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MEDICATION ADHERENCE IN PATIENTS OF ISCHEMIC HEART DISEASE DURING FOLLOW-UP: A PROSPECTIVE STUDY AT TERTIARY CARE HOSPITAL

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ABSTRACT: Non-adherence to treatment can negatively affect the result for the patient and the prescriber. On the other hand, high adherence reduces health care cost and improves the quality of life in patients suffering from chronic diseases. This prospective study was carried out on outdoor patients of ischemic heart disease after discharge from the indoor patient department. The modified Morisky Scale is used to assess the patient's medication adherence. The Chi-square Test assessed the significance of the difference in data. After enrollment, 370 out of 400 patients came to the hospital for follow-up (non-interventional group=295 patients and interventional group=75 patients). 89.83% of patients in the non-interventional group while 94.67% patients in the interventional group had high adherence in the motivation scale. This difference was found statistically significant ($p < 0.05$). Similar data were found in the knowledge scale. But overall, 90.81% of patients in motivation and knowledge scales had high adherence. In conclusion, approximately 90% of patients found high adherent. We found high adherence in most patients, possibly due to Mukhyamantri Nishulk Dawa Yojana (MNDY). However, only 35.40% of patients in the motivation scale and 33.24% on the knowledge scale had the highest score (score=3, highly adherent patients). So, this score needs to be increased by removing the other medication barriers to adherence.

INTRODUCTION: Medication adherence to treatment is key to good patient outcomes in chronic diseases. There is huge confusion in the use of the term “chronic” and what diseases and duration are included under the umbrella of “chronic disease”. The Centers for Disease Control and Prevention (CDC) consider heart disease, cancer, chronic lung disease, stroke, Alzheimer's disease, diabetes, and chronic kidney disease as chronic diseases. Chronic diseases are defined broadly as conditions that last one year or more and require ongoing medical attention or limit activities of daily living or both¹.

According to Medicine Net, a chronic disease is one lasting 3 months or more (U.S. National Center for Health Statistics). Chronic diseases generally cannot be prevented by vaccines or cured by medications, nor do they just disappear. Chronic disease includes cardiovascular disease, stroke, diabetes, epilepsy, oral health, cancer obesity, and arthritis². World Health Organization (WHO) defines medication adherence as “the degree to which the person's behavior corresponds to the agreed recommendations from a health care provider³.”

Although “adherence” and “compliance” are the same, there is still a slight difference. Compliance is the extent to which the patient's behavior matches the prescriber's advice⁴. Most research on adherence shows that approximately 50-70 % of patients adhere to prescribed medication which warrants improvement⁵. There are multiple barriers to medication adherence as follows: Lack

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Patients related factors of knowledge on drugs and disease; forgetfulness; stopping medicines intentionally; concern and beliefs- believing natural remedies are better, not feeling good after medication, fear, stopping medicines when feeling better; difficulty to access hospital and pharmacy; medication-related barriers - cost, side effects, frequency, monitoring test, confusion in taking medicines; caretaker related barriers- dependency on caretaker; and healthcare-related- increased waiting time, communication gap between doctor-patient and not giving proper time and instruction to patient ⁶.

Because medicines are given to patients for a longer period of time in chronic diseases, it is important to monitor adherence for a better treatment outcome to the patient's benefit.

Greater medication adherence is associated with lower healthcare cost ⁷ while low or non-adherence can lead to increased hospitalization and mortality in older patients ⁸.

Rational treatment and high adherence to medicines will reduce healthcare costs ⁵ while low adherence will lead to a worse health outcome ⁹. This study focused on assessing the adherence to treatment among ischemic heart disease (IHD) patients.

MATERIALS AND METHODS: This prospective study was carried out on IHD patients of the in-patient department (IPD) in the cardiology department who later came to visit the cardiology outdoor at S.M.S. Hospital, Jaipur. Enrollment of patients in this study was started after approval from the institutional ethical committee (IEC) on 11th June 2020 (Ref. Letter 753/MC/EC/2020 Dated 15.10.2020). While the plan approval meeting was held on 11.06.2020 prior to the patient's enrollment and Cardiology department. The study duration was from June 2020 to May 2021.

Patients aged between 20-80 years of either sex were included in this study. Those patients may have had co-morbidities like diabetes mellitus, hypertension, and obesity or may not, were included. Patients with diseases other than IHD, like endocarditis, rheumatic heart disease, arrhythmia, cardiac tumors, *etc.*, and pregnant and lactating women were excluded from the study.

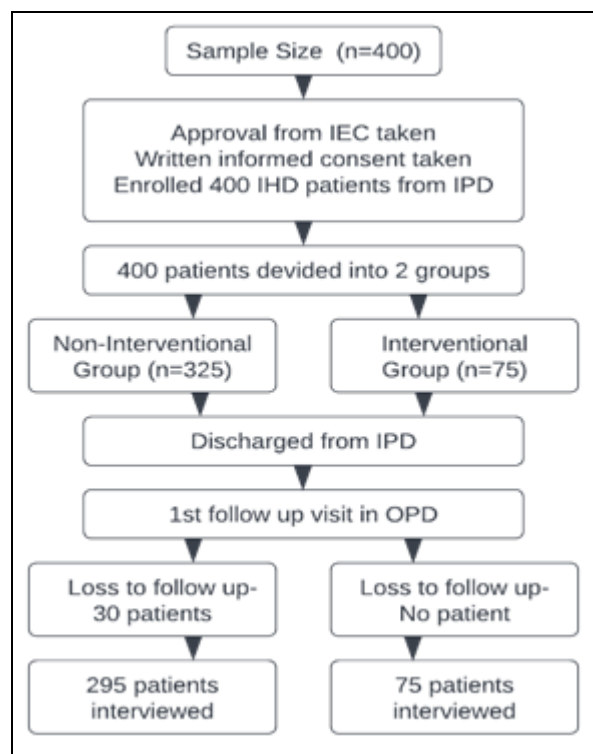


FIG. 1: STUDY DESIGN

Sampling: The sample size was calculated at 95% confidence level with a relative allowable error of 10%. Thus, the sample size was calculated at 400 patients. The sampling was done by random selection from indoor patients, and patients fulfilling inclusion criteria were enrolled for the study until the required sample size attained. All patients, irrespective of their interventional status, were recruited and categorized into two groups: the interventional group (those who had already undergone intervention) and the non-interventional group (those who had not undergone any intervention) **Fig. 1**.

Data Collection: After discharge from IPD, these patients visited the cardiology outdoors for follow-up. Data, including age, sex, and personal history were collected in a predesigned study proforma. Every patient was explained about the study's purpose, methods, and goal. After their consent was taken in written form, each patient was interviewed by the investigator. Each patient was asked the question mentioned in the Modified Morisky Medication Adherence Scale (MMMAS) ¹⁰. There were also different validated tools for assessing medication adherence ¹¹.

Study Parameter: The MMMAS is used to assess the patient's medication adherence. It is a short and

validated tool that is used to assess patient adherence on a motivation and knowledge scale. There are six questions in the MMMAS (three for motivation and three for knowledge scale), which are simple and easily understandable **Table 1**. Question no. 1, 2 and 6 related to motivation scale while question no. 3,4 and 5 are related to the

knowledge scale. There is a scoring for each question in terms of 0 and 1 in the motivation and knowledge columns separately. So, each motivation and knowledge scale score range is from 0 to 3. The adherence score on the motivation and knowledge scale is categorized as follows: 0-1=low adherence; and 2-3= high adherence.

TABLE 1: MODIFIED MORISKY MEDICATION ADHERENCE SCALE

Question	Motivation	Knowledge
1. Do you ever forget to take your medicine?	Yes (0) No (1)	
2. Are you careless at times about taking your medicine?	Yes (0) No (1)	
3. When you feel better do you sometimes stop taking your medicine?		Yes (0) No (1)
4. Sometimes if you feel worse when you take your medicine, do you stop taking it		Yes (0) No (1)
5. Do you know the long-term benefit of taking your medicine as told to you by your doctor or pharmacist?		Yes (1) No (0)
6. Sometimes do you forget to refill your prescription medicine on time?	Yes (0) No (1)	

Statistical Analysis: Quantitative data were expressed in the form of percentages. The significance of the difference in the proportions of data in the non-interventional and interventional groups was assessed by Chi-square test. The p value <0.05 were considered significant, while p value >0.05 were considered non-significant. Statistical Package for Social Sciences (SPSS) version 20.0 software was used for statistical calculation.

RESULTS: In this study, a total of 400 patients of IHD of IPD from the cardiology department were included. Out of them, 325 patients had not gone under intervention at the time of enrolment (non-

Interventional group), and the remaining 75 patients had gone under intervention (interventional group). Among the enrolled patients, 305 (76.25%) were men and 95 (23.75%) were women. 186 (46.5%), 172 (43%), and 42 (10.5%) patients were from age groups of 61-80, 41-60 and 21-40 years, respectively.

Thirty patients in the non-interventional group were lost to follow-up on their first follow-up visit, whereas all patients in the interventional group followed up. Thus, a total 370 patients were taken into consideration for the study. (Non-interventional group = 295 patients and interventional group = 75 patients) **Fig. 1**.

TABLE 2: MOTIVATION-BASED ADHERENCE SCORING OF MMMAS IN BOTH GROUPS

Adherence	Motivation scoring	Non- interventional group n=295		Interventional group n=75		Total n=370		p- value (Chi-square test)
Low	0	0	0%	0	0%	0	0%	<0.05
Adherence	1	30	10.17%	4	5.33%	34	9.19%	
High	2	186	63.05%	19	25.33%	205	55.41%	<0.05
Adherence	3	79	26.78%	52	69.34%	131	35.40%	

Table 2 shows that in the non-interventional group, 89.83% (186+79) patients have high adherence (score = 2 & 3), whereas in the interventional group, 94.67% (19+52) patients have high adherence (score = 2 & 3) on motivation scale. This

difference was found to be statistically significant (p<0.05). It means patients in the interventional group are more motivated and less forgetful to take medicine. But overall, 90.81% (205+131) adhere highly to the motivation scale.

TABLE 3: KNOWLEDGE-BASED ADHERENCE SCORING OF MMMAS IN BOTH GROUPS

Adherence	Knowledge scoring	Non-interventional group n=295		Interventional group n=75		Total n=370		p- value (Chi-square test)
Low	0	0	0%	0	0%	0	0%	<0.05
Adherence	1	30	10.17%	4	5.33%	34	9.19%	
High	2	192	65.08%	21	28%	213	57.57%	<0.05
Adherence	3	73	24.75%	50	66.67%	123	33.24%	

Table 3 shows that in the non-interventional group, 89.83% (192+73) patients have high adherence (score=2 & 3) whereas in the interventional group, 94.67% (21+50) patients have high adherence (score=2 & 3) on the knowledge scale. This difference was found to be statistically significant ($p < 0.05$). It means patients in the interventional group had more knowledge about their disease. But overall, 90.81% (213+123) of patients have high adherence on the knowledge scale.

DISCUSSION: Non-adherence to medication in chronic diseases is a big challenge for healthcare providers and a major problem worldwide. Non-adherence to treatment can negatively affect the result for the patient and the prescriber. On the other hand, high adherence contributes to lower healthcare costs and improves the quality of life in patients suffering from chronic disease.

In our study, according to the motivational scale, more patients (94.67% > 89.83%) from the interventional group were highly adherent to treatment. It means patients undergoing an intervention are more aware and less forgetful about taking their medicines. Similarly, more patients from the interventional group found high adherent in the knowledge-related adherence scale. But overall, 90.81% of patients on motivation and knowledge scales were highly adherent. Adherence level is higher in acute conditions compared to Chronic conditions¹² as seen in our study. In this study, IHD patients admitted were in IPD due to acute episode, and they were followed up to measure adherence on their first outdoor visit.

Regarding scoring, 35.40% of patients in motivation scale and 33.24% in the knowledge scale had the highest 3 score (highly adherent patients). A WHO report says that 50% of patients suffering from chronic illness have high adherence. However, this report is based on studies done in developed countries¹³. Low or non-adherence in developing countries might be due to several reasons. According to one study done in twelve Sub-Saharan countries by Mac quart de Terline D et al. showed that the most influential factors for low adherence were as follows: financial burden on patients with low income; use of traditional medicine; and forgetfulness to take medicine¹⁴. To improve medication adherence, patients'

medication-taking habits must be focused. Such patients must be counseled and motivated regarding taking medicine on time and its long-term benefits¹⁵. Most of the patients are unaware of and unable to explain the dose of medicine taken, frequency, and duration of therapy. This can affect and reduce medication adherence. Compared to general patients, chronically ill patients have more difficulties understanding health information¹⁶.

Medical practitioners have a shortage of time to educate and counsel their patients during consultation, especially in developing countries with low doctor-patient ratios. In such a scenario, nurses and pharmacists can counsel and provide information to these patients. Nurses can talk about the disease course while pharmacists can explain to the patient about side effects and drug interactions of medicines, the best way to use medicines and lifestyle modifications¹⁷.

Due to the financial burden of health care, poor people are not able to take complete treatment and patients quit the treatment in the middle of therapy. Buying medicine is never a priority if there is not enough money to buy food or clothes¹⁸. In Rajasthan, the Mukhyamantri Nishulk Dawa Yojana (MNDY) scheme provides free medicines to every patient at every government hospital. This step by the government improved the adherence of people in lower-income group. It is one of the important step taken by the government so we found a high level of adherence in the majority of the patients.

Finally, the patients with low or medium adherence were sensitized to be adherent to their prescribed medications to obtain complete therapeutic outcomes. Also, patients with high adherence were encouraged to maintain it. This study has certain limitations. This study is focused only on a single chronic disease and more on patient-related factors. The studies examining the adherence of at least common chronic diseases as per above definition may produce better results. Simultaneously, the other influencing factors on adherence, like treatment-related (number of prescriptions, dose, duration, and knowledge about them), socio-economic status, and healthcare system-related factors (number of pharmacies used for refills) can be included in the study.

CONCLUSION: In this study, approximately 90% of patients were highly adherent. In Rajasthan, the MNDY scheme provides free medicines. It is one of the important steps taken by the government so we found a high level of adherence in the majority of the patients.

However, only 35.40% of patients on the motivation scale and 33.24% on the knowledge scale had 3 scores (highly adherent patients). So, it needs to be increased by removing the other barriers to adherence.

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