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Excellence in Heart Failure: A Multidisciplinary Program on Heart Failure Management for Improved Patient Outcome

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Abstract: Chronic heart failure (HF) is the 21st-century cardiovascular epidemic, marked by recurrent hospitalizations and high mortality rates, and represents a considerable burden on Western societies. The complex care demands of HF patients require multidisciplinary approaches, aligning with contemporary guidelines. Accordingly, the Excellence in Heart Failure Program, implemented in Portuguese tertiary hospitals, aims to establish multidisciplinary HF outpatient clinics in Portugal, improving patients' clinical outcomes. Herein, the results of its pilot project are presented, showing that the implementation of the multidisciplinary clinic resulted in a minimal number of hospitalizations and emergency visits, with only one rehospitalization reported. In addition, patients in the Program experienced significant improvements in ejection fraction (EF) and NT-proBNP levels. Despite the limited power of the sample, these findings underscore the effectiveness of the Program in the management of Portuguese HF patients, particularly in the early discharge period after heart failure, when patients are most vulnerable.

Keywords: heart failure; disease management; multidisciplinary care; health services; patient discharge planning; patient-focused outcomes

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1. Introduction

Heart failure (HF) is a major public health problem affecting about 64.3 million people worldwide and is associated with high mortality and morbidity [1]. In developed countries, the prevalence of HF is estimated to be approximately 2% of the adult population and nearly 10% in the elderly [2]. These numbers are expected to increase with the aging of the European population and improved survival from other forms of heart disease. In Portugal, HF is estimated to affect approximately 5.2% of the population aged 25 years or older, accounting for 4.7% of all deaths and 2.4% of all years of life lost due to premature death [3,4], posing a significant social and economic burden.

Hospital admissions for HF have been steadily increasing over the past decades, with recent data reporting HF as the leading cause of hospitalization in older adults (≥65 years) in Europe and the United States [5,6], with more than 1 million hospitalizations as the primary diagnosis and constituting about 1 to 2% of all hospitalizations [7]. In addition, hospitalized HF patients require, on average, longer hospital stays than those with myocardial infarction [8].

The hospital discharge of a patient after an episode of acute HF is a vulnerable period, often marked by a constraint in communication between hospitals and general practitioners, with deficient hospital referrals [9,10]. Patients and their caregivers often describe hospital discharge as sudden and unexpected, and consequently feel ill-prepared. As a result, this period is typically characterized by unplanned emergency room (ER) visits, hospital stays,

and an elevated risk of mortality. Remarkably, approximately 20–25% of HF patients are readmitted within 30 days of discharge and more than 50% within 6 months [11]. In this context, the European Society of Cardiology (ESC) guidelines on HF advocate a continuum of care between hospital and community care facilities and recommend multidisciplinary HF management programs [12].

In Portugal, the implementation of these guidelines is still far from being universally achieved. Patients follow very different and complex flows after hospital discharge, frequently leading to early rehospitalization [13]. Hence, there is an urgent need to standardize HF care at the hospital level to improve guideline adherence, especially during the vulnerable phase of the disease.

In light of this, a multidisciplinary consultation program for HF management, known as Excellence in Heart Failure (hereafter referred to as Excellence), has been designed and implemented by Novartis in several Portuguese tertiary healthcare centers, with a view to applying the current ESC guidelines in Portugal [12]. This Program entails a tailored and continuous care network that is adapted to the specific characteristics of each local center, guiding patients throughout their journey, from HF diagnosis/decompensation until program discharge. The primary objective of the Program is to enhance the management and care of HF patients by enabling early symptom detection and optimizing therapy. This, in turn, will reduce hospitalization and mortality rates while contributing to an improved quality of life.

This pilot study at Centro Hospitalar de Vila Nova de Gaia e Espinho (CHVNG) provides an initial exploration of the Excellence Program's feasibility and effectiveness in a real-world setting in Portugal. The presented results lay the groundwork for improving HF patient care nationwide in line with established guidelines. Ultimately, these findings will contribute to the widespread implementation of such programs across the country, improving overall HF management and outcomes.

2. Materials and Methods

2.1. Study Design and Setting

This was a pilot interventional cohort study carried out under the Excellence Program at CHVNG, in the northwestern region of Portugal. Patient data were collected retrospectively between January and December 2019, focusing on assessments performed as part of routine care under the scope of the Program.

Launched in January 2019 at CHVNG, the Excellence Program aimed to establish a well-structured response for HF patients, with a focus on improving their prognosis. Its primary goal was to reduce hospital admissions and mortality risks across a spectrum of HF patients requiring short-term follow-up, clinical reassessment, and treatment optimization following clinical decompensation, while improving their clinical outcomes. Through a patient-centered approach, the Program closely monitored patients, allowing for the prompt initiation and titration of prognosis-modifying therapy. The multidisciplinary team, including a nursing team specializing in cardiac rehabilitation, played a pivotal role in patient education, emphasizing understanding of the disease, symptom awareness, and self-monitoring. The Program also included collaboration with physical medicine for patient integration into cardiac rehabilitation programs, as well as with nutrition and palliative care. The patient journey began with a pre-discharge appointment with the nursing team, followed by a telephone call between day 3 and day 7 after discharge. Subsequent evaluations occurred between days 7 and 14, by both the nursing team and the physician. Following this, one-, three- and six-month appointments were scheduled with the medical and nursing team. At nine months, a second follow-up telephone call with the nursing team was conducted. Finally, at 12 months, the patient's condition was assessed by the medical and nursing team, and they were discharged from the Program. During regular follow-up visits, patients continued to receive ongoing education about the disease and its symptoms and their management to enable self-medication. Medication was closely monitored and titrated by the medical team. When appropriate, the Program was individualized to meet

the patient's needs, including the timing and number of appointments. Additionally, a telephone line with a direct connection to the multidisciplinary team was available for patients' requiring reevaluation or having any doubts regarding their treatment, symptoms, or other concerns. During clinical appointments, patients were educated about HF symptoms and how to recognize and assess decompensation of the disease.

2.2. Study Participants

Eligible patients were identified and recruited by physicians from the Program, according to the following inclusion criteria: (i) patients admitted to the cardiology service with an initial diagnosis of HF/decompensated HF with reduced ejection fraction (EF) requiring short-term follow-up/reassessment after discharge for clinical stabilization and treatment optimization; (ii) patients followed up in the cardiology outpatient clinic for HF with reduced EF and evidence of clinical decompensation requiring treatment optimization and short-term reassessment; and (iii) patients seen in the emergency room (ER) with an initial diagnosis of HF/decompensated HF with reduced EF and who did not meet hospitalization criteria. After enrollment, patients were followed up in the Program until they reached one of the following discharge criteria: (i) clinical stability (no hospitalizations or referrals to the ER for HF in the last 12 months) and optimized treatment (maximum tolerated dose or target dose achieved), with referral to cardiology outpatient consultation; (ii) recovery of ventricular function with referral to primary care; and (iii) terminal HF with referral to palliative care. No specific exclusion criteria were established for patients enrolled in the Program.

2.3. Data Collection and Outcomes

Patient data were collected retrospectively for up to 15 months. At baseline, demographic (sex and gender) and clinical data (patient origin and destination, etiology, number of visits, follow-up time (in months), implantable device status, medications, EF, and N-terminal portion of B-type natriuretic peptide (NT-proBNP) levels) were collected. Implantable device status, medications, EF and NT-proBNP levels were also collected at the patient's last follow-up visit.

This study aimed to ascertain the effectiveness of the pilot phase of the Excellence Program in reducing healthcare resource utilization and improving clinical outcomes for HF patients. Primary endpoints included evaluation of the number of hospitalizations/rehospitalizations, ER admissions, and mortality throughout the follow-up period. In addition, variations in EF and NT-proBNP levels from baseline to follow-up were assessed to gauge improvements in cardiac function and neurohormonal status. Exploratory analyses based on clinically relevant variables such as sex, age, HF etiology, achievement of target dose, and use of different medications were performed to identify potential factors influencing the relative differences in EF and NT-proBNP observed.

2.4. Statistical Analysis

The characterization of continuous variables was performed considering the median and interquartile range (IQR). For categorical variables, absolute and relative frequencies were obtained.

The relative percentage differences between baseline and follow-up were determined using the following formula:

$$\textit{Relative differences} = (\textit{value at follow-up} - \textit{value at baseline})/\textit{value at baseline} \times 100 \quad (1)$$

The normality of the distribution of the EF and NT-proBNP values, observed at both baseline and follow-up, and their relative differences, was examined using histograms, Q-Q plots, and the Shapiro–Wilk test.

Comparison of paired observations, between baseline and follow-up, was performed considering the parametric Student's *t*-test for paired samples for EF, and the nonparametric Wilcoxon test for paired samples for NT-proBNP. Pearson's and Spearman's correlation coef-

ficients were estimated to analyze the correlations between the obtained relative differences and other continuous variables.

To investigate whether the relative differences obtained for EF or NT-proBNP were affected by some clinically relevant variables, comparison analyses were performed between these and some independent subgroups, defined by sex, age, HF etiology, and patients who did or did not reach the target dose or who used angiotensin-converting enzyme inhibitors/angiotensin receptor blockers (ACEi/ARB) versus angiotensin receptor–neprilysin inhibitors (ARNI) drugs. These comparisons were made considering the parametric Student's *t*-test for independent samples for EF and using the nonparametric Mann–Whitney test for independent samples for NT-proBNP values.

All hypotheses were tested using two-sided tests at the significance level $\alpha = 0.05$.

Statistical analysis was conducted using R® software version 4.1.2.

2.5. Ethics

This study was approved by the local Ethics Committee (Comissão de Ética para a Saúde (CES) do Centro Hospitalar de Vila Nova de Gaia/Espinho, EPE). As the data for this study were collected retrospectively, informed consent was not required.

3. Results

3.1. Study Sample

A total of 66 patients were included in this study between January and December 2019, following the defined inclusion criteria. Of these, patients with a follow-up period of <3 months ($n = 12$) were excluded from the baseline analysis, leaving a total of 54 patients in this group. For the analysis of relative differences in EF and NT-proBNP between baseline and follow-up, patients were divided into two distinct groups, as there were some missing data for these variables at follow-up, as illustrated in Figure 1.

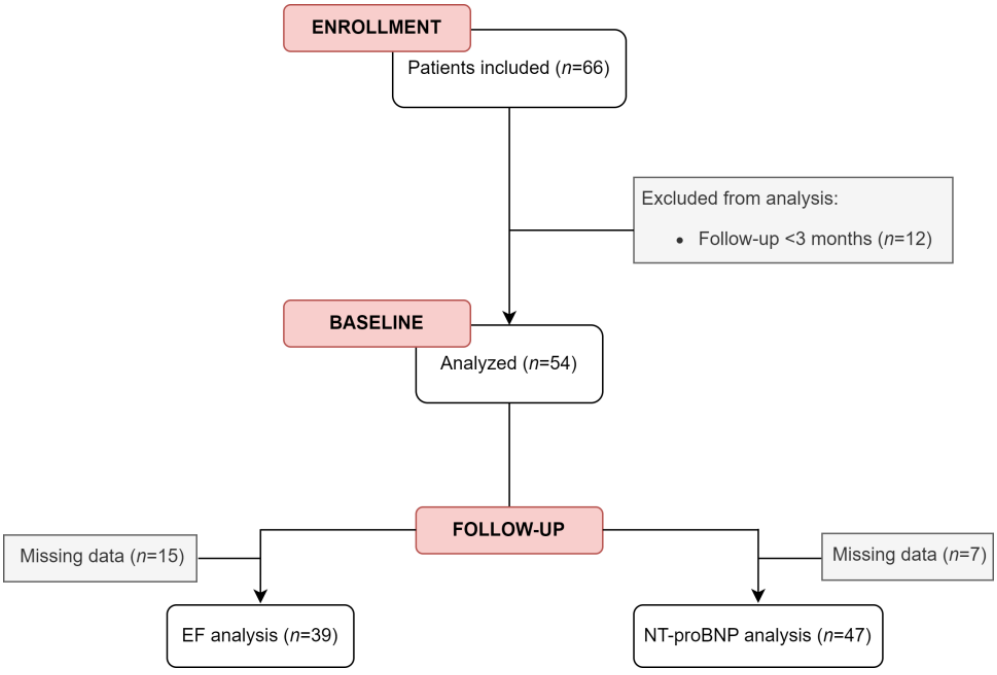

Figure 1. Participant flowchart. The flow chart shows the progression of participants throughout the study. EF = ejection fraction. NT-proBNP = N-terminal portion of B-type natriuretic peptide. A total of 54 patients were analyzed at baseline. At follow-up, 39 patients had EF data (15 with missing data) and 47 patients had NT-proBNP data (7 with missing data).

3.2. Patient Characteristics at Baseline

The characteristics of the 54 patients included in the baseline analysis are shown in Table 1. Most patients were male (n = 38, 70.4%), with an overall median (P25; P75) age of 62.0 (51.0; 71.0) years. Of note, 33 (61.1%) patients were younger than 65 years, and only 8 patients (14.8%) were older than 75. The median EF and NT-proBNP values at baseline were 28 (23; 34) and 2552 pg/mL (895; 29726), respectively. According to the 2021 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure, the majority of patients (n = 52, 96.3%) presented a reduced EF (≤40%), whereas 2 (3.7%) had a mildly reduced EF (41–49%) [14].

Table 1. Patient demographics and baseline characteristics.

Baseline Characteristics	***n* = 54**
Sex, *n* (%)	
Female	16 (29.6%)
Male	38 (70.4%)
Age (years), median (P25; P75)	62 (51; 71)
EF (%), median (IQR)	28 (23; 34)
≤40%, *n* (%)	52 (96.3%)
41–49%, *n* (%)	2 (3.7%)
NT-proBNP (pg/mL), median (P25; P75)	2552 (895; 29,726)
Patient origin, *n* (%)	
Hospitalization	24 (44.4%)
Cardiology outpatient consultation	20 (37.0%)
Emergency department	10 (18.5%)
Etiology, *n* (%)	
Ischemic disease	12 (22.2%)
Non-ischemic disease	42 (77.8%)
Consultations (number), median (P25; P75)	4 (3; 5)
Follow-up time (months), median (P25; P75)	7 (4; 10)

EF = ejection fraction; NT-proBNP = N-terminal portion of B-type natriuretic peptide; P25 = 25th percentile; P75 = 75th percentile.

Of the 54 patients included in the Program, 24 (44.4%) originated from hospitalization, 20 (37.0%) from cardiology outpatient consultation and 10 (18.5%) from the emergency department. Regarding etiology, non-ischemic diseases had the highest prevalence (n = 42, 77.8%), with dilated cardiomyopathy being the most commonly reported within these (n = 19, 35.2%) (see Supplementary Table S1 for a complete list of patients' etiologies). Patients had a median of 4 (3; 5) visits throughout the Program and were followed for 7 (4; 10) months, with a maximum follow-up of 15 months.

3.3. HF-Related Events: Hospitalizations, ER Visits, and Mortality Rates

Of the 54 patients enrolled at baseline, 24 (44.4%) originated from hospitalization. However, during the Excellence Program, only one (4.2%) of these patients was re-hospitalized. None of the patients coming from cardiology outpatient consultation and the emergency department were admitted to the hospital during their participation in the study. Emergency department visits were recorded for two (3.7%) patients, one from the hospitalization and the other from a previous ER visit. No deaths were reported during the follow-up period of the Program.

3.4. Treatment Profile during Follow-Up

Regarding medication for HF, patients were prescribed beta blockers (BB), angiotensin-converting enzyme inhibitor/angiotensin receptor blockers/angiotensin receptor–neprilysin inhibitors (ACEi/ARB/ARNI) and/or mineralocorticoid-receptor antagonists (MRA) (Table 2). Of note, the prescription of sodium-glucose co-transporter-2 inhibitors (SGLT2i) was not evaluated because they were not an established therapy for HF at the time of the Program [12]. Overall, 1 patient (1.9%) did not take any drugs for HF (only took diuretics), 2 (3.7%) only took one drug, 12 (22.2%) took a combination of two drugs and 39 (72.2%) combined three drugs (Supplementary Table S2). Most patients were under BB (50, 92.6%). Additionally, MRA drugs were prescribed to 81.5% of patients (n = 44), ACEi/ARB drugs to 51.9% (n = 28), and ARNI medication to 38.9% of patients (n = 21) (Table 2). The target dose (of at least one class of drugs) was reached in 25 (46.3%) of the 54 patients. Of these, 21 (38.9%) reached the target dose of only one of the drugs used, 3 (5.6%) reached the target dose of two drugs, and only 1 (1.9%) patient reached the target dose of all three drugs. The distribution of patients for each of the drug classes is presented in Table 2.

Table 2. Patients' medication for HF.

Medication for HF Management	***n* = 54**
BB, *n* (%)	50 (92.6%)
Reached the target dose	4 (7.4%)
MRA, *n* (%)	44 (81.5%)
Reached the target dose	8 (14.8%)
ACEi/ARB, *n* (%)	28 (51.9%)
Reached the target dose	8 (14.8%)
ARNI, *n* (%)	21 (38.9%)
Reached the target dose	10 (18.5%)

ACEi = angiotensin-converting enzyme inhibitors; ARB = angiotensin receptor blockers; ARNI = angiotensin receptor–neprilysin inhibitors; BB = beta blockers; HF = heart failure; MRA = mineralocorticoid-receptor antagonists.

During follow-up in the Excellence Program, 39% of patients required treatment with implantable devices. Specifically, 13% (n = 7) required an implantable cardioverter defibrillator for primary prevention and 5.6% (n = 3) required an implantable cardioverter defibrillator for secondary prevention. Regarding cardiac resynchronization therapy (CRT), 7.4% (n = 4) required a biventricular pacemaker (CRT-P) and 13% (n = 7) required cardiac resynchronization therapy with a defibrillator (CRT-D), all for primary prevention (Supplementary Table S2). At the end of this Program, four patients were referred for heart transplantation—two were placed on the heart transplant waiting list and the other two were still under evaluation.

3.5. Cardiac Function at Follow-Up

The cardiac function status of this cohort was assessed by comparing EF and NT-proBNP levels between baseline and follow-up.

Of the 54 patients considered at baseline, only 39 patients had EF data at follow-up. Considering this cohort of 39 patients, the median EF level increased, on average, by 10 points, from 28 (23; 34) at baseline to 38 (30; 43) at follow-up ($p < 0.001$). The median time of follow-up was eight months (P25; P75 = 5; 11) (Supplementary Table S3). The relative differences in the EF between follow-up and baseline, and their distribution, is shown in Figure 2A. Overall, a median increase in EF of 9.0 points (3.0; 15.0) and 28.1% (11.5; 47) was observed at follow-up ($p < 0.001$). When analyzing the number of patients in different ranges of EF values (Table 3), it can be observed that 15 (38.5%) patients improved their score; 24 (61.5%) patients maintained their score, and none presented a worse score

($p < 0.001$). Of note, of the 38 patients with baseline EF ≤40%, 11 (28.2%) had mild EF (41–49%) and 4 (10.3%) had recovered EF (≥50%) at follow-up.

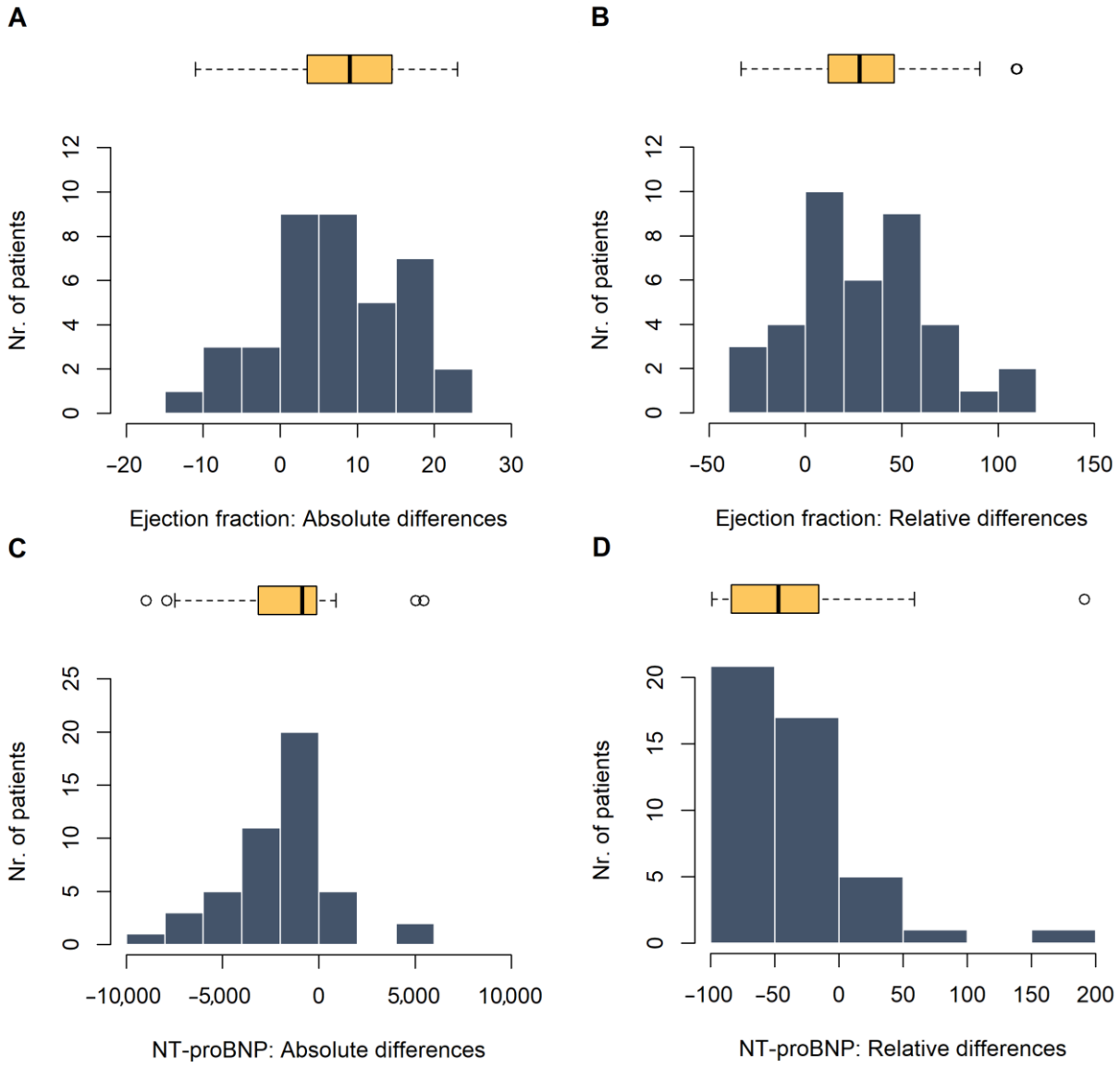

Figure 2. Distributions of the absolute and relative differences (in %) for (**A**,**B**) ejection fraction and (**C**,**D**) NT-proBNP values among patients. NT-proBNP = N-terminal portion of B-type natriuretic peptide.

Table 3. Ejection fraction values across different ranges at baseline and follow-up.

		EF at Follow-Up (*n*, %)							
		≤40%		**41–49%**		**≥50%**		**Total**	
EF at baseline (*n*, %)	≤40%	23	59.0%	11	28.2%	4	10.3%	38	97.4%
	41–49%	0	0%	1	2.6%	0	0%	1	2.6%
	Total	23	59.0%	12	30.8%	4	10.3%	39	100%

Regarding NT-proBNP, 47 of the 54 patients had recorded values at follow-up. The median NT-proBNP decreased significantly from 2652 (970; 5296) pg/mL at baseline to 678 (257; 1478) pg/mL at follow-up ($p < 0.001$). The distribution of relative differences in NT-proBNP between follow-up and baseline, in percentage, is shown in Figure 2B. A

median change in NT-proBNP of −873.0 points (−3246.0; −85.0) and −47.2% (−84.0; −15.6) was observed.

3.6. Factors Associated with Improved Cardiac Function

In order to examine whether clinically relevant variables had an impact on the relative differences observed for EF or NT-proBNP, comparative analyses were conducted on various independent subgroups. Initially, an analysis was performed to assess the correlation between the observed relative differences in the EF and some continuous variables (age, follow-up time, NT-proBNP levels at baseline and follow-up, and relative differences observed for NT-proBNP) (Supplementary Figure S1). The data revealed no statistically significant correlation between the differences in EF values and age ($p = 0.144$), follow-up time ($p = 0.445$), baseline NT-proBNP levels ($p = 0.815$), or relative differences in NT-proBNP ($p = 0.068$). However, a statistically significant and negative association was found between the relative differences in EF and the NT-proBNP levels at follow-up ($p = 0.005$). This indicates a higher improvement in EF in patients with the lowest NT-proBNP levels at follow-up.

The remaining comparative analyses aimed to assess potential variations in the EF or NT-proBNP regarding distinct independent groups, defined by sex (male vs. female), HF etiology (ischemic vs. non-ischemic) (Figure 3) and number of drug classes (≤2 vs. 3) (Figure 4).

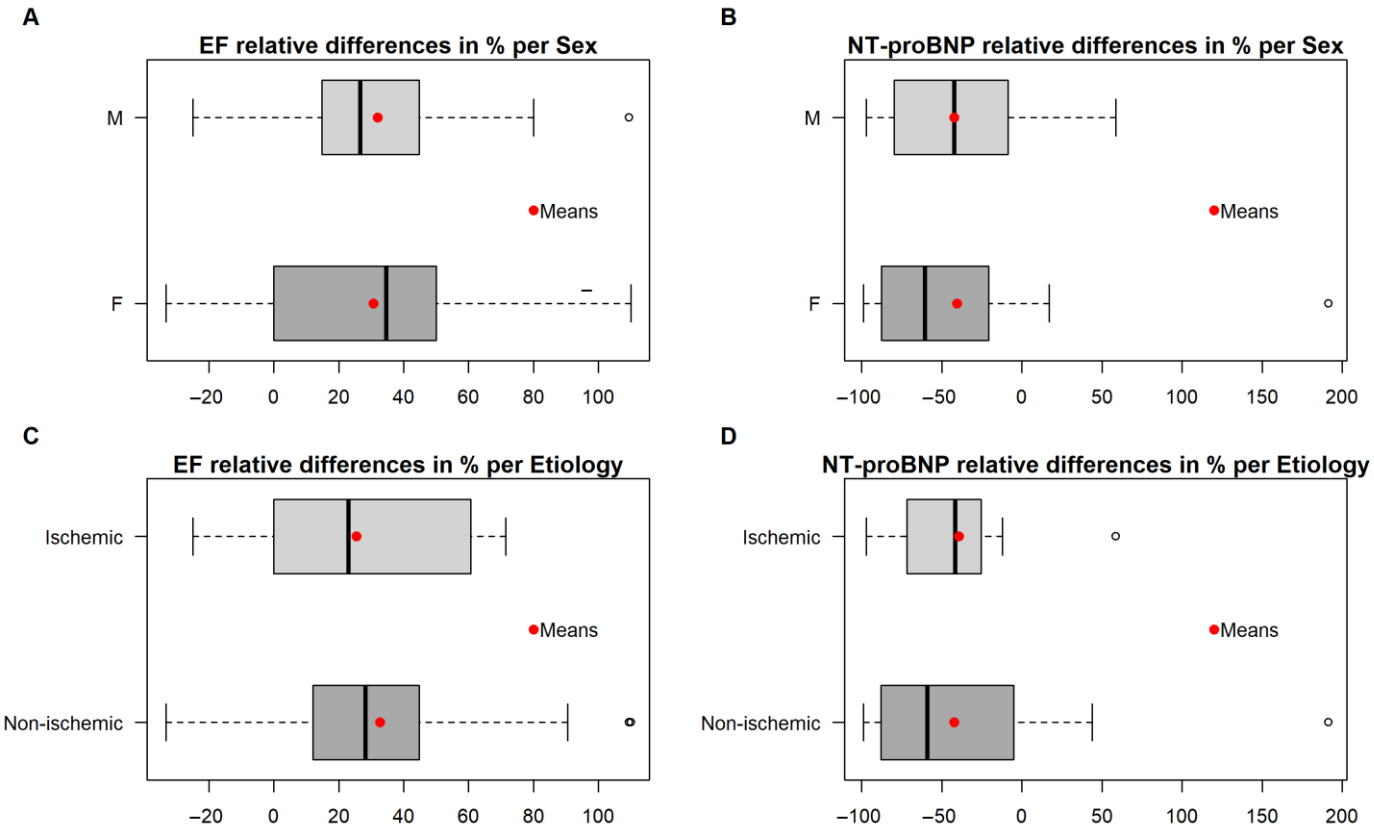

Figure 3. Comparison between EF and NT-proBNP relative differences and some independent categorical variables. (**A**,**B**) Patient sex and (**C**,**D**) HF etiology were considered for the analysis. White circles represent outliers.

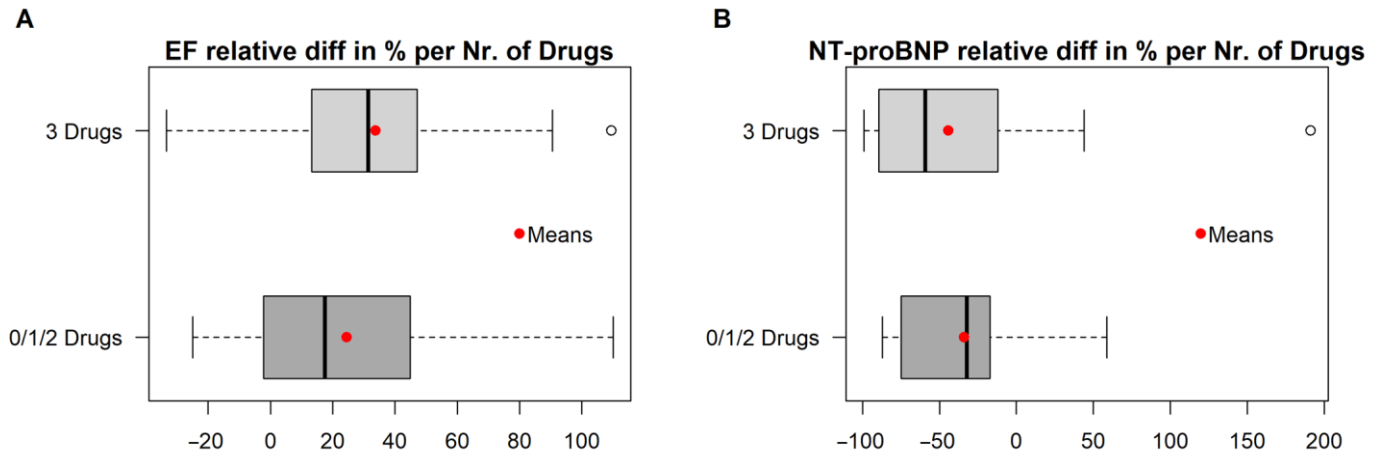

Figure 4. Comparison between the variations in the EF or NT-proBNP and medication. Effect of the number of drug classes used by patients in (**A**) EF and (**B**) NT-proBNP relative differences. White circles represent outliers.

The data from this analysis show that in women (Figure 3A,B) and in patients with HF non-ischemic etiology (Figure 3C,D), a higher variation was observed in the EF values at follow-up ($p < 0.001$), as well as a greater percentage of reduction in the NT-proBNP values ($p < 0.001$).

Regarding medication, patients who were prescribed more drug classes (three compared to none, one or two) exhibited, on average, a higher increase in the percentage differences observed for EF (Figure 4A) and a larger reduction in NT-proBNP values (Figure 4B) ($p < 0.001$). Of note, no positive association was found between reaching the target dose in any of the drug classes and the increase in EF or reduction in NT-proBNP levels.

4. Discussion

This study provides the first evidence of the effectiveness of the pilot project of the Excellence Program at a tertiary center in Portugal. Multidisciplinary HF clinics play a crucial role in the long-term management of HF patients. Although each clinic has unique features, they typically involve a team of cardiologists, specialized nurses, pharmacists, social workers, dietitians, and home care services, among others. In addition, the European Society of Cardiology 2021 Guidelines for the management of HF recommend the incorporation of non-medical interventions such as lifestyle modifications, exercise training, psychological support, patient education, and easy access to healthcare services [14]. Follow-up care for these patients involves scheduled appointments with cardiologists and general practitioners, telephone contacts, and patient self-assessment [15–17]. In fact, the outpatient management of HF patients has been addressed in several publications, highlighting the importance of assessing symptom burden, promoting self-monitoring, and implementing transitional care for improved outcomes and reduced hospital readmissions [10,18–20].

Accordingly, the Excellence Program in our study was composed of a multidisciplinary team with the main goal of improving the prognosis of HF patients from their inclusion in the Program to post-discharge follow-up. Patients received education about their condition, enabling them to gain a better understanding of their symptoms and medications while facilitating self-management. Regular follow-up was conducted after program enrollment to monitor patients' progress and provide ongoing support.

The Program attracted patients from different settings, including inpatient, outpatient, and emergency department visits, highlighting its multidisciplinary nature. Contrary to the expected higher prevalence of HF in older adults [14], the majority of the patients included were younger than 65. These results are consistent with recent studies suggesting an increasing incidence of HF among individuals under 50 years old due to cardio-metabolic risk factors such as obesity, smoking, hypertension, dyslipidemia, and diabetes [21]. These

trends emphasize the importance of educating patients about lifestyle modifications to mitigate the impact of these risk factors. Additionally, the predominance of non-ischemic etiologies in the study population underscores the importance of addressing non-coronary causes of HF within the Program. Interestingly, in Portugal, the prevalence of HF in the population under 60 years old has been declining and is projected to continue decreasing until 2080 [4].

After enrollment in the Excellence Program, a low rate of HF-related events was recorded, with only 4.2% patients requiring hospitalization and 3.7% requiring ER visits during the course of the Program. Considering that the 6-month period following acute HF discharge is a particularly sensitive period, with high rates of hospital admissions, ER visits, and extended hospital stays [9,11], these results can be considered quite positive. Furthermore, no deaths were reported among the study population during the follow-up period, in contrast to a previously reported mortality rate of 34.3% in a population without multidisciplinary follow-up [22]. The low incidence of HF-related events observed in this study may be attributed to the continuous and personalized patient follow-up of patients, the comprehensive management delivered by the multidisciplinary HF team, and the patient education on recognizing and managing HF symptoms and decompensation, as previously demonstrated for patients with cardiac conditions [18].

The non-clinical outcomes further underscored the positive impact of the Excellence Program. Notably, 38.5% of patients improved their EF during follow-up, along with a significant reduction in NT-proBNP levels. EF values increased by an average of 28%, while NT-proBNP levels exhibited a considerable median change of −47.2%. In addition, patients with the lowest NT-proBNP levels during follow-up experienced a greater improvement in EF, indicating a negative correlation. This result aligns with previous findings, as a decrease in NT-proBNP is associated with an extensive reverse remodeling, leading to an improved EF. A study by Daubert et al. showed that a decrease of 1.000 pg/mL of NT-proBNP over a 12-month period is associated with an increase in EF of 6.7% [23]. Similarly, Savarese et al. demonstrated that reductions in NT-proBNP values were associated with improved mortality and morbidity outcomes [24]. Notably, in the Excellence Program, 10.3% of patients initially categorized with reduced EF ($\leq$40%) achieved an EF > 50% at follow-up, suggesting a potential reversal of cardiac dysfunction.

Although representing only 30% of the population study, women benefited more from the Excellence Program, presenting better EF and NT-proBNP levels at follow-up. These findings resonate with the existing literature, where the female gender has been associated with an increased likelihood of EF recovery [25]. Women, in general, tend to have higher baseline EF compared to men, potentially contributing to better recovery in female HF patients [26]. Ghali et al. concluded that within the BEST study population, women had significantly better survival than men, but only in non-ischemic HF [27].

Currently, pharmacotherapy is the cornerstone of treatment for HF patients with reduced EF. The 2016 ESC guidelines recommend ACEi or ARB plus a BB as first-line therapy for HF patients with reduced EF. MRA and ARNI would only be introduced in patients with persistent symptoms despite the first-line therapy [12]. However, the 2021 ESC guidelines introduced a new "all at once" approach to the treatment of HF patients [28,29]. According to these guidelines, the first-line treatment includes two renin-angiotensin-aldosterone system inhibitors (ACEI, ARB, or ARNI; and MRA), along with a BB and a SGLT2i, with stepwise titration of these drugs until targeted or maximum tolerated dose is achieved [14,30]. Despite the Excellence Program being implemented in 2019, prior to the latest ESC guidelines, more than 80% of patients were prescribed prognosis-modifying medications (BBs, ACEi/ARB/ARNI, and MRA). The data showed that patients receiving a combination of three drugs had improved EF and lower NT-proBNP levels compared to those receiving two or fewer drugs, indicating better cardiac function and supporting the benefits of an "all at once" approach.

Among the enrolled participants, 46% successfully reached the target dose of at least one of the prescribed drugs. Similar findings were reported in a recent randomized

controlled trial that investigated the impact of multidisciplinary clinic follow-up on HF patients, with 10% and 13% of patients reaching the target doses of BBs and ACEi/ARBs, respectively [31]. Additionally, a prospective observational study in 2019 reported target doses of 18.7% for BBs, 10.8% for ACEi/ARBs, and 2.0% for ARNI in HF patients with reduced EF [32]. Of note, the Excellence Program observed a higher percentage of patients reaching the target dose for ARNI (18.5%). The importance of reaching the target dose for ARNI has been previously reported, as low doses were associated with increased risk of hospitalization and all-cause mortality [32]. Taken together, the data presented herein suggest that the frequent visits and rigorous follow-up protocol established in the Program, particularly during the vulnerable post-discharge period, played a significant role in optimizing drug titration.

While acknowledging the valuable insights into the potential benefits of the Excellence Program in the management of HF patients in Portugal, it is crucial to recognize that these observations are part of a single-center study with inherent limitations. The pilot nature of this study, with its exploratory character, underlines the preliminary nature of the results. Although the observed outcomes are deemed valuable, their interpretation should be approached with caution due to the inherent constraints imposed by a small cohort with limited statistical power. In addition, the lack of pre-program mortality or readmission rates hinders a comprehensive assessment of the Program effectiveness. Future investigations should prioritize the inclusion of comprehensive data, including baseline comparisons and patient-reported outcomes related to quality of life. Another limitation relates to the economic aspects, a facet left unexplored in this pilot project. Conducting a cost–benefit analysis would be a valuable addition, providing insight into the feasibility, costs, and potential barriers of the Program. This study is also limited by its retrospective and real-world nature, conducted in routine clinical practice, which introduced variability in data completeness and resulted in a considerable amount of missing data. Finally, the lack of a control group limits direct comparisons and assessment of the interval validity of the results.

5. Conclusions

This real-world study provides compelling evidence of the effectiveness of the Excellence Program in Portugal, underscoring the pivotal role of multidisciplinary HF clinics, especially during the early discharge period. The close follow-up and integration of non-medical interventions were associated with favorable outcomes in cardiac function, contributing to a low incidence of hospital admissions and mortality rates. Despite its pilot nature and limited statistical power, these findings emphasize the universal need for comprehensive and multidisciplinary HF management and lay the groundwork for further implementation of similar programs throughout the country, offering potential reductions in the financial and social burden of the disease.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/hearts5010001/s1, Table S1: Patients' HF etiology at baseline; Table S2: Distribution of the prescribed medication and implanted devices among patients; Table S3: Follow-up time characteristics of the patients who had EF data at follow-up; Figure S1: Scatterplots of the correlation analysis between relative differences in EF and other continuous variables.

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Institutional Review Board Statement: This study was conducted in accordance with the Declaration of Helsinki and approved by the local Portuguese Ethics Committee (Comissão de Ética para a Saúde (CES) do Centro Hospitalar de Vila Nova de Gaia/Espinho, EPE). As this is a retrospective study involving the secondary use of data, it was determined to be exempt from the requirement for informed consent, and no protocol code was assigned. However, the committee did issue a positive decision regarding the data collection.

Informed Consent Statement: Due to the retrospective nature of this study, the need to obtain informed consent was waived by the local Ethics Committee. All data were de-identified to protect patient privacy.

Data Availability Statement: The data presented in this study are available within this article or the Supplementary Materials.

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