An Empirical Study on Improving Adherence Level on Cardiovascular Disease Related Patients

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Abstract : Background- The bang of cardiovascular diseases has now changed the attribute of patients as well as healthcare professionals these days. For the successful treatment of any type of disease, patient adherence towards the treatment and medication is very crucial. The patient adherence includes the initiation of the treatment properly, implementation of the treatment and at the end discontinuation of pharmacotherapy. More the adherence level of patients more will the probability of improvement from diseases.

Objective- The study on patient adherence was carried out to validate Morisky Medication Adherence Scale (MMAS 8) and also to determine the factors that affect the patient adherence level to cure the disease.

Methodology- A cross- sectional study was carried out among 244 patients suffering from cardiovascular disease and its reliability was analyzed. The data was evaluated by using SPSS software and MS Excel.

Result and Conclusion- The Cronbach's alpha value was 0.700 and the demographic factors like age, family, gender, education etc. showed an association regarding the low adherence level. The 20 variables were taken for the data analysis were- knowledge, awareness, addiction towards tobacco, smoking or alcohol, time management, satisfaction from doctors, lifestyle changes etc. The application of factor analysis represented that the major six factors that affected the patient adherence level at highest level are- patient's attitude, assurance factors, unfavorable addiction, insufficient time, lifestyle factors and patience factors.

Keyword: **Factor analysis, adherence, cardiovascular diseases, reliability, MMAS.**

I.INTRODUCTION

With the change in time, the cardiovascular diseases have shown the huge mortality rate in India [1]. The cardiovascular diseases are the type of diseases that are related to heart and blood vessels. It consists of various types like coronary heart disease (heart attacks), cardiovascular disease, raised blood pressure (hypertension), peripheral artery disease, rheumatic heart disease, congenital heart disease and heart failure.

According to the report in Times of India 2018, the death rate due to cardiovascular diseases decreased in US from last 15 years but in India the death rate has increased at high rate i.e. death rate in US has declined by 41% in between 1990-2016 and in India it increased by 34% [2]. Also, according to WHO report, it was analyzed that 17 million people died due to cardiovascular diseases in the year 2005. In overall death report, about 7.2 million people died due to heart attack and 5.7 million people died due to stroke majorly in low and middle income countries. It has been estimated that till the Year 2030, this rate will increase and 23.6 million people will die due to cardiovascular diseases [3]. In the report by Global Burden of Disease, the death in India was about 24.8% due to the cause of cardiovascular diseases [4]. So, by the various studies one can conclude that cardiovascular disease is one the most loaded disease in terms of death in India and also in other countries.

It has been reported that all over the world, the serious concern in the field of successful healthcare delivery is the patient's non-adherence behavior towards treatment and medications [5]. Adherence is the term defined as the extent of the patient's behavior that corresponds with medical or health advice. The adherence ratio is very less in chronic diseases as compared to acute diseases and this rate decreases after 6 months of medication and treatment in chronic conditions [6]. There are various studies that shown factors affecting non-adherence of patients such as age, sex, education, route of administration, duration of treatment, complexity of treatment, side effects of medicines etc. [5]. Similarly, in one of the report, the factors that is majorly responsible for poor adherence level includes patient demographics, side effects from various medications, drug dosing, cost of medications, number of medications, knowledge of patients, belief and attitude of patients for the treatment, involvement of patient in care system etc.[7]
The adherence level involves the poor taking of prescribed medications, observance in follow-up of appointments and also continuing the optional lifestyle alteration [8]. Thus, it is very essential for the patient to consider the important aspects of poor adherence level for the better improvement of their disease. The medication adherence from the side of patients is declining at very high rate and it is the responsibility of the patient as well as the healthcare providers to fill this huge gap of curing the diseases on time.

According to WHO 2003, in the report entitled "Adherence to Long Term Therapies: Evidence for Action", WHO stated that the problem of poor medication adherence is increasing at large scale and is critical issue for health aspect [9]. Thus, WHO identified 5 dimensions or factors that are overall responsible for poor adherence in terms of patients and healthcare providers and they are Social and economic factors, Health system and healthcare team related factors, Therapy related factors, Condition related factors and Patient related factors.

II. OBJECTIVES

1) To analyse factors affecting poor patient adherence level.
2) To analyse the morisky medication adherence level scale.
3) To study the impact of poor adherence level on patients.

III. METHODOLOGY

Study area and population-
The cross-sectional study was conducted in various regions of hospitals and clinics in Delhi-NCR from August 2018 to December 2018. The respondents or the population taken were suffering from various cardiovascular diseases such as coronary artery disease, heart attack, abnormal heart beat, heart valve disease, congenital heart disease, aortic disease and vascular disease.

Sample size-
The sample size of 244 patients was analyzed to check the adherence level towards medications and treatment. The respondents were selected on the basis of their various demographic factors like age, gender, education status, occupation, family etc.

Statistical analysis-
The analysis was done with analyzing the level of agreement on some healthcare factors that directly or indirectly affect the adherence level of medication and treatment. The five-point scaling was done anchored by 1= Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree, 5= Strongly Agree. Also, the MMAS-8 scale was added in the questionnaire in which 8 questions were asked to the patients on the basis of the medications and treatment taken. There were some additional questions asked related to the hospital types, treatment, medications, symptoms etc.

IV. RESULTS AND DISCUSSION

The results of the data are stated as-

Item selection-
The study was done on the basis of demographic patterns and studying the level of agreement of the patients for the services provided by the healthcare providers, patient's attitude and perception etc. The statements were designed accordingly to enhance the patient adherence level and to elicit the overall attitude and influence on medication adherence in cardiovascular disease related patients. The five point scaling was done for the statements. The MMAS-8 analysis was also done to know the effective and valid reasons for improving the patient adherence level.

Pre-testing of the questionnaire-
The questionnaire was pre-tested by randomly selecting the 50 patients and was requested to give the marks on the clarity and language of the questions. On the basis of the suggestions the changes were done accordingly for cleanness and specificity of the statements.

Reliability of the survey-
The reliability analysis of the questionnaire was done to assist the consistency and dependability of the factors that affect the patient adherence level and MMAS-8. For this, the Cronbach's alpha for 20 statements of the factors 0.700 and for MMAS-8 it was 0.777 which has been shown in table 1 and table 2 respectively. Both the values show the good reliability of the statements.

Table I- Showing Reliability Statistics of statements

Cronbach's Alpha	N of Items
.700	20

Table II- Showing Reliability Statistics of MMAS-8

Cronbach's Alpha	N of Items
.777	8

Judging the correctness of factor analysis-
The appropriateness and correctness of factors analysis for the statements was done by KMO and Bartlett's Test and the results are shown in Table 3. KMO (Kaiser-Meyer-Olkin) measure of sampling adequacy is a type of index which is used to examine the appropriateness of the factor analysis and in this the high value ranging in between 0.5- 1.0 indicates that the factor analysis is appropriate and the values ranging below 0.5 signifies that factor analysis is not appropriate. It can be easily judged from the table 3 that the value is 0.730 which ranges in the high value category and mentioned that the factor analysis is appropriate. Similarly, Bartlett's test is used to examine the hypothesis that the variables are uncorrelated in the population and in this the probability less than 0.05 is suitable. The hypothesis formulated was-
H0: (Null Hypothesis): There is insignificant correlation between the variables for affecting patient adherence level towards medications and treatment.

H1: (Alternated Hypothesis): There is significant correlation between the variables for affecting patient adherence level towards medications and treatment.

Table III- Showing KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.730
Bartlett's Test of Sphericity	Approx. Chi-Square	993.049
	Df	190
	Sig.	.000

Analyzing the number of factors-

Table IV- Showing Rotated Component Matrix

Statements	Component					
	1	2	3	4	5	6
I think I have complete knowledge about my disease	.669	-.366	-.222	.332	.102	-.003
I am aware about the therapies or medications involved for my disease	.610	-.479	-.168	.303	.100	.109
The addiction towards tobacco, smoking or alcohol usually causes non-adherence to treatment	.225	.205	-.228	.325	.550	.366
It is difficult for me to take medications on time.	.172	.179	.438	.455	.234	-.299
At times, I am not satisfied with the treatment I am getting from my doctor	.186	.421	.421	.320	-.135	.104
The unpleasant side-effects of medications are always present.	.418	.398	-.040	-.320	.050	.195
At times, my treatment requires interference with the lifestyle.	.286	.316	.152	.069	-.548	.266
When I skipped my medications, the condition of disease got serious	.338	.238	-.094	-.335	.003	-.003
I have a good relationship with my healthcare provider	.520	-.296	.009	-.202	.032	.109
If I am aware about my disease, it helps me to stick to the treatment	.475	-.367	.386	.080	-.038	.366

I am satisfied with the communications skills of healthcare provider	.590	-.233	.057	-.102	-.157	-.299
Sometimes, I feel dissatisfied with my healthcare provider due to long waiting times	.355	.564	.148	.011	-.025	.104
My doctor shows personal concern during my visits	.361	.216	-.217	-.446	.357	.195
I am satisfied with the cost of medications I used to pay for my treatment	.448	-.217	-.438	-.070	-.227	.078
My family members are with me during my visit to doctor.	.558	.190	-.370	.272	-.242	.004
My family members pay for my medications	.356	.444	-.323	.116	-.223	-.400

Statements	**Component**					
	1	**2**	**3**	**4**	**5**	**6**
Usually, I feel dissatisfied with the language of doctor's prescription or any other medical practitioner when they explain the medications	.437	.395	.126	-.003	.172	.086
I am aware about the medical insurance policies	.520	-.134	.255	-.319	.040	.100
I am careless at times due to hectic schedule of medications	.458	.160	.340	-.128	.185	.266
Sometimes, due to cultural issues or beliefs, I skipped my medications	.264	-.419	.503	-.158	-.093	.001

Following are the 6 number of factors that came out from rotated component matrix-
Factor 1- Patient's attitude
Factor 2- Assurance factors
Factor 3- Patience factors
Factor 4- Insufficient time
Factor 5- Unfavorable addiction
Factor 6- Lifestyle factors

Table V- Showing Item-Total Statistics

Statements	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Do you sometimes forget to take your medicine?	2.9877	6.712	.358	.771
People sometimes miss taking their medicines for reasons other than forgetting. Thinking over the past 2 weeks, were there any days when you did not take your medicine?	3.1762	7.191	.171	.796
Have you ever cut back or stopped taking your medicine without telling your doctor because you felt worse when you took it?	3.2992	6.416	.567	.743
When you travel or leave home, do you sometimes forget to bring along your medicine?	3.1475	5.962	.694	.720
Did you take all your medicines yesterday?	3.1393	6.013	.667	.725
When you feel like your symptoms are under control, do you sometimes stop taking your medicine?	3.3197	6.474	.558	.745
Taking medicine every day is a real inconvenience for some people. Do you ever feel hassled about sticking to your treatment plan?	3.1803	6.083	.649	.728
How often do you have difficulty remembering to take all your medicine?	2.6803	4.934	.467	.791

Talking about the Morisky Medication Adherence Scale, the medication adherence level was checked for cardiovascular patients. Table 5 shows the total item statistics for each statement and which have also shown good reliability for the statements and that is almost more than 0.6. The MMAS has different categories to calculate the adherence level of patients on the basis of high adherence, medium adherence and low adherence which was calculated with the value of 31, 182 and 31 respectively. The categories are divided on the basis of scores and the score of 0 is categorized as high adherence, score 1-2 is categorized as medium adherence and score 3-8 is categorized as low adherence. The widely held of patients were under medium adherence level suggesting that patients should focus on improving adherence level towards medications and treatments for better use and cure from chronic illness.

Table VI- Frequency distribution showing demographics of respondents

	Category	No. of people	Percentage	Cumulative percentage
Age in years	20-30 years	43	17.6	17.6
	30-40 years	81	33.2	50.8
	40-50 years	53	21.7	72.5
	50-60 years	28	11.5	84.0
	>60 years	39	16.0	100.0
	Total	244	100.0	
Gender	Male	139	57.0	57.0
	Female	105	43.0	100.0
	Total	244	100.0	
Education	Illiterate	55	22.5	22.5
	Upto 12^{th} standard	85	34.8	57.4
	Graduate	57	23.4	80.7
	Post graduate	45	18.4	99.2
	Others	2	0.8	100.0
	Total	244	100.0	
Occupation	Business	72	29.5	29.5
	Home maker	76	31.1	60.7
	Professional	83	34.0	94.7
	Retired	13	5.3	100.0
	Total	244	100.0	
Marital Status	Single	25	10.2	10.2
	Married	179	73.4	83.6
	Divorced	21	8.6	92.2
	Widowed	19	7.8	92.2
	Others	0	0	100.0
	Total	244	100.0	
Family	Nuclear	112	45.9	45.9
	Joint	132	54.1	100.0
	Total	244	100.0	

The study investigated the status of patient adherence level in terms of proper follow-up of treatment and medications. The non-compliance is considered to be the vital cause of control of cardiovascular diseases. The medium or low adherence in the study is associated with many factors. The patient's knowledge towards the disease is linked with compliance to medication. The various studies suggested that the patients who are aware regarding the disease have better chance to improve the adherence level. It is very important for the patient to change the attribute, perception and knowledge in terms of controlled aspects for increasing the compliance rate. In one of the study, the adherence level was connected with the demographic patterns as the older patients have less adherence level [10] while in one study, the younger patients have less adherence [11].

Also, in some studies it is very well explained that the good adherence level towards medication and treatment helps to reduce the whole cost at the time of treatment. If the process of medication decreases with time then in future the cost of hospitalization and care increases [12], [13]. For this reason, it is important for the patients to stick to the treatment for enhanced and improved results from the disease. When patients do not follow the treatment as per instructed by the healthcare providers then the patients suffers a lot. Adherence is termed as the capability to stick to the treatment with the therapeutic course [14]. There are many reasons that

insist the patients to not follow-up the treatment in proper way and some of the mentioned reasons are- incorrect dose, delaying process in treatment, not following the doctor's prescription etc.

V.CONCLUSION

In the conclusion of this study, it revealed medium adherence rate of cardiovascular disease related patients. The major players that can improve the adherence level in overall aspect are healthcare providers such as pharmaceutical industries, doctors, pharmacist, government and the patients itself. It is recommended that the health education to the patients can improve the adherence level and this can be done with the help of various campaigns, online networks with the patients, pamphlets by the hospitals and government policies.

Talking about the pharmaceutical industries and their role, the pressure on the functioning affects a lot and this has direct effect to the patients on their adherence level. It is very essential to cover-up this gap to improve the illness level of patients suffering from cardiovascular diseases. This can be effectively done by focusing on major players of market such as government, pharmaceutical industries, doctors, pharmacists and patients.

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