ACH Med J
(2023) 4: 173-178
ISSN:2822-5872
Doi : 10.5505/achmedj.2023.36025

RESEARCH ARTICLE

Inpatient follow-up in the palliative care center or the cardiology clinic in patients with end-stage heart failure? cost-effectiveness study, two-center retrospective study

Nuray Yilmaz Cakmak[1], Gulay Aydin[2], Kadriye Kahveci[3]

[1]Internal Medicine Clinic, Palliative Care Center, Ankara Yıldırım Beyazıt University, Ankara Bilkent City Hospital, Ankara, Turkiye
[2]Cardiology Clinic, Darıca Farabi Training and Research Hospital, Kocaeli, Turkiye
[3]Intensive Care Clinic, Department of Anesthesia and Reanimation, University of Health Sciences, Ankara Bilkent City Hospital, Ankara, Turkiye

Article Info

Received Date: 12.04.2023
Revision Date: 24.07.2023
Accepted Date: 24.07.2023

Keywords:

Cost-effectivite, heart failure, palliative care

Abstract

Introduction: The aim of this study is to compare the treatment costs, hospitality costs and total costs of the patients who were hospitalized for chronic decompensated heart failure and monitored by the Palliative Care Center and Cardiology Clinic during a one-time hospitalization. **Methods:** A two-center retrospective study was performed. A total of 92 patients were included in this study. Thirty-eight out of the 92 were inpatients with chronic decompensated heart failure, and were monitored in the Palliative Care Center, and the other 54 were dealing with chronic decompensated heart failure and were treated at the Cardiology Clinic. **Results:** At the end of the day, 42.10% of the patients hospitalized in the Palliative Care Center and 37.03% of the patients hospitalized in the Cardiology Clinic were women. The mean age of the patients hospitalized in the Palliative Care Center was 76.71 ± 11.34 years; the mean age of the patients hospitalized in the Cardiology Clinic was 74.09 ± 11.16 years. There was no statistical difference between the two groups. The duration of hospitalization for patients in the Palliative Care Center was longer than patients in the Cardiology Clinic. The cost to the patient was greater in the palliative care center in terms of the average cost of treatment per patient, average cost of hospitality management and average total cost per patient, which was statistically important ($p < 0.05$). The mortality rate that was observed during hospitalization was lower in the Cardiology Clinic by a statistically important margin ($p < 0.05$). **Conclusion:** The cost of treatment, the cost of hospitality and the total cost of hospitalization for chronic decompensated heart failure patients were higher in the Palliative Care Center than in the Cardiology Clinic. However, it was observed that the rate of mortalityand higer co-morbidities in the Palliative Care Center was higher than the Cardiology Clinic.

Correspondence Address: Beytepe Mah. 5540. Sokak B Blok No: 8 Ankara - Türkiye
Phone: +90 3125526000 / **e-mail:** dr.nurayyilmaz@gmail.com

Introduction

Palliative care is a type of specialized medical care for patients living with a serious chronic illness. Such care aims to reduce patient discomfort, improve quality of life and minimize stress. Although palliative care was initially implemented to alleviate the suffering of cancer patients at the end of their lives, today it aims to help patients and their caregivers adapt to the new reality at an earlier stage in diseases that may end up being fatal.[1] In addition to cancer patients, palliative care services also provide services to patients with heart disease, stroke, muscle and nerve diseases that have caused lesion and dysfunction, end-stage liver disease, end-stage renal failure, Alzheimer's disease and dementia, chronic lung disease, Parkinson's disease, congenital disease, and other chronic diseases that result in limitation of movement or bed dependency.

Studies show that palliative care is effective in both reducing symptom burden and improving quality of life. It has also shown to be cost-effective and is synonymous with quality of care.[2]

Heart failure is a chronic and progressive disease prevalent in approximately12% of those 65 years and older around the world, and this rate tends to increase each year.[3] Heart failure is a major health problem due to its high morbidity and mortality rates, as well as bringing symptoms that lead to a poor quality of life.[4] Patients living with heart failure often struggle with many conditions including dyspnea, orthopnea, and often uncontrollable symptoms such as edema and fatigue, depression, anxiety, and psychosocial stress.

However, palliative care may offer some benefits to those dealing with heart failure, such as a focus on reducing symptom burden, improvement in mental health, and reduction in the overall number of hospital admissions. At the same time, it can help promote a successful environment for home-care, as it also deals with relatives watching over patients with heart failure.[5]

Both the World Health Organization (WHO) and the European Society of Cardiology agree that it is necessary to work alongside palliative care not only for end-stage heart failure patients, but also from the moment of diagnosis of heart failure.[6,7] Despite this, the number of patients who can receive palliative care is very limited among patients struggling with heart failure in Türkiye as in the whole world.

Since heart failure patients are in the category of those requiring multiple hospitalizations, patient-based cost rates can be quite high. There are few studies on this subject and the results are inconsistent.

In this retrospective two-center study, we aimed to compare the treatment costs, hotel costs, and total costs of patients hospitalized for chronic decompensated heart failure who were followed up by the Palliative Care Center and the Cardiology Clinic during a single hospitalization.

Material and Methods

A two-center retrospective study was designed. Since there was no coronary angiography unit in the Cardiology Clinic, coronary angiography, coronary balloon-stent, artificial heart pump, and artificial heart assist devices were not utilized. Patients over 18 years of age, struggling with chronic decompensated heart failure and receiving inpatient treatment at the Palliative Care Center, and patients receiving inpatient treatment at the Cardiology Clinic who were demographically similar were included in the study. Patients younger than 18 years of age, pregnant women, patients with postpartum cardiomyopathy, acute myocardial infarction, acute myocarditis, isolated right heart failure, and isolated diastolic heart failure were excluded. Patients were consecutively included according to the date of hospitalization. Transthoracic echocardiography was performed to evaluate cardiac function before hospitalization. Patients with a left ventricular ejection fraction of 50% or less were also included in the study. The left ventricular ejection fraction was calculated using Simpson's method. The principles of the Declaration of Helsinki were followed throughout this study. Patient data were obtained from the data processing-automation center and billing unit of Ankara City Hospital and Health Sciences University Darıca Farabi Training and Research Hospital after obtaining ethics committee approval.

Local ethics committee approval was obtained from the Ankara City Hospital Ethics Committee 1 with the date 20/01/2021 and number E1-21-1158.

Statistical Analysis

Demographic data and baseline characteristics of all patients were summarized. All continuous variables were described using descriptive statistics, including the number of observations (N), mean, standard deviation (SD), median, minimum and maximum. All categorical variables were summarized using the number and percentage of subjects. Demographic data and treatments of the patients

in the two groups were statistically compared. Normality for variables was tested with the Shapiro-Wilk test using Q-Q plots and histograms. Differences between variables were assessed using the Independent two-sample t-test or Mann-Whitney-U test, depending on normality, while the Chi-square test ($\chi 2$) was used for categorical values. Statistical analyses were performed using SPSS version 26 (IBM Corp., IBM SPSS Statistics for Windows, Version 26.0. Armonk, New York: IBM Corp).

Results

A total of 92 patients were included in the study, consisting of 38 chronic decompensated heart failure patients who were monitored as inpatients by the Palliative Care Center of Ankara City Hospital from 01/2020 to 01/2021 and 54 chronic decompensated heart failure patients who were monitored as inpatients by the Cardiology Clinic of Health Sciences University Darıca Farabi Training and Research Hospital. Thirty-six (39.10%) of the patients included in the study, 16 (42.10%) of the patients hospitalized in the Palliative Care Center and 20 (37.03%) of the patients hospitalized in the Cardiology Clinic were women. When the two groups were compared in terms of gender, it was determined that there was no statistical difference (p=0.20). The mean age of the patients included in the study was 75.17±11.25 years. The mean age of the patients hospitalized in the Palliative Care Center was 76.71 ± 11.34 years; the mean age of the patients hospitalized in the Cardiology Clinic was 74.09 ± 11.16 years. When the patients in these two groups were collation terms of age, there was no statistical difference (p= 0.20). The mean length of hospitalization of the patients contain in the study was 12.22±9.69 days. The mean length of stay of the patients was 14.89±10 days in the Palliative Care Center and 10.35±9.07 days in the Cardiology Clinic. When the two groups were collation in terms of length of stay, it was determined that the patients were hospitalized longer in the Palliative Care Center, and there was a statistical difference (p<0.05). During hospitalization, there was exitus in 21 percent (22,80%) of the patients. The mortality rate observed during hospitalization was 34.21% in the Palliative Care Center and 14.81% in the Cardiology Clinic. When the mortality of the two groups was compared, the rate was lower in the Cardiology Clinic and this was statistically important (p < 0.05). Demographic data of the patients including age, gender, length of hospitalization, and comorbidities are given in Table 1. It was determined that patients hospitalized in the Cardiology Clinic received more positive inotropic support as well as new oral anticoagulants, oral nutrition, and total parenteral nutrition support than patients hospitalized in the Palliative Care Center. It was found that patients hospitalized in the Palliative Care Station also received aspirin, clopidogrel, and low molecular weight Heparin treatment more frequently than patients hospitalized in the Cardiology Clinic. The medications used by the patients are given in Table 2. The average treatment cost per patient in the Palliative Care Station was 2140.46 TL (min 1229.00 TL - max 6631.72 TL) (292.41 $ [min 167.89$-max 905.97$]), while the average treatment cost per patient in the Cardiology Clinic was 773.43 TL (min 71.00 TL - max 4564.73 TL) and the cost in dollars was $105.65 (min $105.89 - max $623.49). When these two groups were compared in terms of the average treatment cost per patient, the average treatment cost was higher in the Palliative Care Center and this was statistically significant (p<0.05). The average hospitality cost per patient in the Palliative Care Center was 8173.73 TL ($1116.62) (min 150.00 TL [$20.49] - max 68496.25

Table 1. Demographic data of the patients including age, gender, length of hospitalization, and comorbidities

Variables	Patients in the Palliative Care Center s (%) 38 (41,30)	Inpatients in the Cardiology Clinic S (%) 54 (58,70)	Total patients s=92	p
Female gender s (%)	16 (42,10)	20 (37,03)	36 (39,10)	>0,05
Age (year)	76,71±11,34	74,09±11,16	75,17±11,25	0,20
Length of hospitalization (days)	14,89±10	10,35±9	12,22±9,69	<0,05
Alzheimer's disease s (%)	20 (52,63)	4 (7,40)	24 (26,10)	<0,05
Cancer s (%)	16 (42,10)	2 (3,70)	18 (19,60)	<0,05
Diabetes mellitus s (%)	13 (34,21)	16 (29,62)	29 (31,50)	0,06
Hypertension s (%)	19 (50,00)	29 (53,70)	48 (52,20)	0.08
CAD s (%)	15 (39,47)	20 (37,03)	35 (38,00)	<0,05
COPD s (%)	8 (21,05)	6 (11,11)	14 (15,20)	0.06
CRF s (%)	22 (57,89)	37 (68,51)	59 (64,10)	0.20
Hemodialysis s (%)	13 (34,21)	13 (24,07)	26 (28,30)	0.20
Ejection fraction %	30 (20-50)	30 (20-50)	30 (20-50)	0,70
Discharged to home s (%)	22 (57,89)	45 (83,33)	67 (72,80)	<0,05
Transfer to intensive care unit s (%)	1 (2,63)	0	1(1,10)	
Discharge to care home s (%)	2 (5,26)	1 (1,85)	3 (3,30)	0,7
Exitus s (%)	13 (34,21)	8 (14,81)	21 (22,80)	<0,05

S: Number , CAD: Coronary Artery Disease , COPD: Chronic Obstructive Pulmonary Disease , CRF: Chronic Renal ailure

TL [$9357.41]), while the average hospitality cost per patient in the Cardiology Clinic was 4031.87 TL ($550.80) (min 372.00 TL [$50.81] - max 27300.00 TL [$3729.50]). When the two groups were compared in terms of the average hospitality cost per patient, the average hospitality cost was higher in the Palliative Care Center and this was statistically important ($p<0.05$). The mean total cost per patient in the Palliative Care Center was 10314.20 TL ($1409.04) (min 1229.11 TL [$167.89] - max 73461.00 TL [$100035.65]), while the mean total cost per patient in the Cardiology Clinic was 4785.82 TL ($653.68) (min 653.46 TL [$89.27] - max 28636.0 TL [$3912.02]). When the two groups were collation in terms of the mean total cost per patient, the mean total cost was higher in the Palliative Care Center and this was statistically important ($p<0.05$).

Table 2. The medications used by the patients

Variables	Patients in the Palliative Care Center s (%) 38 (41,30)	Inpatients in the Cardiology Clinic s (%) 54 (58,70)	Total patients s (%) 92(%100)	p
ACE Inhibitor/ARB s (%)	9 (23,68)	19 (35,18)	28 (30,40)	0,20
Beta blocker s (%)	27 (71,05)	37 (68,51)	64 (69,60)	0,70
Digoxin s (%)	10 (26,31)	20 (37,03)	30 (32,60)	0,20
CCB s (%)	26 (68,42)	45 (83,33)	71 (77,20)	0,09
Positive inotrope s (%)	16 (42,10)	27 (50,00)	43 (46,70)	<0,05
NOAC s (%)	7 (18,42)	27 (50,00)	34 (37,00)	<0,05
Aspirin/clopidogrel s (%)	28 (73,68)	18 (33,33)	46 (50,00)	<0,05
Varfarin s (%)	2 (5,26)	7 (12,96)	9 (9,80)	0,20
Furosemid s (%)	29 (76,31)	40 (74,07)	69 (75,00)	0.80
Spirinolactone s (%)	25 (65,78)	37 (68,51)	62 (67,40)	0.70
LMWH s (%)	28 (73,68)	19 (35,18)	47 (51,10)	<0,05
Oral nutritional support s %	20 (52,63)	45 (83,33)	65 (75,70)	0,70
NG/PEG s (%)	16 (42,10)	1 (1,84)	17 (18,50)	<0,05
TPN s (%)	2 (5,26)	8 (14,81)	10 (10,90)	<0,05

ACE Inhibitor: angiotensin converting enzyme inhibitor, ARB: angiotensin receptor blocker, CCB: calcium channel blocker, NOAC: novel oral anti-coagulant, LMWH: low molecular weight Heparin, NG: nasogastric, PEG: percutaneous endoscopic gastrostomy

Discussion

Early palliative care in heart failure patients offers many advantages, such as symptom management, prevention of depression, improvement of grade of life, and alleviation of the burden of family members providing care, but the effects of palliative care on recurrent hospitalizations and cost-effectiveness are still unclear. As far as we were able to investigate, there is no multicenter study on cost analysis in inpatients for our country.

In this retrospective two-center study, there was no important difference in the mean age of patients receiving palliative care compared to the patients receiving classical inpatient care. It was observed that patients in both groups were in the geriatric age group. That appears consistent with the literature.[8]

When co-morbidities such as diabetes, hypertension, COPD, and chronic renal failure were examined in our study, no important difference was sight between heart failure patients receiving conventional treatment and heart failure patients receiving inpatient treatment in a palliative care center. However, the presence of active cancer and basic palliative care indications such as Alzheimer's disease and previous cerebrovascular events were significantly higher in the group of patients followed up in palliative care centers. This may have been due to the palliative care center consultations of the clinician who followed the patient before palliative care, as patients with cancer and co-morbidities such as cerebrovascular diseases and Alzheimer's disease were matched with the need for palliative care because they had a more indigent patient profile.

It was observed that most of the nutrition was provided by oral route in both groups. Studies suggest that to improve the quality of life in patients with poly-morbidity, the functional gastrointestinal tract should be monitored and supplemented with enteral products in cases of inadequate oral nutrition.[9,10] In addition to health hazards relating to dietary salt restriction and obesity, many nutritional problems such as cardiac cachexia and sarcopenia may develop in heart failure patients that should be taken into consideration.[11] It was observed that tube feeding was important higher in patients with heart failure who were followed up in a palliative care center. This may be due to the high prevalence of dysphagia in patients with Alzheimer's disease and cerebrovascular disease. Malnutrition occurs as a result of inadequate intake of daily nutrients. Its negative effects on the length of stay in all inpatients are well known. Malnutrition, also known as cardiac cachexia, has been detected in up to 40% of inpatients with chronic heart failure.[12] Many factors can have an impact on malnutrition in patients with heart failure, including old age, intestinal edema, anorexia triggered by inflammation, nausea, and vomiting, low activity of daily living caused by dyspnea, and anxiety. Like all clinicians, cardiologists dealing with heart failure have knowledge of this issue. However, in order to alleviate major morbidity symptoms such as dyspnea and edema in patient, the

fluid-salt restriction is essential and this is one of the factors preventing patients from accessing adequate nutrients. In our study, while over 90% of the patients more than in the palliative care center received nutritional support, this rate did not exceed 30% in the group hospitalized in the classical cardiology service. There is a significant difference between them. There are also significant differences between nutrition methods. Although the effects of oral supplements in eliminating cachexia in patients with heart failure are controversial, all patients in our palliative care center were screened for nutrition under the supervision of a specialist dietician with the goal of providing the level of nutrient consumption considered optimal for our country in a multidisciplinary approach.[13]

Patients with heart failure receive many drug therapies both to manage symptoms and to improve the chances of survival. There was no difference in the use of ACE inhibitors/ARBs, beta-blockers, digoxin, calcium channel blockers, diuretics, spironolactone and other basic medications in heart failure patients followed in palliative care centers compared to cardiology services. However, there was a significant difference between antiaggregant and anticoagulant preferences.

When the patients were evaluated in terms of mortality during hospitalization, it was found to be significantly higher in patients hospitalized in palliative care centers. In a study by Chioncel et al. which included 9428 patients, all causes of killing in patients hospitalized with heart failure were found to be 18.6% per year. Although this rate is similar to the mortality rates in palliative care, it is important higher than the patient population followed by cardiology. This may be due to the fact that our study was cross-sectional and included single hospitalizations of patients.[14]

Heart failure is an increasing clinical and economic burden in the United States. Robust cost data on disease burden are critical to inform economic evaluations of new therapeutic interventions.[15] One of the aim of palliative care is actually the use of cost-effective health management. There are limited studies showing that palliative care is more effective in patients with heart failure.[16] However, there is no clear proof that it reduces readmissions.[17]

In our study conducted in two different tertiary centers, it was detected that the transaction costs of palliative care were higher than the invoices generated as a result of follow-ups in the classical cardiology service. This is due to the differences between the pricing of inpatient services at our social security institution and the service pricing of the palliative care center. Since the social security institution in Türkiye considers palliative care to be a specialty service due to the team being made up of psychologists, spiritual support, physiotherapists, dieticians, specialized nurses, and doctors, as well as specialized hospitality support and care staff, its pricing differs from normal service or primary intensive care pricing. At the same time, this leads to heightened hotel costs in the palliative care station due to the longer lying days compared to the cardiology clinic. Limitations: We had relatively few patients in our study. This is due to the fact that we have 16 beds in our 3rd step hospital with 3500 beds, and unfortunately, we cannot allocate enough beds for patients with heart failure because there are outpatient admissions from all units at the same time, so the number of palliative care patients followed up with heart failure is low.

In conclusion, in this study, we detected that the cost of therapy, hotel costs, and total costs of inpatients with chronic decompensated heart failure were higher in the Palliative Care Center than in the Cardiology Clinic. However, considering the mortality rates in clinics, we think that this is related to the fact that the patient profile in palliative care centers is worse, and therefore, additional treatment and the hotel services are consequently more expensive. Large prospective studies are needed to answer the question of how to follow up end-stage heart failure patients in a cost-effective manner.

References

1. https://www.who.int/news-room/fact-sheets/detail/palliative-care. 02/11/2022
2. Gomes B, Calanzani N, Curiale V, Mccrone P, Higginson IJ. Effectiveness and cost-effectiveness of home palliative care services for adults with advanced illness and their caregivers. Cochrane Database Syst Rev. 2013;2013(6).
3. Groenewegen A, Rutten FH, Mosterd A, Hoes AW. Epidemiology of heart failure. Eur J Heart Fail. 2020;22(8):1342-1356.
4. Mosterd A, Hoes AW. Clinical epidemiology of heart failure. Heart. 2007;93(9):1137-1146.
5. Aaronson EL, George N, Ouchi K, et al. The Surprise Question Can Be Used to Identify Heart Failure Patients in the Emergency Department Who Would Benefit From Palliative Care. J Pain Symptom Manage. 2019;57(5):944-951.

6. Jaarsma T, Beattie JM, Ryder M, et al. Palliative care in heart failure: a position statement from the palliative care workshop of the Heart Failure Association of the European Society of Cardiology. Eur J Heart Fail. 2009;11(5):433-443.
7. Cancer pain relief and palliative care: report of a WHO expert committee [‌meeting held in Geneva from 3 to 10 July 1989]‍ [Sep; 2021];WHO Expert Committee on Cancer Pain Relief and Active Supportive Care & World Health Organization. https://apps.who.int/iris/handle/10665/39524 World Health Organization. 1990.
8. Hersberger L, Dietz A, Bürgler H, et al. Individualized Nutritional Support for Hospitalized Patients With Chronic Heart Failure. J Am Coll Cardiol. 2021;77(18):2307-2319.
9. Gomes F, Schuetz P, Bounoure L, et al. ESPEN guidelines on nutritional support for polymorbid internal medicine patients. Clin Nutr. 2018;37(1):336-353.
10. Karahan İ. , Çifci A. Malnütrisyonun tanımı ve hastaların yönetimi. J Med Palliat Care / JOMPAC / Jompac. 2020; 1(1): 5-9.
11. von Haehling S, Ebner N, dos Santos MR, Springer J, Anker SD. Muscle wasting and cachexia in heart failure: mechanisms and therapies. Nat Rev Cardiol. 2017;14(6):323-341.
12. Rahman A, Jafry S, Jeejeebhoy K, Nagpal AD, Pisani B, Agarwala R. Malnutrition and Cachexia in Heart Failure. JPEN J Parenter Enteral Nutr. 2016;40(4):475-486.
13. Anker SD, John M, Pedersen PU, et al. ESPEN Guidelines on Enteral Nutrition: Cardiology and pulmonology. Clin Nutr. 2006;25(2):311-318.
14. Chioncel O, Lainscak M, Seferovic PM, et al. Epidemiology and one-year outcomes in patients with chronic heart failure and preserved, mid-range and reduced ejection fraction: an analysis of the ESC Heart Failure Long-Term Registry. European Journal of Heart Failure. 2017;19(12):1574-1585.
15. Urbich M, Globe G, Pantiri K, et al. A Systematic Review of Medical Costs Associated with Heart Failure in the USA (2014-2020). Pharmacoeconomics. 2020;38(11):1219-1236.
16. Kaufman BG, Granger BB, Sun JL, et al. The Cost-Effectiveness of Palliative Care: Insights from the PAL-HF Trial. J Card Fail. 2021;27(6):662-669.
17. Mentz RJ, O'Connor CM, Granger BB, et al. Palliative care and hospital readmissions in patients with advanced heart failure: Insights from the PAL-HF trial. Am Heart J. 2018;204:202-204.