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Impact of a Multidisciplinary Care Model on Clinical Outcomes and Quality of Life in Patients with Heart Failure

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1. INTRODUCTION

The leading cause of death worldwide, cardiovascular diseases (CVDs) are the hidden disaster of the twenty-first century (Perel P, et al 2015). CVD is currently the world's main killer, with 20.5 million people dying each year from CVDs, close to one third of all deaths worldwide (World Heart Report 2023). The death rate from CVDs has gone down in economically developed countries thanks to new drugs, better medical technology, and changes in government policies and programs. In contrast, about 75% of CVD fatalities among those under 70 years old occur in low- and middle-income countries, which raises serious concerns about their impact (Jeemon P, et al 2021). Heart attacks and heart failure are the most common CVDs. 64 million people worldwide including about 5 million in the US are afflicted by this rapidly spreading health issue, which makes up 1% to 2% of the world's population. Heart failure mortality rates are greater in Southeast Asia (15%), China (7%), South America (9%), and West Asia (9%), despite significant regional variations in heart failure incidence. Heart failure is the end outcome of several cardiovascular issues. The leading cause of mortality and illness burden in India is cardiovascular disease. Indians are particularly concerned about CVDs because of their early start and quick development with prematurely elevated mortality. India has one of the highest percentages of lost productive years as a result of mortality risk among people aged 35 to 64 (Reddy KS 1998). Heart failure accounts for 8.9% of the total disability adjusted life years (DALY), representing the largest contribution from cardiovascular disorders at 14.1%. In India, the states with the highest incidence of heart failure are Tamil Nadu, Punjab, and Kerala.

The risk factors for heart attacks and heart failure illnesses are similar. "A myocardial infarction, also known as a heart attack, occurs when the coronary blood supply to the heart muscle becomes blocked. Lipid buildup or extreme hypertension may cause a heart conduit to clog or sclerose (Gaziano TA. et al 2007). This leads to sudden cardiac arrest. However, typically, heart failure occurs gradually and becomes worse over time. This complicated disease could be caused by any problem with the ventricle's structure or function that makes it unable to fill with blood (diastolic) or empty of blood (systolic) to meet the metabolic needs of the body. Heart failure may result from valve malfunction, progressive cardiomyopathy, coronary artery disease, or chronic hypertension (Krupp, K et al 2020). If the heart isn't pumping well, it can lead to shortness of breath from swollen lungs and blood vessels, poor exercise tolerance (because tissues aren't getting enough blood), swelling in the feet and legs (called pedal edema), and too much blood and fluid in the body (called volume overload). Numerous factors, such as the patient's age, the severity of the condition, and the involved ventricle, influence the signs and symptoms of heart failure. The most typical signs of left-sided heart failure are shortness of breath, restricted exercise capacity, a chronic, persistent cough, and fluid retention that results in edema in the ankles, legs, or feet. Unusual weight gain, fatigue, and an erratic or rapid pulse are the symptoms of left-sided heart failure (Cavan, David, et al 2016). Typical signs of RSHT. Fluid retention, poor exercise tolerance, and dyspnea are the most prevalent symptoms of heart failure. This negatively impacts an individual's functional abilities and health-related quality of life. The New York Heart Failure Association (NYHA) uses an individual's exercise capacity to categorize the degree of heart failure. It facilitates tracking how well a therapy is working. Over the last 10 years, India's economic expansion and urbanization have caused a greater percentage of its people to adopt unhealthy lifestyles. Human life expectancy is rising as a result of medical advancements. However, the aging population and early onset of CVDs exacerbate it, and this trend is likely to continue in the coming years. Smoking, being overweight, eating a high-fat diet, and not exercising can cause heart failure, according to the American Heart Association (AHA). Risk factors that can't be changed, like age and genetics, can't be changed, but risk factors that can be changed can easily be changed to lower the chance that the illness will show up. People must, for instance, change their eating habits from harmful

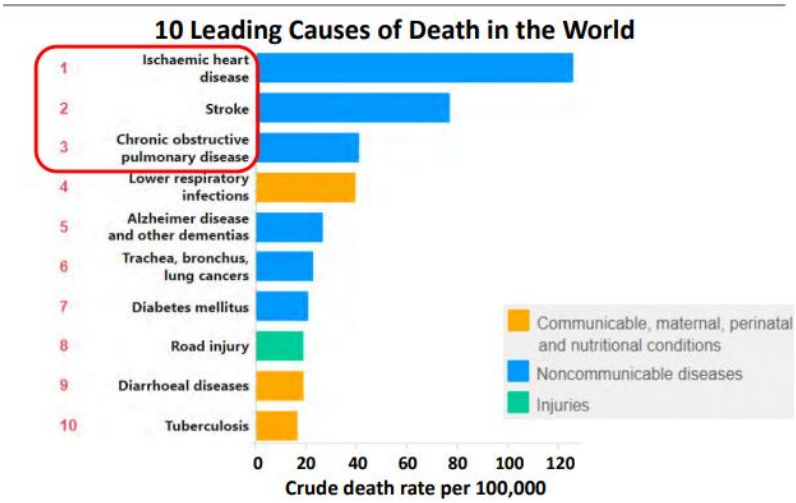
to healthy ones. When advanced risk factors like obesity and hypertension are coupled with a decline in physical activity, heart failure results.

India's HF burden is increasing at a startling pace. Heart failure had one of the highest death rates, at 23%, within a year after diagnosis. It has become the leading cause of mortality in all parts of India, including rural and impoverished states. As this pandemic spreads, individuals are embracing bad lifestyle choices, including less exercise, more stress, and consuming too much fat, which results in obesity, diabetes, and hypertension—all of which are co-morbidities that fuel the emergence of cardiac failure. The average life expectancy has grown due to better medical treatment; hence, heart failure is more likely to occur in the years to come among fast-aging populations.

According to Chamberlain (2018), heart failure needs ongoing, long-term care, which may provide significant therapeutic and financial difficulties for patients. Death and illness rates remain high despite significant improvements in treatments and preventative measures, and heart failure lowers a person's level of life satisfaction. A few components with specific objectives, such as symptom alleviation, enhanced living standards, and halting the course of the illness, are often included in complete therapy modalities for patients with heart failure. Treatment includes pharmacological intervention, risk factor reduction, dietary modifications, and instruction in self-care skills. However, the treatment of heart failure patients varies significantly. This has proven to be a major obstacle in the healthcare sector. Together with other medical professionals, patients with heart failure must learn how to cope with the consequences of their condition and therapy, which requires following a prescribed course of treatment. According to research, some of the contributing factors include not taking prescription drugs as directed, not following dietary and fluid guidelines, not taking proper care of oneself, ignoring warning signs, and not recognizing and seeking treatment for exacerbations in a timely manner. (Moye and others, 2018). According to the American Heart Association and the American Society of Cardiology, patient education is a crucial part of managing heart failure. Nurse-Led To get the best outcomes, structured instruction and dyadic counseling are essential. According to Toukhsati et al. (2019), comprehensive patient education includes self-care practices that patients should follow on a daily basis in order to manage this complicated, chronic illness.9, 10. Transitional care, also known as specialized post-discharge interventions, consists of one or more activities that help people move from one kind of care setting to another in a safe, efficient, and effective manner. The best way to provide transitional care from acute care facilities to convalescent environments may be discharge education combined with telephone conversations

2. GLOBAL SCENARIO

Cardiovascular diseases (CVDs), cancers, respiratory diseases, and diabetes are the most important NCDs, accounting for more than 60% of all deaths. In 2019, seven out of the 10 leading causes of death worldwide were NCDs. These seven factors accounted for 80% of the top 10 causes of mortality and 44% of all deaths. In 2019, non-communicable illnesses were responsible for 74% of all fatalities worldwide (*Bhandari, GP et al (2014*).



(SOURCE:http://www.who.int/gho/mortality_burden_disease/causes_death/top_10/en/)

Figure 1.1 depicts that the main types of NCDs are cardiovascular disease.

3. INDIAN SCENARIO

At the turn of the century, Over 75% of CVD deaths took place in low- and middle- income countries where raised blood pressure happens to be amongst the most important risk factors for CVDs. India reported 63% of total deaths due to NCDs, of which 27% were attributed to CVDs. CVDs also account for 45% of deaths in the 40-69 year age group[21].

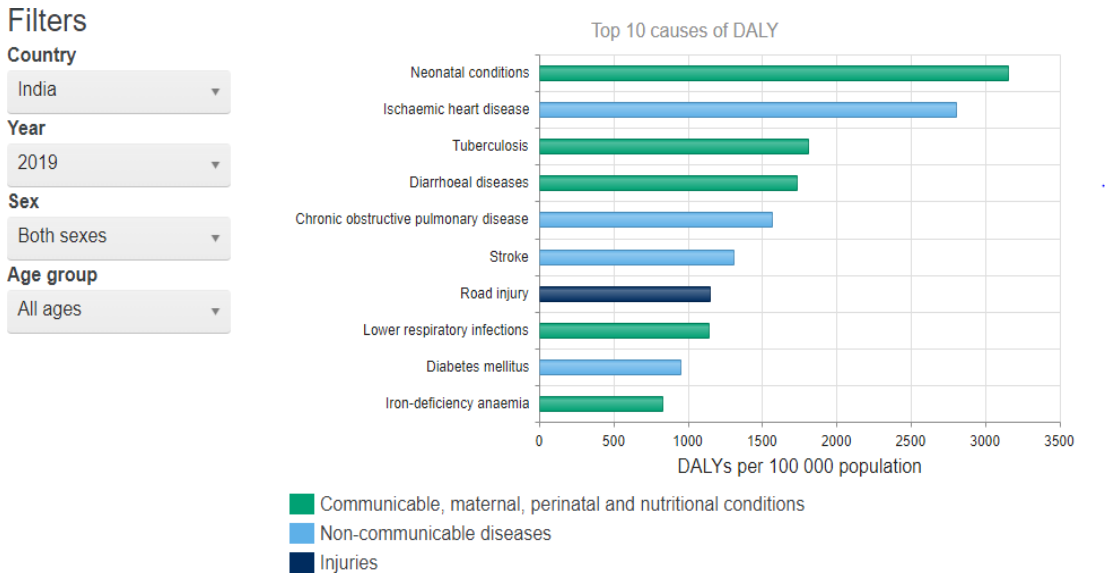


FIG. 1.6 TOP 10 CAUSES of DALY WORLDWIDE. SOURCE: WHO GLOBAL HEALTH ESTIMATES

Figure 1.6 depicts the global trends in disability-adjusted life years (DALYs) in which India has IHD prevalence increased significantly, and years lived with disability doubled from 17.7 million (95% UI: 12.9 to 22.5 million) to 34.4 million (95% UI:24.9 to 43.6 million) over 5 years period.

According to World Health Organization, India is responsible for one-fifth of these deaths globally especially in young population. According to the findings of the Global Burden of Disease study, India has an age-standardized cardiovascular disease death rate of 272 per 100,000 people, which is much higher than the global average of 235. CVDs afflict Indians a few decades before they do the rest of the world[22].

In India, the epidemiology of HF has been little recognized. Patients admitted with acute Heart failure symptoms over a one-year period were described based on their ejection fraction, according to a hospital and community-based registry in south India (EF). Despite significant Developments in the management of chronic HF, it still remains with worse prognosis leading to several hospitalizations. According to the INDUS study, the estimated prevalence of HF in India was 1% of the total population; that is about 8 to 10 million patients[23]. The following are the triggering factors that lead to heart failure, as shown in the table below:

TABLE 1.1 CLINICAL CHARACTERISTICS AND OUTCOMES OF PATIENTS ADMITTED WITH HEART FAILURE: INSIGHTS FROM A SINGLE- CENTER HEART FAILURE REGISTRY IN SOUTH INDIA

	HFrEF *n*=296 (65.9%)	**HFmrEF *n*=90 (20%)**	**HFpEF *n*=63 (14.03%)**	***p* value**
Total *n*=449	190 (42.3)	142 (31.6)	28(31.1)	20(31.7)
Drug non-compliance	418 (93)	312 (69.4)	80(88.8)	26(36.5)
Increased fluid/salt intake	55 (12.2)	41 (9.1)	12(13.3)	2(3.1)
ACS	55 (12.3)	41 (9.1)	8(8.8)	6(9.5)
Acute valvular pathology	16 (3.5)	12 (2.6)	2(2.2)	2(3.1)
Accelerated hypertension	3 (0.6)	2 (0.4)	1(1.1)	0
Pulmonary thromboembolism	78 (17.3)	58 (12.9)	15(16.6)	5(7.9)

The pandemic insights from south Indian clinical registry revealed that the incidence of ADHF admissions during COVID-19 lockdown significantly increased compared to the previous year. During the lockdown, in-hospital mortality was

proportionally higher and the occurrence of de-novo HF increased and become the most common cause of IHD as per the ICC NHFR (Indian College of Cardiology National Heart Failure Registry) for 2019 and 202024.

4. MATERIALS & METHODS

4.1 RESEARCH APPROACH

In view of the nature of the problem and to accomplish the objective of the study, a Quantitative Research Approach was adopted for this study.

4.2 RESEARCH DESIGN

The research design outlines the fundamental strategies employed by the researcher to generate precise and interpretable information. It serves as the structural framework for implementing the study.

In this study, a True Experimental pre-test post-test control group design was utilized to validate the outcomes. To demonstrate the effectiveness of the Hospital to Home (H2H) initiative intervention, a comparison was essential. Therefore, the investigator aimed to evaluate the impact of the H2H initiative on therapeutic compliance, functional ability, and health-related quality of life among heart failure patients by comparing the experimental and control groups. To ensure fairness, the investigator used a random allocation method to assign selected heart failure patients equally to either the experimental or control group.

TABLE 4.1: SCHEMATIC REPRESENTATION OF THE STUDY DESIGN

Random Allocation Design

Groups and Testing Phases

Group	**Pre-Test (O_1)**	**Intervention**	**Post-Test 1 (O_2) (1st Month)**	**Post-Test 2 (O_3) (3rd Month)**
Experimental Group	O_1	**H_2H – Hospital to Home Initiative Intervention Package (X)**	O_2	O_3
Control Group	O_1	**Conventional Care**	O_2	O_3

- O_1 (Pre-Test Data Collection): Includes baseline assessments on the following:
- Demographic and Clinical Variables
- Medication Adherence: Assessed using the Morisky Medication Adherence Scale (MMAS)
- Heart Failure Compliance: Measured using the Heart Failure Compliance Scale (HFCS)
- Self-Care Behavior: Evaluated with the European Heart Failure Self-Care Behavior Scale (EuHFSBs)
- Physical Activity Status: Determined through the DUKE Activity Status Index (DASI) Scale

O_2 European Heart Failure Self - Care Behaviour Scale (EHFScBS - 9)

It was developed and standardized by **Jaarsma et al. (2009).** The EHFScBS described the actual state of self-Care Behaviour of patients. The 9-item European Heart Failure Self-care Behaviour Scale was tested to measure patient's self-care in two dimensions - consulting behaviours and adherence with the regimen[89].

The consulting behaviours dimension investigates how often people with Heart Failure call their Nurse in case of shortness of breath, ankle swelling, weight gain and fatigue. Whereas the adherence with the regimen dimensions was measured by how often patients weigh themselves, their fluid intake, follow low sodium diet, regular on medication and exercise.

4.3 DATA COLLECTION PROCEDURE

Following official administrative clearance from the institutional ethics committee, data gathering got underway. The principal of Batra Hospital & Medical Research Center granted official written consent. The investigator introduced themselves before beginning data collection for each sample.

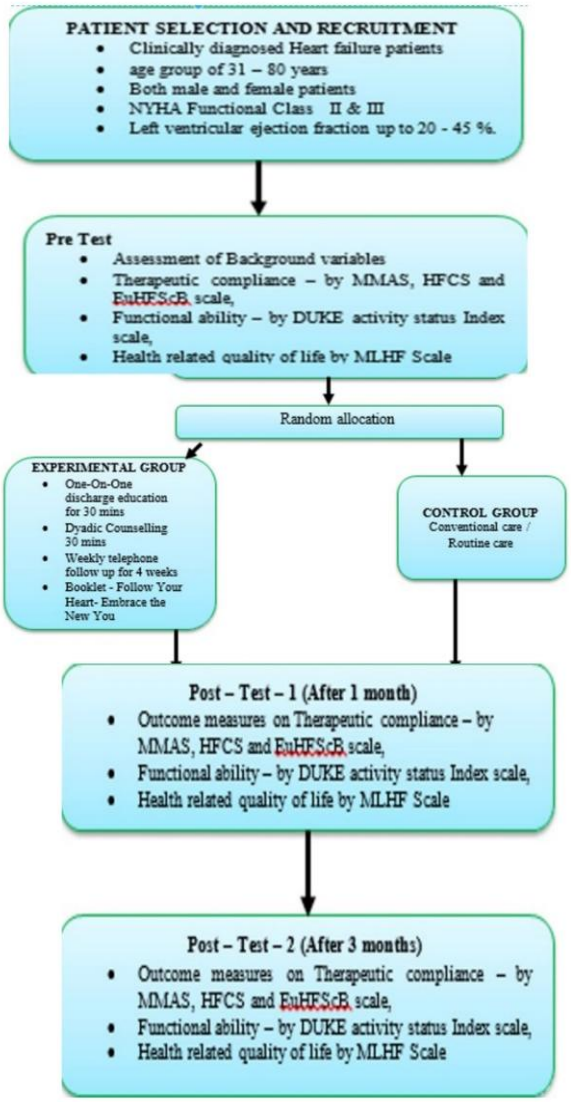
For each of the chosen samples, the researcher created a sealed envelope with sequential numbers. The researcher promised heart failure patients anonymity and secrecy. The research subjects gave their informed consent. Samples were chosen based on the study's baseline assessment criteria. Three to five patients in cardiac units provided data to the investigator each day. Because of the worsening of symptoms, it was raised throughout the winter. Data was gathered over a 4-month period from heart failure patients who were hospitalized to KMC Hospital's cardiology department. Before discharge, the

intervention was carried out in three stages. The research was described to the patients when they were contacted. The chosen study participants were given opportunity to ask any questions they had concerning the research's objectives. A pre-test questionnaire was then sent to both groups.

A self-administered questionnaire on medication adherence, compliance, self-care practices, and health-related quality of life was sent to both groups as part of the Phase I pre-test.

Patients in the experimental group took part in the Hospital to Home initiative in Phase II. They were provided with personalized teaching via structured discharge education that included PowerPoint presentations and an instructional booklet prior to release. The evaluation was carried out on Day 1 and included the illness status and its pathophysiology, etiology, modifiable risk factors, and treatment methods, including non-pharmacological therapies. The study participants were contacted three days before to their planned discharge. Family caregiver counseling will cover the previous day's materials and activities on Day 2, and Day 3, which is discharge day, will highlight the importance of lifestyle modification for compliance with H2H initiative measures and include the booklet "Follow Your Heart – Embrace the New You." For four weeks, the study group's patients were monitored by phone on a scheduled basis to ensure they followed the treatment plans.

A post-test was given on the 30th and 90th days of follow-up in Phase III. Similar self-administered questionnaires on activities, self-care, medication adherence, compliance, functional ability, and health-related quality of life were used in the research. The control group received just conventional care.



The frequency and percentage distribution of demographic variables among experimental and control groups are described in Section 5.1: Description of Demographic and Clinical Variables Table 5.1

(N=220)

Demographic Variables	Group				c2 and p value
	Experimental (n=110)		Control (n=110)		
	n	%	n	%	
Age (years)					
a. 31 - 40	10	9.09	6	5.45	
b. 41 - 50	40	36.36	30	27.27	c2=3.90
c. 51 - 60	37	33.64	46	41.82	P=0.25 DF=3 (NS)
d. 61 - 70	23	20.91	28	25.45	
Sex					
a. Male	102	92.73	99	90.00	c2=0.52 P=0.47
b. Female	8	7.27	11	10.00	DF=1 (NS)
Marital Status					
a. Married	88	80.00	85	77.27	
b. Unmarried	2	1.82	4	3.64	c2=1.16
c. Separated	2	1.82	1	0.91	P=0.76
d. Widow/widower	18	16.36	20	18.18	DF=3 (NS)
Education					
a. No formal	13	11.83	12	10.91	
education	39	35.45	48	43.64	c2=2.11
b. Higher secondary	41	37.27	32	29.09	P=0.55 DF=3 (NS)
c. Degree					
d. PG/higher education	17	15.45	18	16.36	

Demographic Variables	Group				c2 and p value
	Experimental (n=110)		Control (n=110)		
	n	%	n	%	
Occupation					
a. Employed	46	41.82	43	39.09	
b. Self employed	22	20.00	24	21.82	c2=3.31
c. Unemployed	36	32.73	30	27.27	P=0.35

d. Retired from job	6	5.45	13	11.82	DF=3 (NS)
Alcohol intake a. Non drinker b. < 3 times / week c. > 3 times /week d. Daily	 48 51 9 2	 43.64 46.36 8.18 1.82	 49 48 9 4	 44.55 43.63 8.18 3.64	 c2=0.77 P=0.86 DF=3 (NS)
Smoking a. Yes b. No	40 70	36.36 63.64	29 81	26.36 73.64	c2=2.56 P=0.11 DF=1 (NS)

NS= not significant; DF= Degrees of Freedom; P>0.05 not significant

Table 5.1 shows that 41.8% of the control group's members were between the ages of 51 and 60, whereas 36% of the experimental group's members were between the ages of 41 and 50. In terms of gender, 90 percent of the control group and 92.7% of the experimental group were males. In terms of marital status, 77.7% of the control group and 80% of the experimental group were married. Most of them shared a home with a spouse. In terms of education, 43.6% of the control group had completed upper secondary school, whereas 37.27% of the experimental group had done so. Regarding employment, the majority of the experimental group (41.8%) and the control group (30.9%) drank fewer than three times per week, while 44% of the control group did not drink. Regarding smoking, 63% of the experimental group and 73% of the control group either quit smoking after beginning therapy or did not smoke. group were working. Regarding alcohol use, the vast majority of trial participants (46%) were experiencing the

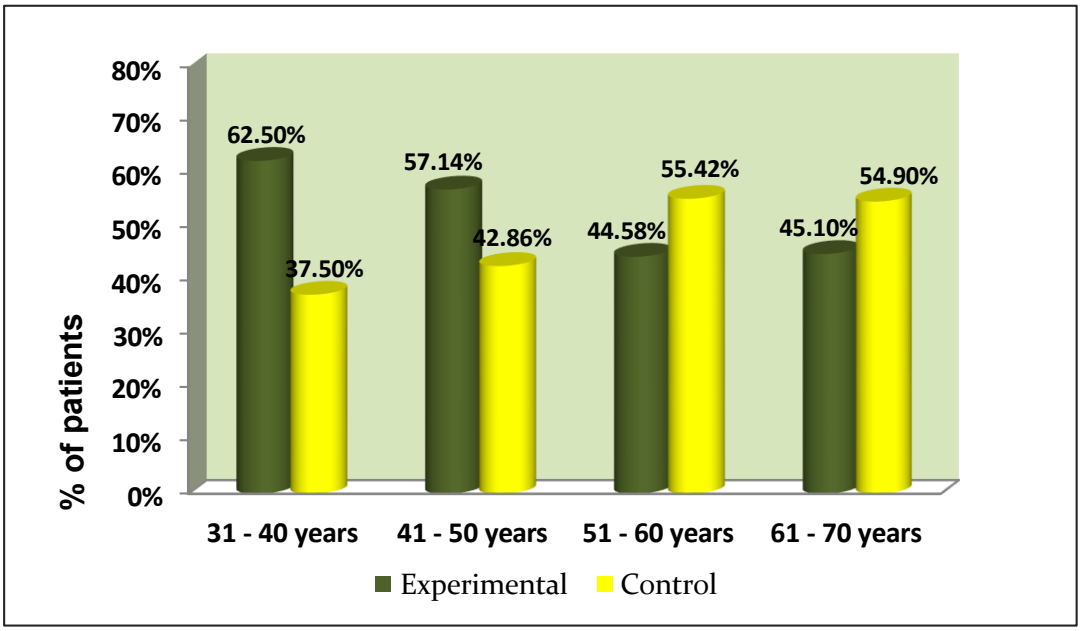


FIG. 5.1 AGE DISTRIBUTION

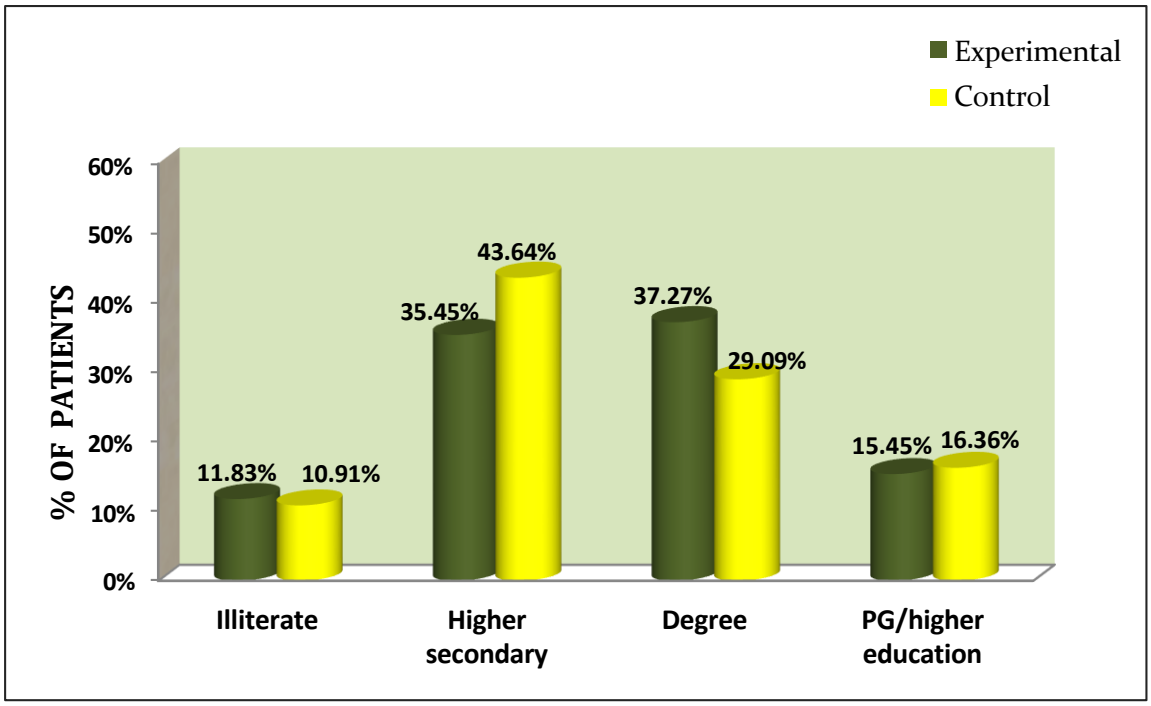


FIG. 5.3 EDUCATIONAL STATUS

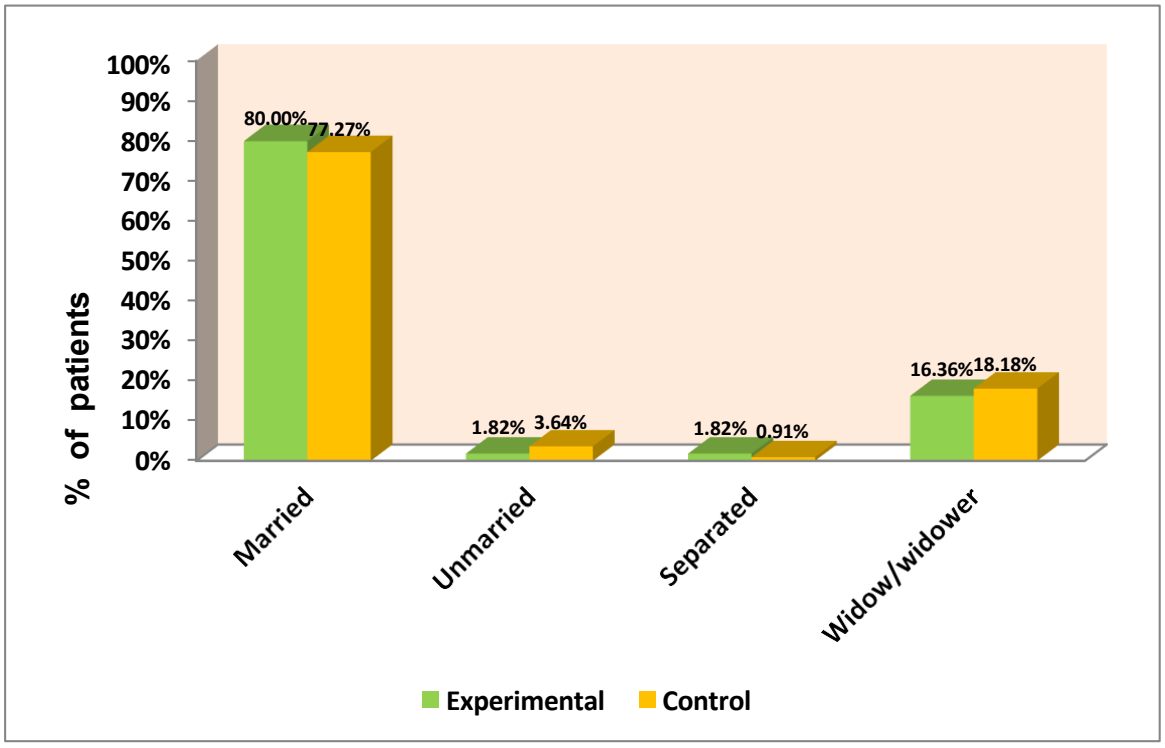


FIG. 5.4 MARITAL STATUS

FIG. 5.5 OCCUPATIONAL STATUS

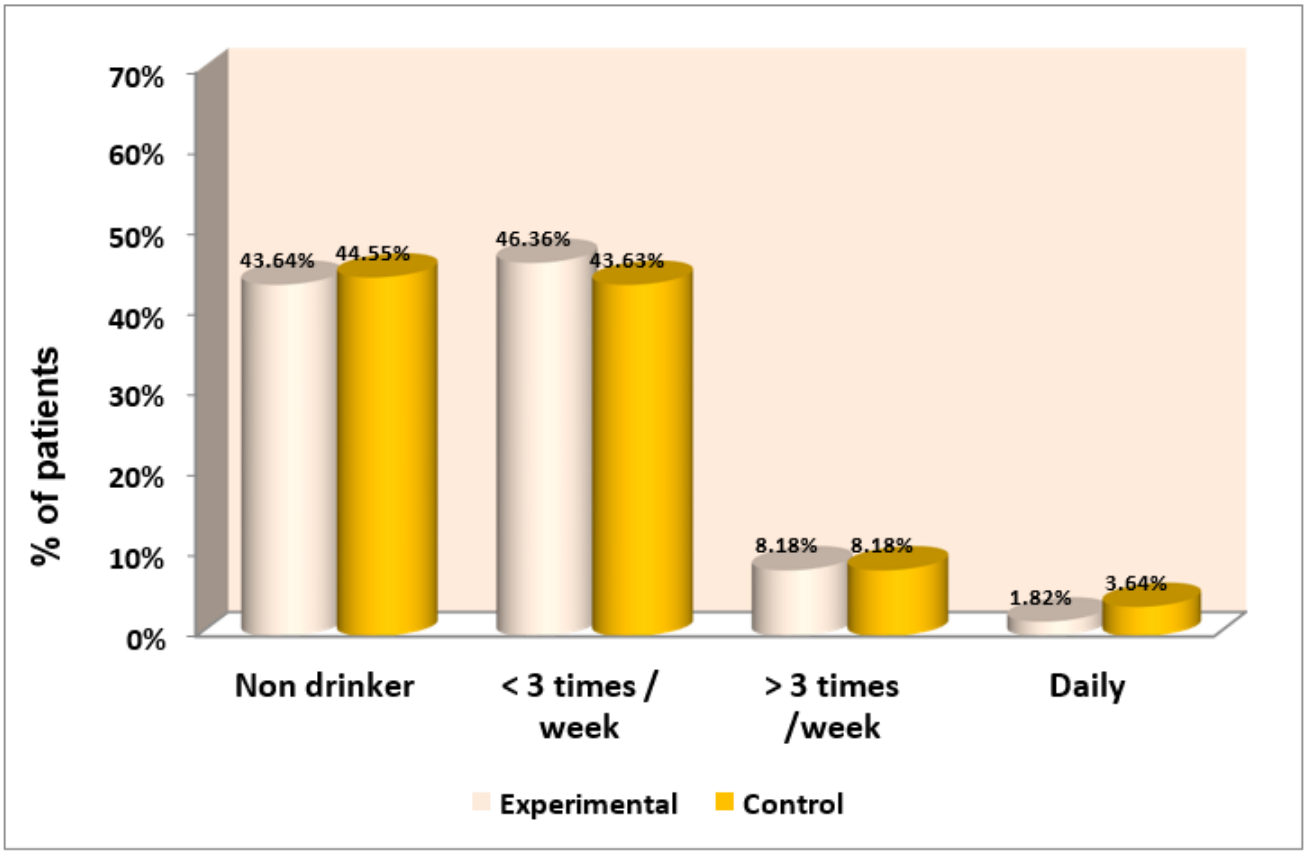


FIG. 5.6 ALCOHOL INTAKE

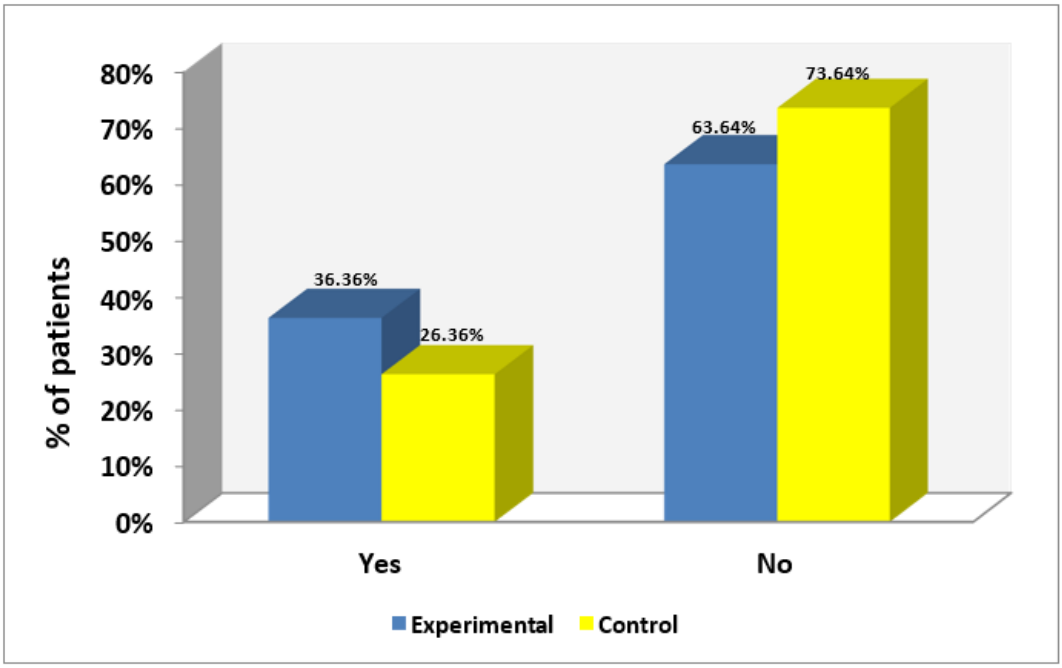


FIG. 5.7 SMOKING

TABLE 5.2 FREQUENCY AND PERCENTAGE DISTRIBUTION OF CLINICAL VARIABLES AMONG EXPERIMENTAL AND CONTROL GROUP

Conclusion

The findings of this study demonstrate that a multidisciplinary care model significantly improves the clinical outcomes and quality of life in patients with heart failure. By integrating the expertise of cardiologists, nurses, pharmacists, dieticians, and physiotherapists, patients receive comprehensive and individualized care that enhances medication adherence, reduces hospital readmissions, and promotes better self-management. This collaborative approach not only addresses the medical aspects of heart failure but also supports the psychological and social well-being of patients. Therefore, implementing multidisciplinary strategies should be considered an essential component of standard heart failure management to achieve sustainable improvements in patient outcomes and healthcare efficiency.

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Conflict of interest

No conflict of interest were found.

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