with non-adherence to medication.

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Conflict of interest: None declared

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