

Assessment of Medication Adherence in Cardiovascular Patients in Tertiary Care Hospital: A Prospective Observational Study

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ABSTRACT

Background: Cardiovascular Disease (CVD) is commonly known as disease of heart of blood vessels and is typically composed of fatty deposits. Heart attack and Heart failure are caused by the high levels of fatty tissues blocking the coronary arteries. The WHO estimates that approximately 17.3 million people worldwide die each year from CVD, and that number will rise to 23 million by the year 2030. **Materials and Methods:** A Prospective observational study was carried out in 210 patients in cardiology department over 6 months. The Medication Adherence Rating Scale, was used to assess medication adherence. The MARS Consists of 10 questions. Scoring was done as follows: For questions 1-6 and 9-10 'NO' response is indicative of adherence and given a score of 1. While questions 7 and 8 'YES' response indicates adherence and given a score of 1. Total score ranges from 0-10. **Results:** Out of 210 patients, 113 (53.8%) patients were Good adherent, 97 (46.1%) were Bad adherent. It was observed that males were highly adherent to prescribed medication as compared to the females. Subjects of age category (41-50 years) had Good adherence, while age (81-90) had Bad adherence. Our study also reported that urban subjects and literates were Good adherent to the treatment, whereas the rural subjects and illiterates showed Bad adherence. **Conclusion:** Our study showed that pharmaceutical care and clinical pharmacist services has helped in improving patient's medication adherence and patient's quality of life.

Keywords: Medication adherence, MARS, Cardiovascular disease, Tertiary Care.

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INTRODUCTION

The muscular heart is an organ that draws deoxygenated blood from every area of the body and exhales carbon dioxide. The blood is then transported from the lungs and distributed to every region of the body.¹ Heart-related illnesses are often referred to as Cardiovascular Disease (CVD) namely atherosclerosis (typically composed of fatty deposits (arteries)), Heart attacks and heart failure which are caused by the high levels of fatty tissue blocking the coronary arteries.² Multifactorial disorder, which includes multiple congenital and acquired illnesses, is one of the primary causes of cardiovascular disease modality and mortality worldwide. The third most common cause of death worldwide is Cardiovascular Disease (CVD).

The World Health Organization (WHO) estimates that approximately 17.3 million people worldwide die each year from cardiovascular disease, and that number will rise to 23 million by the year 2030.³ The risk factors in CVD patients include unhealthy nutrition, physical inactivity, dyslipidemia, hyperglycemia, high blood pressure, obesity, considerations of selection of population, and race/ethnicity, thrombosis/smoking, kidney dysfunction, and genetics/familial hypercholesterolemia.⁴

A heart attack or stroke could be the initial symptom of a hidden illness. Heart attack signs and symptoms includes chest pain or discomfort in the middle; and/or arm, left shoulder, elbow, jaw, or back pain or discomfort. Sudden weakness of the face, arm, or leg, usually on one side of the body, is the most typical sign of a stroke. Other signs include severe headache with no apparent cause, numbness of the face, arm, or leg, particularly on one side of the body; confusion; difficulty speaking or understanding speech; difficulty seeing with one or both eyes; difficulty walking; dizziness and/or loss of balance or coordination; and/or fainting or unconsciousness.⁵



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Medication adherence, as defined by the World Health Organization, is the extent to which the person's behaviour corresponds with the agreed recommendations from a health care provider. It was a useful starting point for the nonadherence key associated with treatment effectiveness, but it is more crucial for medications prescribed for chronic conditions. Medication adherence often refers to whether a patient continues to take their prescribed medication as directed (e.g., twice daily, three times daily). Secondary cardiac risk factors can be avoided with proper lifestyle changes and medication compliance. The main issue and risk factor for the patient's life is non-adherence to prescriptions after discharge. This will result in a poor health outcome, higher healthcare costs, and a worsening of the disease. It is widespread and linked to poor outcomes and increased healthcare costs.^{6,7} Hence this study aimed to assess the medication adherence in CVD patients.

MATERIALS AND METHODS

The study was a Prospective observational study which was carried out for a duration of 6 months involving the inpatients of Cardiology Department of Vivekananda General Hospital, hubballi. Both males and females who were above 18 years of age admitted to the hospital and who underwent cardiac related problems were included in the study. Subjects who are not willing to participate in the study and the discharged against medical advice (DAMA) cases were excluded.

RESULTS

Total 210 subjects were enrolled and analyzed during our study period. The study included the subjects from inpatient cardiology department in Vivekananda General Hospital, Hubballi. As shown in Table 1. Among 210 subjects, 128 were male (61.00%) and 82 were female (39.04%). The subjects were categorized into seven age groups i.e., 21-30, 31-40, 41-50, 51-60, 61-70, 71-80 and 81-90 years. The mean age of the study population was found to be 58.62 ± 26.02 . Age group 61-70 years were in majority accounting for the 28.57% ($n=60$) of the total population whereas age group 21-30 years were minimal in number i.e., 2.38% ($n=5$). The study population included 43 smokers, 56 alcoholics, 24 subjects engaged in both drinking and smoking and 59 subjects involved in chewing gutka.

In our study, the most commonly seen co-morbidities were HTN ($n=65$) and Diabetic mellitus ($n=58$). RHD, TB and Appendicitis having the same frequency ($n=1$) were the least seen comorbidity in our study population. The other co-morbidities were COPD ($n=15$), Hypothyroidism ($n=10$), Pulmonary edema ($n=5$) and IHD ($n=6$). The subjects having HTN and DM as the comorbidity in our study are at high risk of developing the heart diseases.

The subjects of study population were classified based on employment status as employed and unemployed. Employed category included 153 subjects who are Farmer, Driver, Teacher,

Table 1: Demographic details of study population.

Demographic details	Frequency (n)	Percentage
Gender		
Male	128	61.00%
Female	82	39.04%
Age		
21-30	5	2.38%
31-40	23	10.95%
41-50	44	20.95%
51-60	45	21.43%
61-70	60	28.57%
71-80	27	12.86%
81-90	6	2.86%
Social habits		
Alcoholic	56	26.67%
Smoking	43	20.48%
Alcoholic + Smoking	24	11.43%
Chewing gutka	59	28.09%
No social habits	28	13.33%
Comorbidities (162)		
Hypertension (HTN)	65	40.12%
Diabetes Mellitus (DM)	58	35.80%
Ischemic Heart Disease (IHD)	6	3.70%
Rheumatic Heart Disease (RHD)	1	0.61%
Tuberculosis (TB)	1	0.61%
Appendicitis	1	0.61%
Hypothyroidism	10	6.17%
Chronic Obstructive Pulmonary Disease (COPD)	15	9.25%
Pulmonary edema	5	3.08%
Residence		
Rural	116	55.23%
Urban	94	44.76%
Marital status		
Married	156	74.3%
Unmarried	25	11.9%
Widow	29	13.8%
Body mass index		
Normal weight (18.5-24.9)	70	33.33%
Obesity-class 1 (30.0-34.9)	80	38.09%
Obesity-class 2 (35.0-39.9)	34	16.19%

Demographic details	Frequency (n)	Percentage
Pre-obesity (25.0-29.9)	10	4.76%
Under weight (below 18.5)	16	7.61%
Socioeconomic Status		
Upper class	8	3.80%
Upper middle class	37	17.61%
Lower class	76	36.19%
Lower middle class	89	42.38%
Duration of hospital stay		
1-4 days	37	17.61%
5-10 days	53	25.23%
10-15 days	76	36.19%
>15 days	44	20.95%

Table 2: Level of Medication Adherence towards CVD (n=210).

Sr. No	Adherence Level	Percentage (%) (N)
1	Good Adherence	53.80% (113)
2	Bad Adherence	46.19% (97)

Vendor, Carpenter, Merchant and Engineer. Unemployed category included 57 subjects like home maker and retired officers. The study subjects were divided according to their residence as 56.2% (n=118) Rural and 44.0% (n=92) urban. The study also found that among 210 subjects 74.3% (n=156) are married, 11.9% (n=25) are unmarried and remaining 13.8% (n=29) are widowed. According to the body mass index, subjects were categorized into Normal weight, Obesity-class 1, Obesity class-2, Pre-obesity and underweight having the frequency of 70, 80, 34, 10, and 16 respectively. The data reveals that overweight and obesity increase the risk of developing Heart failure and other conditions of cardiovascular diseases. Majority of the study subjects stayed at hospital for their medication and treatment. 53 subjects stayed upto 5-10 days, 76 subjects stayed upto 10-15 days, 37 subjects stayed upto 1-4 days while 44 subjects stayed for more than 15 days.

Medication Adherence

Level of Medication Adherence towards Cardiovascular disease.

Among 210 patients, 53.08% (n=113) had a Good level of medication adherence, 46.19% (n=97) had a Bad level of medication adherence towards cardiovascular drugs as shown in Table 2.

Table 3: Comparison of Medication adherence with different parameters using Chi-Square test.

Sr. No.	Parameter	Medication adherence		Chi square test
		Good	Bad	p value
1	Gender			0.061
	Male	75	53	
	Female	45	37	
2	Age			0.430
	21-30	2	3	
	31-40	15	8	
	41-50	36	8	
	51-60	20	25	
	61-70	33	27	
	71-80	14	13	
	81-90	4	2	
3	Education Status			0.608
	Literate	56	25	
	Illiterate	49	80	
4	Residence			0.039*
	Rural	55	61	
	Urban	65	29	

* Statistically significant at p<0.05.

Comparison of Medication adherence with different parameters using Chi-square test

As shown in Table 3, among 210 subjects, the study determined that there was insignificance ($p > 0.05$) association seen between the gender and medication adherence, age and medication adherence and also seen with the level of educational status and medication adherence towards cardiovascular treatment.

However, it was observed that the males are highly adherent than the females towards the medication adherence. The age category of 41-50 years had the highest adherence and the bad adherence was seen in category of 81-90 years of age. Literate participants were more adhere than those of illiterate participants towards the cardiovascular treatment.

The study determined that there was a significant association between residence and medication adherence towards cardiovascular medications. The majority of the subjects from rural residence 55.23% ($n=116$) had a bad adherence to the cardiovascular drugs. The findings revealed that residents from the urban area were good adherence to the cardiovascular medication as compared to the rural patients.

DISCUSSION

The mean age of the study population was found to be 58.62 ± 26.02 . Subjects with age group of 61-70 years were in majority accounting for 28.57% ($n=60$) of the total population and the age group 21-30 years were in minimal accounting for 2.38% ($n=5$). Contrary to the study conducted by M. Reshma *et al.*,⁸ subjects with age group of 41-50 years and 51-60 years were in majority and subjects greater than 80 years were minimal in number

Our study has demonstrated that incidence of atrial fibrillation, heart failure, and hemorrhagic stroke is positively correlated with alcohol intake, which is followed by smoking. Moderate drinking is related with a lower risk of coronary heart disease and ischemic stroke. Yet, those that chew gutka reported higher blood pressure.

In our study out of 210 subjects, 43 were engaged in habits such as smoking, 56 were alcoholics, 59 were involved chewing gutka and 24 were indulged in both drinking alcohol and smoking. A similar study was conducted by Bibirsa Sefera *et al.*,⁹ where 31 were alcoholic, 38 were smokers and 62 were involved in khat chewing.

The study demonstrated that chronic high blood pressure, strains the heart and makes it harder to pump the blood in hypertensive subjects, whereas, Blood arteries become less elastic and narrow as a result of high blood glucose levels, which restricts blood flow.

In this study the most commonly seen comorbidities were HTN (65) and DM (58) whereas the least found comorbidities were RHD (1), TB (1), Appendicitis (1). The other comorbidities found in the subjects were COPD (15), Hypothyroidism (10),

Pulmonary edema (5). A similar study by conducted by Asmita *et al.*,¹⁰ which revealed the similar results.

In our study we classified the subjects based on the employment status such as employed and unemployed. Out of 210 subjects, employed category included 43 subjects and unemployed category included 67 subjects. A study by Bibirsa Sefera *et al.*,⁹ showed contradictory results that is unemployed category included 34 subjects and employed category included 203 subjects.

In our study 116 (55.23%) subjects were from rural area and 94 (44.76%) subjects were from urban area. Similar results were revealed by Bibirsa Sefera *et al.*⁹ study. Whereas the study conducted by Aikaterini *et al.*¹¹ revealed, 62 (77.5%) subjects were from urban area and 18 (22.5%) were from rural areas.

Among 210 study subjects 156 (74.3%) were married, 25 (11.9%) were unmarried and 29 (13.8%) were widows. Similar result was showed by Bibirsa Sefera *et al.*⁹ study.

Our study demonstrated that obese subjects were highly associated with increased to develop CVD. In current study out of 210 study subjects, 16 belongs to under-weight, 70 had normal weight, 80 belongs to the obesity class-1, 34 belongs to obesity class-2 and 10 belongs to pre-obesity class. A study Francisco Lopez-Jimenez *et al.*¹² revealed the similar results

Out of 210 study subjects, 53 stayed up-to 5-10 days, 76 stayed up-to 10-15 days, 37 stayed 1-4 days and 44 stayed for more than 15 days. A study conducted by M. Reshma *et al.*⁸ showed 81 stayed for 1-3 days, 51 stayed for 4-6 days and 18 stayed for more than 6 days.

The Medication Adherence Rating Scale (MARS) grading was used to measure patient's non-adherence to medication. This tool aids CVD patients in self-reporting adherence. The purpose of this study was to examine the level of adherence to prescribed treatment among CVD patients.

We revealed that a large percentage of subjects (46.19%) were non-adherent to their treatment. These findings were dispute to the finding of Satish Balaji *et al.*¹³ study.

Among 210 study subjects, it was observed that male subjects were highly adherent (good) to prescribed medication as compared to the female subjects. A similar study was carried by Satish Balaji *et al.*¹³ where both male and female showed equal adherence to the prescribed medication.

Our study also determined that the age category (41-50 years) had highest adherent (good), while age (81-90) had least (bad) adherence. A study by Satish Balaji *et al.*¹³ revealed that the age group of (56-65 years) had high adherence.

Our study also demonstrated that literates were highly adherent to treatment, whereas the illiterates showed poor adherence. Our findings were similar with the findings of study by Satish Balaji *et al.*¹³ and Ali Hussein Al-Ganmi *et al.*¹⁴

The current study also reported that urban subjects showed high adherence, whereas the rural subjects showed low adherence. Our findings were similar with the findings of study by Sameer Bansilal *et al.*¹⁵

CONCLUSION

Non-adherence to medication is still a significant problem for cardiovascular patients. Non-adherence was linked to getting older, using lots of medications, undergoing extensive therapy, and forgetfulness. Several patients with cardiovascular conditions quit taking their medications as soon as they began to feel better. According to the data, socio-demographic factors are substantially associated with the cardiovascular medication adherence. Such characteristics such as gender, age, educational level and residence. According to the finding there was no significant relationship between the respondent age and their medication adherence to CVD therapy. The study highlighted the importance of improving the CVD medication adherence, particularly for the patients who reside in rural areas and illiterate as well as educating them with more information about the cardiovascular disease and its treatment.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

ETHICAL APPROVAL

The study was approved by Institutional Ethics Committee (KLECOPI/IEC/2022-23/04).

ABBREVIATIONS

CVD: Cardiovascular Disease; **MARS:** Medication Adherence Rating Scale; **WHO:** World Health Organization; **HTN:** Hypertension; **DM:** Diabetes Mellitus; **IHD:** Ischemic Heart Disease; **RHD:** Rheumatic Heart Disease; **TB:** Tuberculosis; **COPD:** Chronic Obstructive Pulmonary Disease; **DAMA:** Discharge against medical advice.

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