Chronic care for heart failure patients: who to refer back to the general practitioner? Experiences of the Dutch integrated heart failure care model

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Chronic care for heart failure patients: Who to refer back to the general practitioner?—Experiences of the Dutch integrated heart failure care model

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Abstract

Objective: The number of patients with heart failure (HF) and corresponding burden of the healthcare system will increase significantly. The Dutch integrated model, 'Transmural care of HF Patients' was based on the European Society of Cardiology (ESC) guidelines and initiated to manage the increasing prevalence of HF patients in primary and secondary care and stimulate integrated care. It is unknown how many HF patients are eligible for back-referral to general practitioners (GPs), which is important information for the management of chronic HF care. This study aims to evaluate clinical practice of patients for whom chronic HF care can be referred from the cardiologist to the GP based on the aforementioned chronic HF care model.

Design and Methods: A retrospective case record-based study was conducted, which included all chronic HF patients registered in the cardiology information systems of two different hospitals. Subsequently, 200 patients were randomly selected for evaluation. The following patients were considered eligible for referral to the GP: 1/Stable HF patients with reduced left ventricular ejection fraction (LVEF), 2/Stable HF patients with a recovered LVEF and 3/Stable HF patients with a preserved LVEF, 4/HF, palliative setting.

Results: Of the 200 patients, 17% was considered eligible for referral to the GP. This group consisted of 5% patients with a reduced LVEF, 10.5% patients with recovered LVEF and 1.5% patients with a preserved LVEF. Main indicators for HF care by cardiologists were active cardiac disease other than HF (39.5%), recent admission for HF (29.5%) or a recent adjustment in HF medication (7.5%).

Conclusion: Applying the chronic HF care model of the 'Transmural care of HF patients' and the ESC-guidelines, results in an important opportunity to further

optimise HF integrated care and to deal with the increasing number of HF patients referred to the hospital.

KEYWORDS
clinical guidelines, patient-centred care

1 | INTRODUCTION

It is expected that in developed countries the prevalence of heart failure (HF) will rise to more than 10%.[1] Due to the ageing population, and improved medical treatment, the number of patients with HF and corresponding expenditures will increase significantly.[2–5] The increasing burden on the healthcare system is an important topic on the political agenda: a minimum level of financial growth for primary and secondary care is allowed in the forthcoming years. In the Netherlands, maximum growth on the macro level of secondary medical care was limited to 0.8% in 2018 and 0.0% in 2022.[6,7]

This emphasises the need to deliver HF care efficiently. Several trials have demonstrated that effective coordination of HF care improves clinical outcomes.[8,9] Most of these studies focus on the referral of an HF patient from a general practitioner (GP) to a cardiologist, but not the reverse. To provide the right care for the right patient at the right time and to maintain healthcare accessible in the future, referral back to the GP is equally important as timely referral to a cardiologist.[10,11] Also, the European Society of Cardiology (ESC)-HF Association Standards states that the follow-up and monitoring of chronic HF patients is a neglected area of HF care with only a small amount of literature to guide medical professionals.[12] In response to the above-mentioned trend, the Netherlands Society of Cardiology supports national and regional vertically integrated cardiac care programmes in the Netherlands.[1,13–16] The 'Transmural Care of Heart Failure Patients Model' (LTA) is a regional integrated care programme initiated by cardiologists, GPs, specialised HF nurses, patients and health insurance providers. This model, founded on the ESC guidelines, is designed to implement the ESC guidelines for chronic HF care, enhance the organisation of HF care between GPs and cardiologists, and facilitate the delivery of integrated care.

By facilitating integrated care, this model outlines the path to a long-term management approach for stable HF patients by GPs. Nevertheless, a crucial piece of information that remains elusive is the identification of eligible HF patients suitable for back-referral to GPs, which is of paramount importance for the effective management of chronic HF care.

So, the aim of the present study was to evaluate clinical practice of chronic HF care and so indicating the potential percentage and characteristics of patients in whom HF care can be referred back from a cardiologist to a GP, based on the implementation of the HF care model and in line with the latest ESC guidelines.[16]

2 | METHODS

2.1 | Patients

A cross-sectional study was performed in two centres. Centre A is a university medical centre, the Leiden University Medical centre, where various outpatient clinics are available for HF patients. It provides 'structured tertiary care' for HF patients who are referred by a cardiologist to assess additional tertiary treatment options.[17] Furthermore, it provides 'standard HF care' in an outpatient setting by general cardiologists. This medical facility comprises 882 patient beds and sustains an operational workforce of approximately 8000 personnel, including 500 medical specialists.[18] Centre B is a large regional teaching hospital, the Alrijne hospital, with a dedicated HF outpatient clinic supervised by HF cardiologists. The Alrijne Hospital is dispersed across three distinct locations: Leiden, Leiderdorp and Alphen aan de Rijn. It encompasses a total of 497 patient beds and employs 4000 individuals, including 220 medical specialists.[19]

In the Netherlands, all treatments and diagnoses supplied by health services are coded according to a national financial coding system. Patients with chronic HF were identified with the diagnosis code '021.302', corresponding with ICD-10 I50, in the year 2015 (when the chronic HF care model was implemented). From each centre, a random sample of 100 patients was drawn. Data were collected from the departmental cardiology information system (EPD Vision; Leiden University Medical Centre, the Netherlands, and Xcare; Nexus Nederland).[20] The following clinical characteristics were collected and analysed: age, gender, HF aetiology, comorbidities, cardiac history, clinical characteristics and laboratory results.

Transthoracic echocardiographic images of the patients were digitally stored in cine-loop format and analysed using commercially available software (GE Vingmed Ultrasound AS; EchoPAC version 112.0.1). Left ventricular ejection fraction (LVEF) was measured by standard echocardiographic images (Simson's biplane apical 2 and 4 chamber views).[21] The present study was approved by the Ethical board of the University of Leiden, written informed consent was waived for this retrospective data analysis.

2.2 | Definitions

The following definitions were used to determine whether patients were eligible for referral to a GP or if treatment by a cardiologist was

TABLE 1 Baseline characteristics.

	Total (n = 200)	Centre A (n = 100)	Centre B (n = 100)	p Value[a]
Age (years)	72 ± 15	66 ± 15	78 ± 11	<0.005
Gender, n (%)				0.046
Male	114 (57%)	64 (64%)	50 (50%)	
Heart failure aetiology, n (%)				
Ischaemic cardiomyopathy	88 (44%)	45 (45%)	43 (43%)	0.766
Nonischaemic cardiomyopathy	110 (55%)	55 (55%)	55 (55%)	1.000
Not established	2 (1%)	0 (0%)	2 (2%)	<0.005
Cardiac history, n (%)				
Myocardial infarction	55 (28%)	30 (30%)	25 (25%)	0.428
Revascularisation (PCI or CABG)	74 (37%)	39 (39%)	35 (35%)	0.558
Atrial fibrillation	100 (50%)	42 (42%)	58 (58%)	0.024
Surgery for valvular disease	27 (14%)	15 (15%)	12 (12%)	0.535
Device implantation				<0.005
PM	26 (13%)	9 (9%)	17 (17%)	0.093
ICD	25 (13%)	20 (20%)	5 (5%)	<0.005
CRT-P	1 (1%)	1 (1%)	0 (0%)	0.316
CRT-D	31 (16%)	22 (22%)	9 (9%)	0.011
LVEF (%)	41 ± 13	38 ± 11	44 ± 14	<0.005
NYHA functional class, n				
I	67 (34%)	45 (45%)	22 (22%)	<0.005
II	90 (45%)	43 (43%)	47 (47%)	0.570
III/IV	41 (21%)	11 (11%)	30 (30%)	<0.005
N/A	2 (1%)	1 (1%)	1 (1%)	1.000
Systolic blood pressure (mmHg)	124 ± 21	122 ± 20	126 ± 22	0.310
Diastolic blood pressure (mmHg)	72 ± 10	74 ± 10	73 ± 11	0.448
ECG				
QRS duration (ms)	128 ± 36	134 ± 36	122 ± 35	0.306
Heart rate (bpm)	72 ± 14	71 ± 14	74 ± 13	0.235
Comorbidity				
Hypertension	84 (42%)	41 (41%)	43 (43%)	0.774
Diabetes	42 (21%)	17 (17%)	25 (25%)	0.165
COPD	29 (15%)	11 (11%)	18 (18%)	0.160
PHT	37 (19%)	26 (26%)	11 (11%)	0.006
Laboratory results				
Haemoglobin (mmol/L)	8 ± 6	8 ± 3	7 ± 3	0.800
Creatinin (µmol/L)	110 ± 54	99 ± 52	121 ± 53	0.057
Heart failure medication (n, %)				
ACEi/ARB	146 (73%)	74 (74%)	72 (72%)	0.750
Betablocker	163 (82%)	79 (79%)	84 (84%)	0.363

(Continues)

TABLE 1 (Continued)

	Total ($n = 200$)	Centre A ($n = 100$)	Centre B ($n = 100$)	p Value[a]
MRA	63 (32%)	28 (28%)	35 (35%)	0.287
Diuretics	133 (67%)	63 (63%)	70 (70%)	0.294

Note: Continuous data are presented as mean (±SD), categorical data are presented as numbers (%).

Abbreviations: ACEi, angiotensin-converting-enzyme inhibitor; ARB, angiotensin II receptor blockers; COPD, chronic obstructive pulmonary disease; CRT-D, cardiac resynchronisation therapy defibrillator; CRT-P, cardiac resynchronisation therapy pacemaker; ECG, electrocardiography; ICD, implantable cardioverter defibrillator; LVEF, left ventricular ejection fraction; MRA, mineralocorticoid receptor antagonist; NYHA, New York Heart Association; PHT, pulmonary hypertension; PM, pacemaker.

[a]p Value between Centre A and Centre B.

deemed necessary.[1,14] This was based on the chronic HF care model and is in line with the ESC guidelines.

The following patients were eligible for back referral to GP:

- Stable HF, no active cardiac disease, optimal (medical) treatment, reduced LVEF. In particular, an LVEF of 40%–50% according to the latest ESC guidelines.
- Stable HF, no active cardiac disease, recovered LVEF (>50%).
- Stable HF, no active cardiac disease, optimal (medical) treatment, preserved LVEF
- HF, palliative setting.

For the following patients are recommended to be treated by a cardiologist:

- Unstable HF-related symptoms
- Stable HF, active cardiac disease, LVEF < 50%
- Stable HF, active cardiac disease, LVEF > 50%
- Stable HF, no active cardiac disease, LVEF < 40% or comorbidity

'Unstable HF' was defined as a hospitalisation within the last 12 months either due to decompensated HF (including symptoms such as fluid retention, dyspnoea and orthopnea) or a cardiac intervention or a significant change in HF medication (Angiotensin-Converting-Enzyme inhibitor, Angiotensin-II Receptor Blocker, BetaBlocker or a MineralCorticoid Antagonist) in the last 6 months. Active cardiac disease was defined as valvular disease, pulmonary hypertension, congenital heart defects, inherited cardiomyopathy, an invasive treatment for arrhythmias within the last 12 months or implantation of a cardiac device (this included a pacemaker, an implantable cardioverter-defibrillator [ICD], a cardiac resynchronisation therapy device [CRT-P or CRT-D]).

2.3 | Statistical analysis

Statistical analysis was performed using the Statistical Package for Social Science (SPSS) software version 23.0 (IBM). All continuous data were normally distributed. Continuous data are reported as mean ± SD or SEM, where appropriate, and categorical data as frequencies and percentages. Differences in baseline and clinical characteristics between patients were assessed using the Student's t-test and χ^2 test. A p-value < 0.05 was considered statistically significant, and all tests were two-sided.

3 | RESULTS

3.1 | Baseline characteristics

A total of 1923 patients were identified, of which a random sample of 200 unique patients (100 patients in each centre) was drawn for the analyses of medical files. Baseline characteristics are summarised in Table 1. Patients from Centre A were predominantly male, significantly younger (66 ± 15 years vs. Centre B; 78 ± 11 years, $p < 0.005$) and had a lower LVEF compared with patients in centre B (Centre A; 38 ± 11% vs. Centre B; 44 ± 14%, $p < 0.005$). In both centres, almost half of the patients (Centre A; $n = 45$ [45%] vs. Centre B; $n = 43$ [43%]) had an ischaemic aetiology of their HF. More patients in Centre B had atrial fibrillation as comorbidity (Centre A; $n = 42$ [42%] vs. Centre B; $n = 58$ [58%], $p = 0.024$). There was a significant difference in implanted devices between the two centres. More patients in Centre A had an ICD (Centre A; $n = 20$ [20%] vs. Centre B; $n = 5$ [5%], $p < 0.005$) or a CRT-D (Centre A; $n = 22$ [22%] vs. Centre B; $n = 9$ [9%], $p < 0.011$). Patients in Centre A had a better functional capacity according to the New York Heart Association (NYHA) classification ($p < 0.005$) and had a better renal function ($p = 0.057$). The prescribed HF medication was similar among both centres.

3.2 | Potential substitution

According to the guideline criteria, a substantial amount of patients (17%) were eligible for follow-up by GP (Figure 1). Of all patients, 5% had stable HF with a reduced LVEF; 10.5% of patients had stable HF with a recovered LVEF and 1.5% of patients had HF with a preserved LVEF. None of the analysed patients were in a palliative setting. No significant differences were observed in the indications for back referral to the GP between the two centres (Table 2).

3.3 | Follow-up by cardiologist

A total of 83% of the patients had an indication for follow-up by a cardiologist (Figure 1). The majority of these patients had unstable HF (37%) or the presence of active cardiac disease (39.5%). In 6.5% of the patients, the indication for follow-up by a cardiologist was an

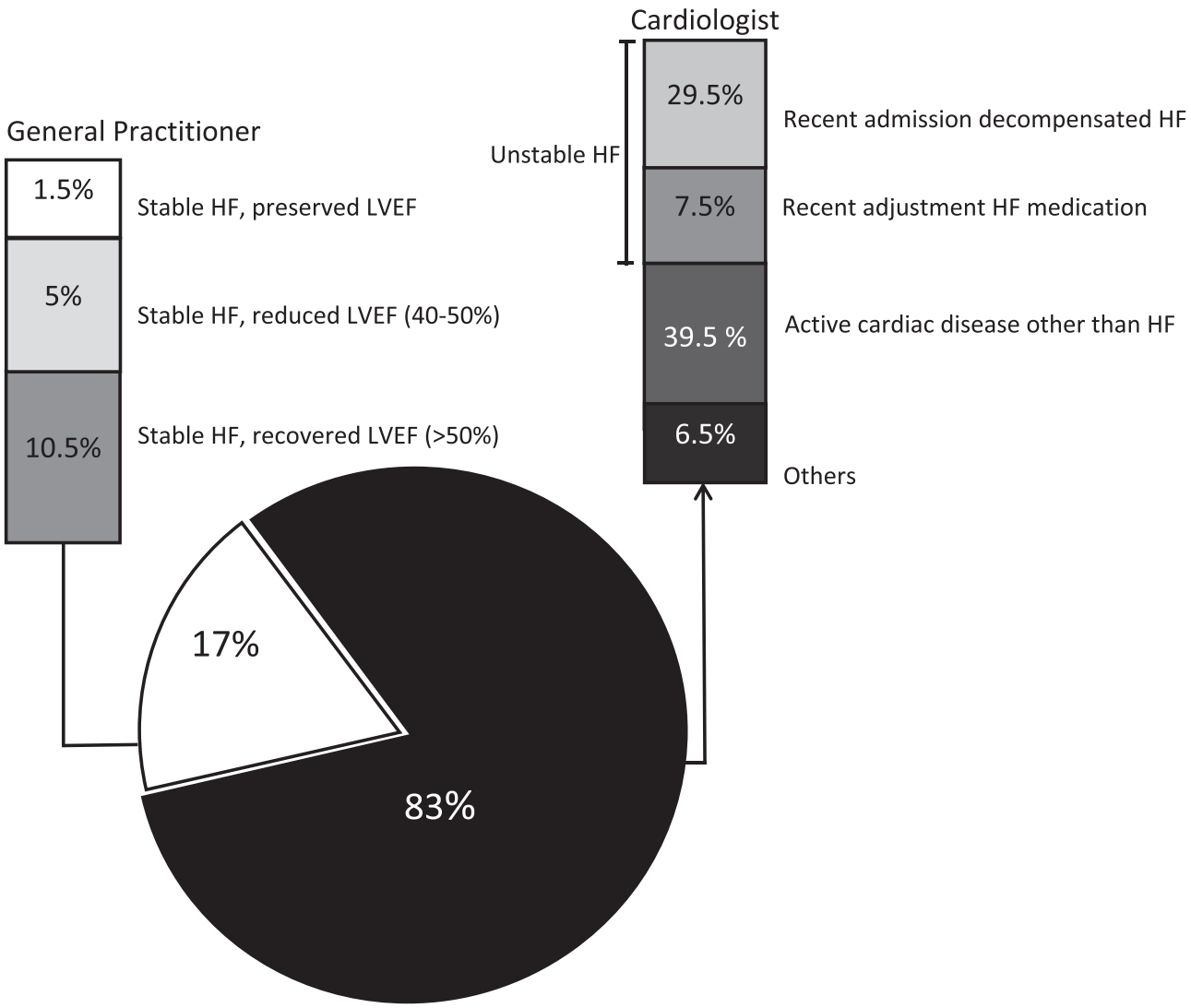

FIGURE 1 Overview of patients who were eligible for referral to the general practitioner (17%) and for who treatment by cardiologist was justified (83%) based on the 'Transmural Care of Heart Failure Patients Model' and in combination with the latest ESC guidelines. 'Others' includes a comorbidity or a left ventricular ejection fraction <40%. ESC, European Society of Cardiology; HF, heart failure; LVEF, left ventricular ejection fraction.

TABLE 2 Subdivision of heart failure patients based on recommendations of the 'Transmural Care of Heart Failure Patients Model' (LTA).

	Total (n = 200)	Centre A (n = 100)	Centre B (n = 100)	p Value
Potential substitution to GP				0.559
1. Stable heart failure, no active CD, reduced LVEF (40%–50%)	10 (5.0%)	6	4	0.516
2. Stable heart failure, no active CD, recovered LVEF (>50%)	21 (10.5%)	9	12	0.489
3. Stable heart failure, no active CD, preserved LVEF	3 (1.5%)	2	1	0.561
Indications follow-up at cardiologist				0.068
4. Unstable heart failure	74 (37.0%)	30	44	0.040
5. Stable heart failure, active CD, LVEF < 50%	53 (26.5%)	34	19	0.016
6. Stable heart failure, active CD, LVEF > 50%	26 (13.0%)	12	14	0.674
7. Stable heart failure, no active CD, LVEF < 40% or a comorbidity	13 (6.5%)	7	6	0.774

Note: No significant differences were observed. Unstable heart failure was the main indication for follow-up at secondary care in Centre B, whereas an active cardiac device was the main indication in Centre A.

Abbreviations: CD, cardiac disease; GP, general practitioner; LVEF, left ventricular ejection fraction.

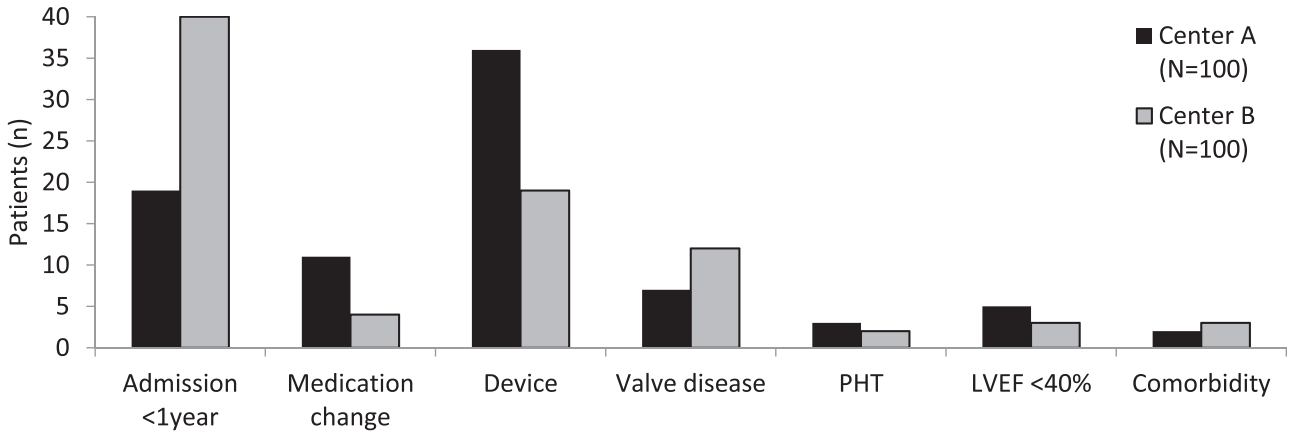

FIGURE 2 The number of patients and main indication for follow-up at cardiologist in Centre A ($N = 83$) and in Centre B ($N = 83$). LVEF, left ventricular ejection fraction.

LVEF < 40% or comorbidity. Comorbidities included chronic obstructive pulmonary disease, renal failure, Duchenne's disease, postradiation therapy or permanent atrial fibrillation.

Figure 2 summarises the indications for follow-up by cardiologist and details the reason for 'unstable HF' and the various cardiac diseases, in the different centres. In both centres, the total number of patients with an indication for follow-up by a cardiologist was equal (Centre A and Centre B, $n = 83$ [83%]). However, some indications for follow-up by a cardiologist were different among the centres (Table 2). First, the number of patients with unstable HF was lower in Centre A than in Centre B (Centre A; $n = 30$ [30%] vs. Centre B; $n = 44$ [44%], $p = 0.040$) and second, an active cardiac disease with a LVEF < 50% was more often present in Centre A than in Centre B (A; $n = 34$ [34%] vs. B; $n = 19$ [19%], $p = 0.016$).

4 | DISCUSSION

The key finding of this study was that, by applying the Dutch integrated programme 'Transmural care of HF Patients' and the ESC guidelines on clinical based HF care, 17% of HF patients seen in either a regional hospital or tertiary care centre can be referred back to the GP.

4.1 | Management of HF

The potential to refer 17% of HF patients back to the GP is an important opportunity to further optimise HF integrated care and to deal with the increasing number of HF patients referred to the hospital. Our findings are supported by previous studies. The Northstar-study, a multicenter randomised clinical controlled trial, included clinically stable HF patients in an outpatient setting and allocated them equally to follow-up in the HF clinic or in primary care. It appeared that clinically stable HF patients, on optimal medical therapy can be safely managed in primary care with no additional benefit from long-term follow-up in a specialised HF clinic.[22] In the present study, patients who were hospitalised either due to HF or a cardiac intervention within the past 12 months or who had a significant change in HF medication within the past 6 months were considered 'unstable'. In the Northstar-study, patients had at baseline a mean LVEF < 35% and approximately 43% of the patients were admitted within the past 12 months. As patients in the present study had an LVEF > 35% at baseline and only 29.5% were admitted within the past 12 months, it might imply that the current patient cohort is more stable, for which it might be even safer to refer the patients back to primary care.

Similar results were found in the COACH-2-study, a multicenter randomised controlled trial (RCT), in which 189 clinically stable HF patients were randomised and equally allocated to primary care or a specialised HF clinic.[23] Baseline characteristics of this study population were comparable to our population. The study showed that long-term follow in a specialised HF clinic was not superior to follow-up in primary care. Furthermore, the importance of integrated care in providing HF care during the unpredictable clinical course of HF patients was underlined. This aspect of HF care is also emphasised in the chronic HF care model, as this model strengthens the cooperation between care providers thereby creating a continuum of care.

Also, the study of de la Porte et al.[24] confirmed the incremental value of collaboration between cardiologist and GP. However, they observed a reduction in HF readmissions and mortality by an intensified HF management programme, compared with usual care. A possible explanation for this finding can be the functional status of the patients. All patients were in NYHA class III or IV, whereas most (45%) of the patients in the current study were functioning in NYHA class II. This suggests that patients with a worse condition benefit more from intensified HF programmes.

4.2 | Integrated care model

Worldwide healthcare expenditures are increasing rapidly. During the last decades, strategies to maintain access and sustainability of the healthcare systems and controlling rising healthcare expenditures have become important subjects on every governmental agenda.[6,25] One strategy is to reduce fragmentation in healthcare delivery and

increase collaboration and coordination among healthcare professionals. This can be established by working with integrated care systems. Integrated care systems can be understood as an organising principle for coordinated care delivery where the needs of the patient are the central focus.[26] A way to describe integrated care is in horizontal integration and vertical integration. Horizontal integration happens when healthcare providers at the same stage of the health system collaborate.[27] Vertically integrated care is defined as the integration of care across different healthcare facilities at different stages in the process of delivering care.[27,28] Multiple studies show the benefits of vertical integration in healthcare delivery, such as effective clinical care, a better communication process and increased collaboration.[29–32] It appears that successful integrated care programmes strengthen the role of primary care.[33] The LTA accommodates the above as it provides clear care pathways for long-term integrated HF management between HF nurses, cardiologists and GPs. With the expected increase of HF prevalence, it is equally important to maintain access in hospitals for the HF patients who really need specialist care. The LTA provides guidance and more awareness to refer stable HF patients back from the cardiologist to GP. As is stated in the ESC-HF Association Standards, HF management should be a network of care pathways for the patient.[12,22,24,34] With the implementation of the LTA, a network with close collaboration and coordination between healthcare providers is established and a continuum of HF care guaranteed.

4.3 | Study limitations

Several limitations should be acknowledged. First, this is a retrospective case record-based study conducted at two different hospitals. The LTA was implemented in 2015, thus the data from 2015 were evaluated, leading to a retrospective study design. Given the study's nature, the outcomes should be interpreted as indicative of the potential impact of LTA implementation on effective healthcare delivery. For a more robust demonstration of the added value of LTA, a prospective study or, ideally, an RCT is warranted. Second, it should be noted that the baseline characteristics varied between the two centres, which is expected as Centre A is a tertiary care centre and Centre B is a secondary care centre. However, only patients who received 'standard' HF care were randomly included, enabling the analysis of the potential effect of the LTA on a 'real-world HF population'. Interestingly, despite the differences in baseline characteristics, the reasons for referral were not significantly different. This finding may be attributed to the relatively small number of patients or, conversely, underscore that the results are applicable to both secondary and tertiary care centres.

5 | CONCLUSION

This study revealed that, within the investigated patient cohort, 17% of individuals could be referred back to their GPs, rather than continuing treatment under a cardiologist's care, by adhering to the LTA and ESC guidelines. This finding suggests potential for improvement not only in other hospitals within the Netherlands but also in countries with similar healthcare systems. The chronic HF care model raises awareness and offers indications for providing efficient HF care across different stages of patients' disease. Establishing a network of integrated care enables the sustenance of high-quality and easily accessible HF care in the near future.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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