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Original Article

Insights into Antihypertensive Medication Adherence: A Tertiary Care Teaching Hospital Study on Patient Compliance and Influencing Factors

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ABSTRACT

Background: Hypertension is a chronic long-stay disease that requires proper treatment management and regular medication assessment, which ensure that the disease does not progress into a disorder. Medication Adherence is an easy access and assessable tool that provides insights about patient compliance to medications and effectiveness of therapy. This helps the physicians to improve patient treatment outcomes and quality of life by addressing the factors that influence medication adherence. **Objectives:** To assess patient compliance to antihypertensive medications and factors that influence medication adherence. **Materials and Methods:** A prospective Observational study was conducted in a tertiary care teaching hospital in Hubli among 200 hypertensive patients, the study subjects were selected based on inclusion and exclusion criteria, data was collected and sorted from patient data collection forms. Medication adherence rating scale was used to assess medication adherence among patients. The association between variables such as age, social status, co-morbidities and polypharmacy with medication adherence was determined using Pearson chi-square in SPSS version 25. **Results:** Our study included 200 hypertensive patients, most of them were males 64%. On assessing Medication adherence rating scale, we found that majority 62.8% of the study subjects adhere to their antihypertensive medication. The association between various factors that influence medication adherence was determined by Pearson Chi-square, we observed that age, social status, co-morbidities and polypharmacy were statistically significant at p=<0.05 with medication adherence. **Conclusion:** Medication adherence plays a significant role in assessing the patient's response to a treatment and improving their quality of life. Similarly, our study highlights the importance of assessing medication adherence, especially in study subjects with existing co-morbidities and polypharmacy, thus reducing hospital stays and unnecessary side effects.

Keywords: Hypertension, Medication adherence, Antihypertensive drugs, Polypharmacy, Co-morbidities.

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INTRODUCTION

Chronically high blood pressure, defined as a systolic blood pressure greater than 140 mmHg and a diastolic blood pressure greater than 90 mmHg, is a major cause of morbidity and mortality that can result in stroke, myocardial infarction, congestive heart failure, and blindness. Every year 9.4 million people worldwide die as a result of hypertension or its complications. In India, the estimated prevalence of hypertension is 29% overall. Hypertension is responsible for 57% of all stroke deaths and 24% of all coronary event deaths.[1-4]

Hypertension management at the population level is not optimum, despite the availability of evidence-based treatment guidelines and effective medical therapy.[5]Adherence is a key associated with the effectiveness of the treatment and is of greater importance in medications prescribed for chronic conditions.[6] Numerous factors, such as complicated drug regimens, convenience considerations (like dosage frequency), behavioural factors, and challenges with treating asymptomatic diseases (like side effects) can all be barriers to medication adherence.[7] A significant modifiable patient-related barrier is improving patient adherence to medicines in order to achieve controlled blood pressure.[8] Studies have shown that anti-hypertensive lowers the risk of myocardial infarction and stroke by 15 and 30-45%

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respectively and that inadequate medication compliance may lead to less-than-ideal illness management and control, also leading to a decline in quality of life, wastage of medical resources, all of which might place a strain on the healthcare system.[9]

Medication Adherence can be measured directly by assaying for parent drug or its metabolites in blood or urine and indirectly through scaled questionnaires though less accurate but after validation these questionnaires are reliably credible.[10] Adherence to antihypertensive medication can be influenced by the presence of comorbidities, or the coexistence of other medical conditions. It is important for healthcare providers to consider comorbidities and their potential impact on medication adherence when managing patients with hypertension and other medical problems.[11]

Improving medication adherence can lead to better health outcomes, lower healthcare costs and improved quality of life for patients. Healthcare providers should prioritize addressing medication adherence with their patients and consider implementing evidence-based interventions to improve adherence.[12] Hence research about adherence-associated elements appears necessary.

MATERIALS AND METHODS

A prospective Observational study was conducted among 200 Hypertensive patients at a Tertiary Care Teaching Hospital in Hubli, for a period of one year. Study subjects were selected based on inclusion and exclusion criteria.

Inclusion Criteria

Subjects above 18 years of age, subjects with a known case of hypertension, Hypertensive subjects with co-morbidities, Subjects who are willing to participate, Subjects of either gender.

Exclusion Criteria

Subjects newly diagnosed with hypertension, Subjects who are attending out-patient department, Subjects who are not willing to participate, Subjects without complete case profile.

Data Analysis

Data was collected and sorted from patient data collection forms. MARS scale was used to assess medication adherence among patients. The association between variables such as age, social status, co-morbidities and polypharmacy with medication adherence was determined using Pearson chi-square in SPSS version 25.

RESULTS

Our study involved 200 hypertensive patients, most of them were males 64% compared to females 36% with a social status of 16% alcoholics and 7% smokers. The mean age of the study subjects was 61.47±12.97(as shown in Table 1). Duration of hypertension is a significant factor for determining the disease progression. Prescribing patterns of medication are influenced by the duration of disease. In our analysis, duration of hypertension was found to be around 1-5% in both male (61.03%) and female (38.8%).

In relation with co-morbidities, we observed that hypertension has a significant impact on the Cardiovascular system (CVS) and Central Nervous System (CNS), contributing to neurological disorders in 38.5% of cases and CVS 30.5% out which 63.9% had ischemic heart disease, endocrine disorders in 31.5%, respiratory disease 14.5%, hepatic disease 2% and other disorders including anemia and rheumatoid arthritis in less than 5% of cases (as shown in Table 2).

In our research, 62.8% of the participants showed high adherence and 15% showed low adherence. It was found that older adults 41.6% (81-90 years) failed to take their medications as prescribed (as shown in Table 3).

On determining the association between social status, age, gender, co-morbidities and polypharmacy with medication adherence, from our study we found that adherence to antihypertensive medications is significantly associated with social status both smoking [^{2}(3,N=200)=187.0, p=.000)] and alcohol consumption [^{2}(6, N=200)=189.37, p=.000)]; Age [^{2}(78, N=200)=104.126, p=.026)], increasing age as factor for low adherence and polypharmacy [^{2}(22, N=200)=248.00, p=.000)],that an increase in pill count decreases adherence. These factors were statistically significant on applying Pearson chi-square at p =<0.005 (Table 4). Whereas as adherence to medication is irrespective of gender.

We studied the impact of various disorders (comorbidities) on medication adherence, it was found that occurrence of cardiovascular events was associated with non-compliance to hypertensive medication, this association was statistically significant at [^{2}(2, N=124)=12.05, p=.002)] whereas Renal disorders, Endocrine disorders, Respiratory disorders and Hepatic disorders were not statistically associated with medication adherence as shown in Table 4.

DISCUSSION

Medication Adherence plays a significant role in management of chronic disorders, our research was conducted to assess medication adherence among in-patient subjects at tertiary care teaching hospital in Hubli. Our study showed a male predominance with 64%. the mean age group was 61.57±12.82 similar to the study conducted by Anuradha vp *et al.*,[13] and Ajmal *et al.*,[14] with 56.2% male dominance and subjects between 46-75 years of age respectively. In our analysis, duration of hypertension was found to be around 1-5 years in male (61.03%) and 6-10 years in female (38.8%) compared to the study conducted by Sharma A *et al.*,[15] were the duration of hypertension in study subjects was less than 5 years in majority of the patients (57.3%).

Increasing age increases the risk of patients to acquire various co-morbidities and disorders, it also contributes to various changes in psychological behaviors making it difficult for the patient and physician to assure effective therapy, our study showed a statistical significance at p=<0.005 A study conducted by Ahmed *et al.*[16] support the same.

Managing Co-morbidities with chronic illness is challenging in current scenario, our study showed that hypertension significantly affects both cardiovascular and cerebrovascular disorders, ischemic heart disease being most prevalent with 63.9% similar to the study conducted by Supratim datta *et al.*[17] had shown showed that ischemic heart disease (27.2%), and renal parenchymal disease (20.2%) was prevalent.

A study conducted by Fatima Yousuf *et al.*[18] showed that most of their study subjects were non- compliant to their anti-hypertensive therapy, in comparison to our study subjects were in a large number 62.85% showed high adherence.

On assessing Statistical significance using Pearson chi-square, we found that social status, age, co-morbidities and polypharmacy were significant at p=<0.005 similarly a study conducted by Solomon *et al*,[19] concluded that patients with co-morbidities and consuming alcohol showed low adherence when compared to patients without co-morbidities.

Polypharmacy is a factor to be considered by physicians while treating chronic illness as an increase in pill counts results in patient non-compliance to medications, our study showed that polypharmacy is statistically associated with medication adherence at p=<0.005 which is similar to the study conducted by Niteesh *et al*,[20] concluded that polypharmacy reduces medication adherence.

Table1: Demographic details of the study population.

Sl. No.	Demographic details	Frequency (n)	Percentage	Total
Gender				
1.	Male	127	64%	200
2.	Female	73	36%	
Age				
3.	21-30	1	0.5%	200
4.	31-40	10	5%	
5.	41-50	33	16.5%	
6.	51-60	31	15.5%	
7.	61-70	61	30.5%	
8.	71-80	52	26%	
9.	81-90	12	6%	
Social Status				
10.	Alcoholic	32	16%	200
11.	Smokers	14	7%	
Duration of Hypertension				
Male				
12.	Less than 1 year	25	64.1%	127
13.	1-5 years	47	61.03%	
14.	6-10 years	25	58.13%	
15.	11-15 years	5	83.3%	
16.	More than 15 years	2	28.5%	
Female				
17.	Less than 1 year	14	35.89%	73
18.	1-5 years	30	38.8%	
19.	6-10 years	18	41.86%	
20.	11-15 years	1	16.6%	
21.	More than 15 years	5	71.4%	

Table2: Comorbidities.

Sl. No.	Comorbidities			Total
Cardiovascular disease				
1.	Ischemic heart disease	39	63.9%	61 (30.5%)
2.	Congested cardiac failure	3	4.91%	
3.	Dilated cardiomyopathy	1	1.63%	
4.	Left ventricular disfunction	18	29.50%	
Endocrine disease				
5.	Diabetes mellitus	52	26%	63 (31.5%)
6.	Diabetic retinopathy	2	1%	
7.	Hypothyroidism	8	4%	
8.	Diabetic ketoacidosis	1	0.5%	
Respiratory disease				
9.	Bronchopneumonia	9	4.5%	29 (14.5%)
10.	Chronic respiratory failure	2	1%	
11.	Chronic obstructive pulmonary disease	13	6.5%	
12.	Asthma	3	1.5%	
13.	Upper respiratory tract infection	1	0.5%	
14.	Tuberculosis	1	0.5%	
Hepatic disease				
15.	Hepatitis	2	50%	4 (2%)
16.	Chronic liver disease	1	25%	
17.	Alcoholic liver disease	1	25%	
Renal disease				
18.	Chronic kidney disease	13	6.5%	27 (13.5%)
19.	Urinary tract infection	7	3.5%	
20.	Acute kidney injury	7	3.5%	
Neurological disease				
21.	Epilepsy	11	5.5%	77 (38.5%)
22.	Cerebrovascular disease	55	27.5%	
23.	Parkinson's disease	2	0.5%	
24.	Trigeminal neuralgia	2	0.5%	
25.	Alcohol withdrawal syndrome	2	0.5%	
26.	Alcohol dependent syndrome	5	2.5%	
Other disease				
27.	Anaemia	10	5%	36 (18%)
28.	Gastritis	12	6%	
29.	Rheumatoid arthritis	3	1.5%	
30.	Deep vein thrombosis	5	2.5%	
31.	Acute diarrheal disease	6	3%	

Table3: Medication adherence among subjects.

Sl. No.	Variables	High adherence	Moderate adherence	Low adherence	Total
1.	Study population	125 (62.85%)	45(22.50%)	30(15%)	200
Gender					
2.	Male	76(59.8%)	29(22.8%)	22(17.3%)	200
3.	Female	48(65.7%)	20(27.3%)	5(6.80%)	
Age					
4.	21-30	1(100%)	0	0	200
5.	31-40	9(90%)	1(10%)	0	
6.	41-50	23(69.6%)	8(24.2%)	2(6.06%)	
7.	51-60	21(67.7%)	6(19.8%)	4(12.9%)	
8.	61-70	42(68.8%)	11(18%)	8(13.1%)	
9.	71-80	27(51.9%)	12(23.9%)	13(25.0%)	
10.	81-90	3(25.0%)	4(33.3%)	5(41.6%)	
Comorbidities					
11.	Cardiovascular disease	19(31.14%)	32(52.4%)	10(16.3%)	61
12.	Endocrine disease	26(41.2%)	27(42.8%)	10(15.8%)	63
13.	Respiratory disease	19(65.5%)	6(20.6%)	4(13.7%)	29
14.	Renal disease	13(48.1%)	11(40.7%)	3(11.1%)	27
15.	Hepatic disease	2(50%)	1(25%)	1(25%)	4

Table 4: Association of Variables with medication adherence.

Association of Demographics with medication adherence				
Sl. No.	**Variables**	**Value**	**D_f**	**significance (2-sided)**
1.	Age with medication adherence Pearson Chi- Square	104.126	78	0.026*
2.	Gender with medication adherence Pearson Chi- Square	1.553	2	0.460
3.	Smoking with medication adherence Pearson Chi- Square	187.000	3	0.000*
4.	Alcohol with medication adherence Pearson Chi- Square	189.376	6	0.000*
	Association of various comorbidities with medication adherence			
5.	cardiovascular disease with medication adherence Pearson Chi- Square	12.051	2	0.002*
6.	Endocrine disease with medication adherence Pearson Chi- Square	0.708	2	0.702
7.	Respiratory disease with medication adherence Pearson Chi- Square	9.077	2	0.011*
8.	Renal disease with medication adherence Pearson Chi- Square	1.926	2	0.382
9.	Hepatic disease with medication adherence Pearson Chi- Square	2.652	2	0.266
	Association of polypharmacy with medication adherence			
10.	Polypharmacy with medication adherence Pearson Chi- Square	248.000	22	0.000*

*Significant.

CONCLUSION

Chronic disease such as Hypertension requires long term treatment management and frequent check-up and medication assessments. Choice of treatment and their effectiveness can be assessed without major complications using scales of medication adherence. Medication adherence thus plays a significant role in assessing the patient's response to a treatment and improvement in their quality of life.

Our study highlights the importance of assessing medication adherence, especially in study subjects with existing co-morbidities and polypharmacy. This reduces hospital admission and stay and also ensures that unnecessary side effects are addressed on time and the right treatment is being provided. Further studies on this topic conducted in larger sample size would give us detailed insights about how medication adherence influence or improve a patient's quality of life.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

ABBREVIATIONS

CNS: Central nervous system; **CVS:** Cardiovascular system; **MARS:** Medication adherence rating scale.

ETHICAL CONSIDERATIONS

Ethical clearance for this study was obtained from the Institutional Ethical Committee KLE College of Pharmacy, Hubballi to carry out this research project. IEC Number: KLECOPH/IEC/2022-23/03.

PATIENT CONSENT

Informed Consent Form was taken from the participants.

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