



## Impact of “Advance Patients Care Plan” in Cardiovascular Disorders

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### Abstract

**Background and Objective:** Cardiovascular deaths and disorders have increased at a fast rate in low and middle-income countries. In India most of population pays their healthcare bills out of their own pocket, so there is always a need to reduce the economic burden on the patients. The research was conducted to implement and analyze “Advance Patients Care Plan” for cardiovascular disorders and its impact in terms of patient therapeutic outcomes.

**Methods:** In this single blinded double arm interventional research three different strategic interventions were implemented under “Advance Patients Care Plan” namely Cost minimization by prescribing cheap brands/generics, Early ADR detection & prevention and Life style modifications. The outcomes were recorded in terms of patient’s therapeutic outcomes, quality of life and reduction in economic burden. The data was analyzed statistically.

**Results:** The overall mean score of WHO QoL BREF questionnaire of experimental group was  $58.2 \pm 8.65$  which was comparatively higher than  $45.95 \pm 1.08$  of control group. The overall mean MLHFQ score was  $38.33 \pm 6.98$  and  $65.67 \pm 3.75$  for experimental group and control group respectively. The total cumulative therapy cost was accounted ₹ 240660 in Experimental Group whereas patients in Control Group spend ₹ 319114.80 on therapy. The Implemented “Advance Patients Care Plan” reduced total cost for therapy by ₹ 2615.16 for each patient.

**Interpretation and Conclusions:** Advance Patients Care Plan in addition to treatment showed significant evidence in improvement of patients’ therapeutic outcomes, improved quality of life and reduced economic burden on the patients.

**Key words:** Pharmacoeconomics, Advance Patients Care Plan, Therapeutic outcome, Quality of Life, Therapy, cost

### INTRODUCTION

Cardiovascular disorders (CVD) are the leading cause of deaths worldwide, though since 1970s, cardiovascular mortality rates have declined in many high-income countries.<sup>[1]</sup> At the same time,

cardiovascular deaths and disorders have increased at a fast rate in low and middle-income countries.<sup>[2]</sup> Although cardiovascular disease usually affects older adults, the antecedents of cardiovascular disease, notably atherosclerosis,

begin in early life, making primary prevention efforts necessary from childhood.<sup>[3]</sup> Over the past decade, CVD has become the single largest cause of death worldwide, representing nearly 30% of all deaths and about 50% of NCD deaths<sup>4</sup>. In 2008, CVD caused an estimated 17 million deaths and led to 151 million DALYs (representing 10% of all DALYs in that year).<sup>[4]</sup> The cost of CVD takes into account the cost of care for the major CVD conditions and their proximate risk factors, as well as lost productivity owing to either premature death or significantly disabling disease.<sup>[5]</sup> Hypertension and cholesterol management and screening. Previous estimates of the total cost of CVD have been calculated only for select developed and developing countries or related to a single risk factor.<sup>[6]</sup> The improvements in Indian Health Care Scenario have not been uniform and inequities based on gender, rural vs. urban and even social status still remain.<sup>[7]</sup> While the government assures healthcare to all its citizens, 80% of all out-patient and 60% of all in-patient care is handled by the private sector which accounts for 68% of all hospitals in the country. Healthcare financing also remains a key issue.<sup>[8]</sup>

The research was conducted to implement and analyze “Advance Patients Care Plan” for cardiovascular disorders and its impact in terms of patient therapeutic outcomes. There were three different strategic interventions implemented under “Advance Patients Care Plan” namely Cost minimization by prescribing cheap brands/generics, Early ADR detection & prevention and Life style modifications. The outcomes were recorded in terms of patient’s therapeutic outcomes, quality of life and reduction in economic burden.

## METHOD

The study was conducted in Coronary Care Unit (CCU) and Medicine Wards of Rajah Muttai Medical College and Hospital (RMMCH), a 1400 bedded Multi-Specialty Tertiary Care Teaching Hospital, Annamalai University.

Patients who came to RMMCH for different Cardiovascular Disorders, admitted in inpatient medicine wards and CCU of either sex, and those who are not having any other comorbidities and willing to co-operate were recruited in the study. These patients (or care giver) were explained about the study and their consent was obtained and recorded in Tamil and English. Patients who were aged more than 18 years with newly diagnosed as having any of the cardiovascular disorders of both sex and patients who were already diagnosed with the CVD disorder and on medications were included in the study.

Patients with other co-morbidities associated with Cardiovascular Disorders, not willing to cooperate, vulnerable groups (pregnant woman, mentally retarded etc.) along with patients coming for General checkup (Out Patients) were excluded from the study. The “Advance Patients Care Plan” was designed with an objective to decrease economic burden and improving patient health outcomes concomitantly.

This study was a single blinded double arm interventional research. The enrolled patients were randomly assigned into two different groups Experimental (Group E) and Control (Group C). In Control group patients received the standard treatment for cardiovascular disorders whereas in Experimental Group patients received “Advance Patients Care Plan” along with standard treatment. Under “Advance Patients Care Plan” three interventions were implemented in experimental group and their effect was recorded. The interventions were designed by the researchers along with the consultant physician. Disagreements over study design were resolved by discussion between the authors if required.

The first intervention was cost minimization by prescribing cheaper brands/generics, the Early detection of Adverse drugs reactions was second intervention and third being life style modification under which low salt intake, DASH diet, patient counseling were instigated.

Therapeutic outcomes in recruited subjects were measured by Minnesota Living with Heart Failure

& Condition Questionnaire (MLHFQ).<sup>[9]</sup>The (MLHFQ) illustrates the therapeutic outcomes in the manner heart condition and treatment can affect the key physical, emotional, social and mental dimensions of quality of life.<sup>[10]</sup>The MLHFQ assessed the therapeutic outcomes with 21 different facets. The total score of the questionnaire was 105. All question pooled same distribution of score. The score was divided into 5 different health states like very good (0-21), good (22-42), moderate (43-63), poor (64-84), very poor (85-105). According to the questionnaire grading lower the score the better was patient's health outcomes.

The quality of health of the patients was measured by WHO QoL BREF questionnaire.<sup>[11]</sup>The WHO QoL BREF questionnaire was best suited for the study as it superlatively explains different aspect of life affected by heart disorders. WHO QoL BREF comprises 26 items which measures the broad domains namely Physical Health, Social Psychological, Relationships and Environment and two items that measure overall QoL and general health. Participants expressed how much they have experienced in the preceding two week on 5-point Likert scale ranging from 1(not at all) to 5 (completely)which usually takes around 10 to 15 minutes in administration. The data was recorded and analyzed statistically.

## RESULTS

### Base Line Patients Demographics

The base line demographics have been shown indifferent parameters. (Table 1) The mean age of Group E 67 years and age of the patients ranged between 31 to 64years. In Group C the mean age was recorded as 64 years ranging between 36 to 78 years. In Group E most patients (n=14) were hospitalized for 5 to 9 days and almost equal number of patients (n=13) depicted hospitalization days ranging between 9 to 12 days. On the contrary in Group C most patients(n=17) were hospitalized for 9 to 12 days. Acute coronary syndrome was the most prevalent disorder among both the groups (Group E 23%, Group C

26.7%).Equal proportions of patients (16.7%) were diagnosed with Inferior Wall Myocardial Infraction and ST Segment Elevated Myocardial Infraction Experimental group. In Control group Inferior Wall Myocardial Infraction, Stoke and Left Bundle Branch Block were diagnosed in equal proportion (13.3%) of patients and were second most prevalent in the group.

### “Advance Patients Care Plan” Improves Quality of Life

The overall mean score of WHO QoL BREF questionnaire of experimental group was  $58.2 \pm 8.65$  which was comparatively higher than  $45.95 \pm 1.08$  of control group. After the first baseline follow up of 2 months the mean WHO QoL score in experimental group was recorded as  $48.24 \pm 4.29$  whereas  $43.91 \pm 2.62$  in control group. At the final follow up after 6 months the WHO QoL score of experimental group ( $71.97 \pm 4.98$ ) was remarkably higher than control group ( $47.59 \pm 3.66$ ). (Table 2) The overall quality of life in experimental graded Good as they received “Advance Patients Care Plan” in contrast the control group was neither poor nor good.(Figure 1)

### “Advance Patients Care Plan” Improves Cardiac Therapeutic Outcomes

The therapeutic outcomes in patients with cardiac disorder were assessed by Minnesota Living with Heart Failure & Condition Questionnaire(MLHFQ).After first baseline follow up of two months from the admission date the mean average score for both Group E (52) and Group C (59) was graded as moderate. After 6 months the final follow up of mean MLHFQ score showed marked improvement in therapeutic outcome of Group E that scored 29 graded Good. The therapeutic outcome for the final follow up was recorded 72 for Group C which categorized as Poor. The overall mean MLHFQ score was  $38.33 \pm 6.98$  and  $65.67 \pm 3.75$  for experimental group and control group respectively.(Table 3) Experimental Group which received “Advance

Patients Care Plan” showed Good therapeutic outcome whereas Control Group concluded with Poor therapeutic outcomes.(Figure 2)

**“Advance Patients Care Plan” Eases Economic Burden**

The analysis indicated a major amount of money was spent by the patient to continue the therapy. In “Advance Patients Care Plan” by substituting cheaper brands and/or generic the cost had come down considerably in experimental group. In control group the total therapy cost was ₹ 214738.50 averaging ₹7158 for each patient. Contrariwise the total therapy cost in interventional group was ₹ 160917.63, averaging

₹ 5364 for each patient. The cost difference in therapy cost alone was ₹ 53820.87, saving ₹ 1794 for every patients in Experimental Group.(Figure 3)

The medication cost was major contributing factor in the direct medical cost and by decreasing it the direct medical cost was brought down substantially to ₹ 211137.63 in experimental group saving ₹ 2401.36on an average per patient. The total cumulative therapy cost was accounted ₹ 240660 in Experimental Group whereas patients in Control Group spend ₹ 319114.80 on therapy.(Table 4)The Implemented “Advance Patients Care Plan” reduced total cost for therapy by ₹ 2615.16 for each patient.

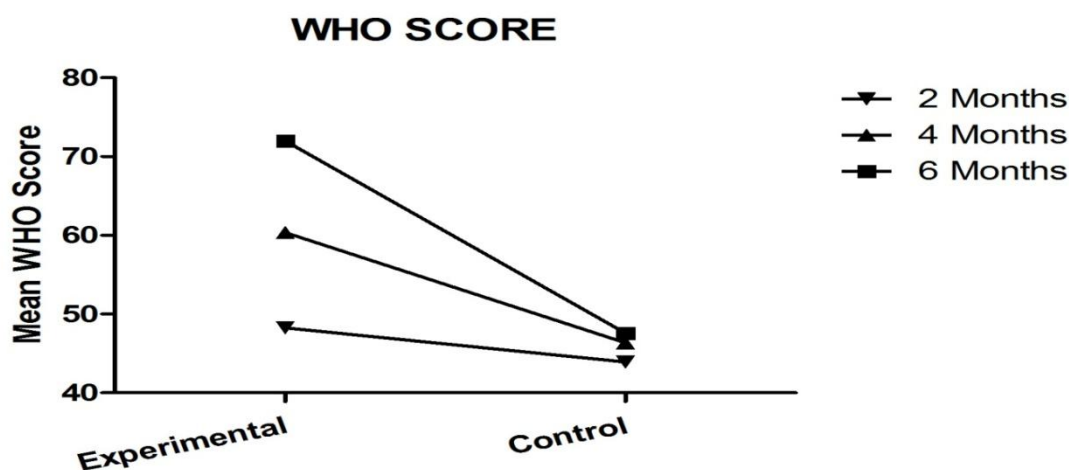


Figure 1 Mean WHO QoL Scores after follow-ups

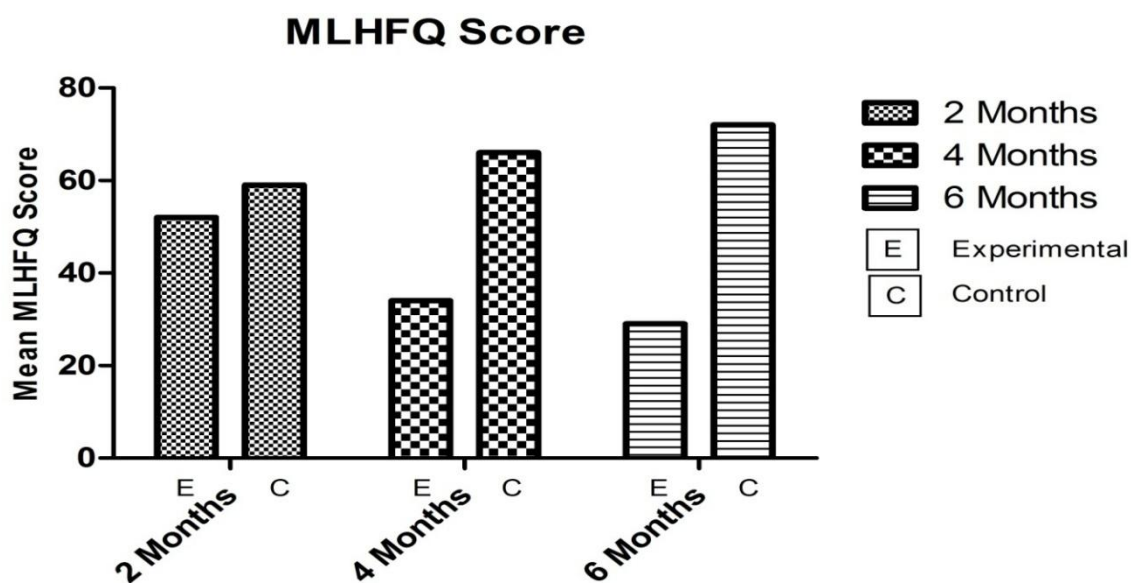


Figure 2 Mean MLHFQ Scores after follow-ups

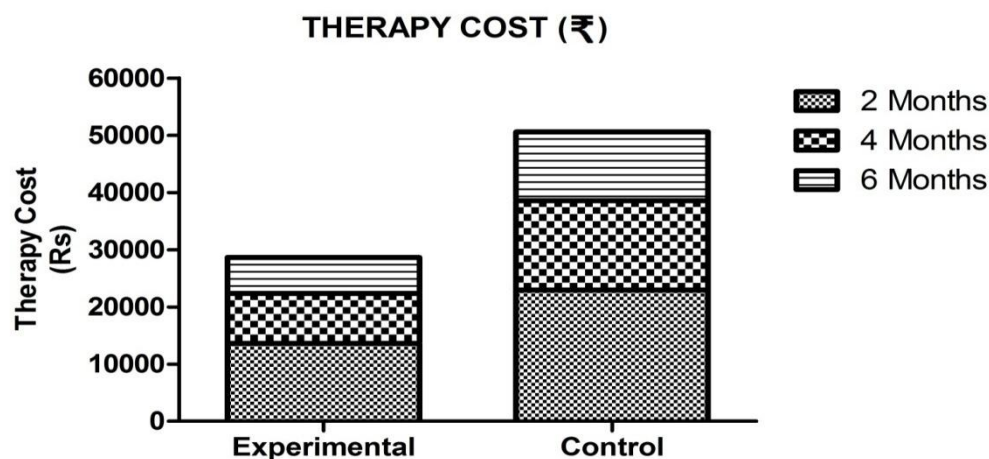


Figure 3 Cumulative Therapy Cost

Table 1 Patient Baseline Demographics

PATIENT DEMOGRAPHICS	EXPERIMENTAL GROUP (Group E) (n=30)		CONTROL GROUP (Group C) (n=30)	
SEX	17 Male	13 Female	19 Male	11 Female
MEAN AGE (years)	67±		64	
AGE RANGE (years)	31-84		36-78	
HOSPITALIZATION DAYS				
DAYS	13-17	....	6	
	12-9	13	17	
	5-9	14	6	
	1-5	3	1	
TYPES OF DISORDERS				
Acute coronary syndrome (ACS)	7		8	
Inferior wall myocardial infraction	4		4	
Unstable Angina(UA)	5		3	
CVA (STROKE)	3		4	
Dilated cardiac myopathy (DCM)	1		2	
ST Segment elevated myocardial infraction (STEMI)	5		3	
Non ST segment Elevated Myocardial Infraction (NSTEMI)	3		2	
Left Bundle Branch Block/LBBB	2		4	

Table 2 Effect of Advance Patients Care Plan on Cumulative Mean WHO QoL Scores

WHO QoL Domains (Scores 0-100)	EXPERIMENTAL GROUP			CONTROL GROUP		
	Follow Up Period (Months)			Follow Up Period (Months)		
	2	4	6	2	4	6
Physical Health	45.35	53.29	68.21	41.36	43.84	42.57
Psychological	54	62.35	81.47	51.17	54.23	51.63
Social Relationships	56.19	73.37	78.51	44	46.74	55.8
Environment	37.45	52.33	59.67	39.12	40.61	40.37
Mean Score	48.24±4.29	60.35±4.89	71.97±4.98	43.91±2.62	46.35±2.90	47.59±3.66
TOTAL MEAN SCORE	58.2±8.65			45.95±1.08		
GRADE*	GOOD			NEITHER POOR nor GOOD		

\*Grade Very Poor (0-20); Poor (21-40); neither Poor nor Good (41-60); Good (61-80); Very Good (81-100). Values are represented as Mean±Standard deviation

**Table 3** Effect of Advance Patients Care Plan on Mean MLHFQ Scores

Therapeutic Outcomes		EXPERIMENTAL GROUP			CONTROL GROUP		
		Follow Up Period (Months)			Follow Up Period (Months)		
GRADE	MLHFQ*	2	4	6	2	4	6
	(Scores 0-105)						
Very Good	0-21						
Good	22-42		34±3.65	29±2.54			
Moderate	43-63	52±2.14			59±4.25		
Poor	64-84					66±3.57	72±
Very Poor	85-105						
Mean Total		38.33±6.98			65.67±3.75		
GRADE		GOOD			POOR		

MLHFQ Minnesota Living with Heart Failure Questionnaire. Values are represented as Mean±Standard deviation

**Table 4** Effect of Advance Patients Care Plan on Cumulative Therapy Cost

DIRECT MEDICAL COST (₹)	EXPERIMENTAL	CONTROL	DIFFERENCE
Hospitalization charges	24000	30000	6000
Medications	160917.63	214738.5	53820.87
Laboratory & diagnostic tests	26220	38440	12220
Total direct cost	211137.63	283178.5	72040.87
DIRECT NON MEDICAL COST (₹)			
Travelling expenses	10500	10328	172
Food	15000 .30	21050	6049.7
INDIRECT COST (₹)			
Lost wages (morbidity)	4022 .07	4558.3	536.23
	29522.37	35936.3	6413.93
TOTAL (₹)	240660	319114.8	78454.8

## DISCUSSION

Cardiovascular diseases contribute for the substantial proportion of the ill health among the people worldwide. The prevalence of cardiovascular disorders is increasing globally and the morbidity and the mortality remains unacceptably high inspite of various efforts.

In a country like India where most of population pays their healthcare bills out of their own pocket.<sup>[12]</sup> There is always a need to ease the economic burden on the patients. 'Advance Patients Care Plan' was designed to reduce the overall cost of the illness without affecting the therapy or medication. The study of 6 months over 60 patients showed a bright prospect that this can be done. The Advance Patients Care Plan perfectly suited to the patients from lower middle class where therapy cost and the lost daily wages are a matter of concern in continuing the therapy. In different cardiovascular disorders the therapy

can be lifelong for patients. In such cases the Advance Patients Care Plan must be implemented to improve quality of life in a long run.

Quality of life is an indispensable aspect of life long diseases. The patients in Experimental Group suffered from less physical pain, medical treatment and had enough energy for everyday life and were able to get around quite well whereas daily wages loss due to physical pain, necessity of medical treatment was common in patients of Control Group. Patients' received "Advance Patients Care Plan" found their life meaningful, enjoyable while patients of Control Group suffered from lack of concentration and depression. Patients in Control Group lacked social communication while patients in experimental group had better personal relationship and satisfied of their condition of living. "Advance Patients Care Plan" helped

patient to regain the confidence and provided the urge to live life in a healthy way again.

“Advance Patients Care Plan” had improved the quality of life for the patients in Experimental Group. Patients with cardiovascular diseases need to adopt few preventive steps in their lifestyle to live a healthier life. Advance Patients Care Plan endorsed various lifestyle modification to patients by which the quality of the life had improved. The patients in Experimental Group have better physical social relationships with partner due to the counseling and interaction provided. The follow up after discharge showed that patients had changed their life style and the suffering of the diseases had decreased remarkably along with the cost of therapy.

In terms of therapeutic outcomes Advance Patients Care Plan showed significant improvement in Experimental Group. The patients in Experimental Group have better sleep habits, sexual life and self-control over their addictions. But in Control Group patients suffer from short of breath, fatigue, low in energy and often depress and prone to the addictions. In few patients recurrent admission to hospital also recorded. This shows in addition to treatment, counseling is also necessary to provide a complete therapy.

In the results it is clearly perceptible the patients of Experimental Group have had paid less for therapy cost and overall wellbeing and state of health is also superior than the patients in Control Group. The strategic intervention of Advance Patients Care Plan aided patients to comprehend the diseases better and to overcome stigma of the diseases. The Advance Patients Care Plan can benefit hugely patients if implemented in a larger scale.

## CONCLUSION

This research highlights the importance of an Advance Patients Care Plan along with the treatment to achieve the desired therapeutic outcomes in cardiovascular patients. Advance Patients Care Plan in addition to treatment showed significant evidence in improvement of patients’

therapeutic outcomes and reducing the economic burden on the patients.

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