An evaluation of service expansion to include patients with heart failure with preserved ejection fraction

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Abstract

Background/Aims

 The Central London Community Healthcare Trust West Hertfordshire

heart failure service expanded in 2020 to include patients with heart failure with

preserved ejection fraction in addition to the patients with heart failure with reduced

ejection fraction. The patient population was predicted to double, requiring staff and

service adjustments; this warranted an evaluation to determine if care targets were

maintained. This study aimed to evaluate the impact of service expansion on service

referral rates, length of stay in the service and clinical workload.

Methods

A retrospective quantitative evaluation of the service data from October 2020

to April 2021 was undertaken to compare referral rates, length of stay in service and key

workload metrics between patients with heart failure with reduced ejection fraction and

those with heart failure with preserved ejection fraction. All referrals to the service with

a new diagnosis of heart failure (confirmed by echocardiogram or magnetic resonance

imaging) were considered for evaluation. Of 250 eligible referrals, 81 were selected for

inclusion using a random sampling method.

Results

The participants with heart failure with preserved ejection fraction had a median

length of stay in the service of 17 weeks. The participants with heart failure with reduced

ejection fraction had a statistically significant longer stay of 35.57 weeks (P<0.001)

compared to a pre-expansion length of stay of approximately 17 weeks. Workload was

proportional between the two cohorts. Patients with heart failure with preserved ejection

fraction were more likely to be reviewed in multidisciplinary teams or by the consultant

community clinic. This group was less likely to attend clinic, where 96.4% of face-to-face

reviews took place at home. Telephone reviews occurred at a similar frequency for both

cohorts, comprising 50% of follow ups. The heart failure with reduced ejection fraction

cohort required more alterations in medication and medication titration, generating

additional follow ups.

Conclusions

The service expansion to include patients with heart failure with preserved

ejection fraction has had a significant impact on workload, leading to a reduction in the

quality of care for those with heart failure with reduced ejection fraction.

Background

Heart failure is the reduced ability of the heart to pump blood around the body, occurring

because of damage to the heart muscle (National Institute for Health and Care Excellence,

2018). It is a common, debilitating and progressive condition, affecting approximately

920000 people in the UK (Conrad et al, 2018). Heart failure with reduced ejection fraction

has a left ventricular ejection fraction of less than 40%, while heart failure with preserved

ejection fraction has a left ventricular ejection fraction greater than 50% (McDonagh et al,

2021). It is important to differentiate heart failure by the left ventricular ejection fraction

when it comes to evaluating treatment options and likely response to therapies (Paulus

and Tschope, 2013). Heart failure causes 5% of emergency hospital admissions and 2% of

NHS expenditure (National Institute for Cardiovascular Outcomes Research, 2021), and

the social and financial burden of heart failure is set to worsen as the population increases

and ages (Cowie, 2017).

Heart failure specialist nurses manage the majority of specialist care in the community,

aiming to improve morbidity and mortality rates for patients living with heart failure with

reduced ejection fraction (Conrad et al, 2018). While heart failure with preserved ejection

fraction represents 50% of the population with heart failure (Oktay et al, 2013; Forsyth

et al, 2019; Pfeffer et al, 2019; Hossain et al, 2021), only limited evidence supports

the effectiveness of heart failure specialist nurses in the management of these patients.

Nonetheless, the National Institute for Health and Care Excellence quality standard (2015)

recommended that all patients with heart failure should be reviewed by a specialist team,

prompting many UK commissioning groups to merge all patients with heart failure under

the care of heart failure specialist nurses.

The Central London Community Healthcare Trust West Hertfordshire heart failure

service was functioning as expected in 2018, with referral rates of patients with heart

failure with reduced ejection fraction at approximately 45 per month and patients staying

in the service for a median of 17 weeks (based on local audit data). This was aligned to

the service target, which was based on international guidance of 12–24 weeks length of

stay, given the prognostic benefits of rapid titration (Zannad et al, 2011; McMurray et al,

2014; 2019; Vaduganathan et al, 2020; Packer and McMurray, 2021). The new patients with

heart failure with preserved ejection fraction were admitted to the service in May 2020.

The expectation on planning this service was that a management plan would be put in

place for the patients with heart failure with preserved ejection fraction by a consultant

cardiologist, and a heart failure specialist nurse would be appointed to implement this. No

benchmark length of stay in service was assigned to the patients with heart failure with

preserved ejection fraction, as the plan was for only one appointment for each patient to be

made. In reality, this aim was found to be unrealistic because of a combination of reasons,

including comorbidities, inadequate team−team referrals and poor social support. Resources

were not adjusted to account for this, and no revised targets or expectations were made.

Despite improved processes, the service has struggled to manage referrals. During the

COVID-19 period, cardiology services were backed up, staff were redeployed and more

patients were seen at home to prevent infection from visiting the hospital. No new staff

were allocated to the service. The impact of the pandemic is yet to be fully understood,

but heart failure deterioration has now been found to be more likely and there is a higher

risk of death following admission to hospital (Bhatt et al, 2021).

The aim of this study was to evaluate how expanding the service to include patients with

heart failure with preserved ejection fraction has impacted service referral rates, length of

stay in the service and clinical workload.

Methods

Study design

A retrospective evaluation of the service data for patients with heart failure with reduced

ejection fraction or with preserved ejection fraction was undertaken over a 7-month period

(October 2020–April 2021). The information was recorded manually from patients’ notes

and captured on a data collection sheet designed for this purpose within Microsoft Excel.

Notes were reviewed by JP. Variables were extrapolated from the notes and analysed,

which included baseline demographics (age, referrer, hospital admissions in a year, fluid

loss on discharge, New York Heart Association class on admission and comorbidities),

referral rates, length of stay and clinical workload. Before analysis, the sample was split

into the two cohorts: heart failure with reduced ejection fraction and heart failure with

preserved ejection fraction; these were the independent variables. The dependent variables

were: referral rates, length of stay in service and clinical workload. Clinical workload was

defined as the number of clinical contacts that comprised care, based on five parameters:

multidisciplinary team or consultant review, number of follow-up clinic visits, number

of follow-up home visits, follow-up telephone contacts and medication titration events.

The service had been originally set up for patients with heart failure with reduced ejection

fraction who were expected to require five or more medicine titration appointments. This

was taken as the cut-off point for analysis. While medication titration was the expected

reason for follow up in all patients with heart failure, the reason was cross-checked given

the uncertainty in the needs of the heart failure with preserved ejection fraction group.

Therefore, the reason for each follow up (clinic, home or telephone) was also noted.

Participants

All patients aged 18 years or over with a new diagnosis of any heart failure, who were

referred into the service from any source were included in the evaluation. Patients referred

prior to the evaluation date (October 2020) and those returning to the service were excluded.

A total of 468 patients were referred to the service between October 2020 and April 2021,

with 401 being patients with heart failure with reduced ejection fraction. Of these referrals,

250 met the inclusion criteria. Approximately 73.2% (n=183) were patients with heart

failure with reduced ejection fraction, compared to 26.8% (n=67) of patients with heart

failure with preserved ejection fraction. Using a simple random sampling method, 81

records were selected, including 41 participants with heart failure with reduced ejection

fraction and 40 with heart failure with preserved ejection fraction. This was considered

an adequate sample size, as this represented one-third of eligible referrals into the service.

Data analysis

The Statistical Package for the Social Sciences 27.0 software was used for data analysis.

Where statistical assumptions were met, a Chi square test or Fisher’s exact test were used

for comparison between heart failure type and referral rates, length of stay and clinical

workload. Where data were not normally distributed, the Wilcoxon signed rank test was used

for statistical analysis. Results were expressed as mean +/- standard deviation (range) or,

if variables were not normally distributed, results were expressed as median (interquartile

range). A P value of <0.05 was taken to indicate a statistically significant difference.

Ethical approval

Study approval was gained in line with the local service evaluation protocol and from the

ethics committee at London South Bank University (21/A/16).

Results

The heart failure with reduced ejection fraction cohort were younger on average, with a

mean age of 72 years compared to 85 years for the heart failure with preserved ejection

fraction cohort. The heart failure with preserved ejection fraction cohort had a higher

comorbidity burden, with atrial fibrillation and hypertension being the most common. All

comorbidities were observed more frequently in the heart failure with preserved ejection

fraction cohort, except for coronary artery disease and diabetes (Table 1).

There was a strong negative association for the heart failure with reduced ejection fraction

cohort compared to the heart failure with preserved ejection fraction cohort (P<0.001) in

terms of length of stay in service. A total of 95.1% (n=39) of patients with heart failure with

reduced ejection fraction remained in the service longer than the 24-week target, compared

to 25.0% (n=10) of patients with heart failure with preserved ejection fraction (Figure 1).

The length of time in service was significantly higher in patients with heart failure with

reduced ejection fraction. The expansion of the service was associated with a statistically

significant increase (P<0.001) in length of stay in service for the heart failure with reduced

ejection fraction cohort (35.57 weeks) compared to the target of 24 weeks (Figure 2).

There was a greater proportion of multidisciplinary team or consultant reviews among

participants with heart failure with preserved ejection fraction compared to heart failure

with reduced ejection fraction (P<0.004). However, there was a greater proportion of

clinic visits for participants with heart failure with reduced ejection fraction compared

to heart failure with preserved ejection fraction (P<0.001). The opposite was shown for

home visit frequencies, where this was greater for the participant with heart failure with

preserved ejection fraction, but the difference did not quite achieve statistical significance

(P<0.054). There was a non-significant difference in frequency of heart failure type and

telephone review (P=0.241), where participants with heart failure with reduced ejection

fraction had more telephone reviews. The heart failure type and titration frequency was

higher in participants with heart failure with reduced ejection fraction, but this was not

statistically significant (Figure 3).

A similar titration workload was found for both cohorts when evaluating whether the

patients had any medication alteration and not the total number of titrations. However,

when follow-up appointments and medication titration were reviewed against heart failure

type, as anticipated given the number of prognostic medications, there was a significant

association between heart failure type and medication titration (P<0.012) and total number

of follow ups (P<0.001). As such, participants with heart failure with reduced ejection

fraction required more medication titrations and were expected to need a higher number of

follow ups, given that there was a statistically significant association between medication

titration and follow ups (P<0.002).

While the relationship between medication titration and follow-up appointments was

expected for the heart failure with reduced ejection fraction group, the service expectation

for one follow-up appointment for the heart failure with preserved ejection fraction group

was exceeded. Only 2 of the 40 patients with heart failure with preserved ejection fraction

had the one allocated follow-up appointment. The remainder (n=38) had a median of seven

follow ups each, with a median of two appointments associated with a medication titration.

There was a statistically significant (P<0.001) greater number of medication titrations and

follow-up appointments in the heart failure with reduced ejection fraction cohort (Figure 4).

Discussion

This service evaluation aimed to review the impact of service expansion to include patients

with heart failure with preserved ejection fraction. Approximately 70 patients in total were

referred per month over the data collection period. This was an increase from 45 patients

(56%), compared to the last audit in 2018 (internal data). Of the total of 250 referrals,

73.2% (n=183) were patients with heart failure with reduced ejection fraction. While this

does not reflect the accurate proportion of heart failure types in this population, the data

was collected within the first year of increasing the service remit. New services take time

to integrate, and it is expected there will be an increase in heart failure with preserved

ejection fraction referrals to a similar rate as heart failure with reduced ejection fraction

over time (Ariss et al, 2015).

The timeline of full treatment optimisation within 12–24 weeks for heart failure with

reduced ejection fraction is clinically guided and underpinned in research (Zannad et al,

2011; McMurray et al, 2014; 2019; Vaduganathan et al, 2020; Packer and McMurray,

2021). Unfortunately, there is no such guidance in the management of heart failure with

preserved ejection fraction. The median length of stay for the entire cohort was 27 weeks,

which falls outside the 24-week target. The new cohort of patients with heart failure with

preserved ejection fraction had a median stay of 17 weeks, while the heart failure with

reduced ejection fraction cohort had a statistically significant longer stay of 35.57 weeks.

This is in contrast with the 2018 audit of the heart failure service, which was within target,

with a median length of stay of 17 weeks. While not all delays in care can be attributed

to the service expansion, the loss of this standard suggests that the new cohort of patients

is being managed to the detriment of the care of patients with heart failure with reduced

ejection fraction.

The workload impact evaluation showed a similar proportion of workload activities for

both cohorts, despite the expected and allocated workload being less for participants with

heart failure with preserved ejection fraction. Medication titration was a major workload

contributor, with a similar frequency of alterations to medication between both cohorts.

However, when the number of titrations and follow ups were assessed in more detail, 4 MA Healthcare Ltd

there were differences found between the two groups. As anticipated, given the number

of prognostic medications for the heart failure with reduced ejection fraction cohort, they

required more frequent alteration. Accordingly, they also had a greater number of follow-up

visits. In contrast, patients with heart failure with preserved ejection fraction often only

had their diuretics altered and, despite having fewer titrations than the reduced ejection

fraction cohort, over 50% required more than six appointments. Investigation showed that

these were not associated with medication titration and more likely to be associated with

comorbidity management and social care. Not only does this suggest that frequent follow

ups took place over a short period of time, but that they were being reviewed for reasons

other than offloading fluids. Many other clinical needs were likely to have been seen as

necessary for timely care and to prevent admissions. However, the heart failure service

was only commissioned for one appointment, which appears here to be inadequate to meet

the needs of this group.

Consistent with this, there were a greater number of multidisciplinary team or consultant

reviews in the heart failure with preserved ejection fraction cohort, suggesting that they are

the more complex heart failure type when it comes to management, and are more likely

to require time-consuming reviews. This may be exacerbated by the lack of treatment

guidance for this group. Furthermore, whereas patients with heart failure with reduced

ejection fraction were more likely to be reviewed in clinic, those with heart failure with

preserved ejection fraction were more likely to be house bound or visited at home. This

was expected, as this population was older and frailer on average. However, this may not

accurately reflect the need for at-home appointments given that clinics had been halted or

limited during the COVID-19 pandemic. Patients had to meet certain criteria to be allowed

to come to clinic, but they could still refuse in-person visits at this stage. Therefore, many

patients who could have been seen in clinic if the service was running as normal may

not have done so, instead they were seen at home during this period. Given COVID-19

restrictions on in-persons visits, telephone reviews were a major contributor to workload,

making up 50% of clinical follow ups in both groups. There was a similar frequency of

telephone reviews between the two heart failure types, suggesting that the new methods

of teleclinic monitoring have been accepted by clinicians and patients, and continue to be

frequently used in practice. Although this does not necessarily save time in appointment

length, given that there is no need to travel, more reviews can be completed in a day,

improving service efficiency.

 It was shown from service delivery metrics observed by the team (not from the audit),

that the heart failure with preserved ejection fraction cohort were often re-admitted with

decompensation, requiring further input and having a greater negative impact on service

resources. This may suggest that despite the time spent educating patients on signs and

symptoms and lifestyle management, they were not empowered to manage their own health

in the same way as the heart failure with reduced ejection fraction cohort. They may also

be less likely to contact the service directly when deteriorating as they appear less aware

of the signs and symptoms. This highlights the clinical instability of the heart failure with

preserved ejection fraction population, and the importance of effective social support and

regular reviews for case management, both of which are aspects of good practice (Oktay

et al, 2013; Fu et al, 2016; Forsyth et al, 2019). The planned service for patients with heart

failure with preserved ejection fraction did not incorporate such support.

Recommendations

Based on the findings of the current service evaluation, the authors set out the following

recommendations to improving care delivery when expanding cardiac services to include

patients with heart failure with either reduced or preserved ejection fraction.

1. Improve waiting times for patients with heart failure with reduced ejection fraction:

allocation of more resources is necessary to reduce waiting times and bring the time to

full titration to target

2. Comorbidity care must be better embedded in the GP pathway: while cardiac comorbidity

remains the responsibility of the specialist team, non-cardiac comorbidity is managed by

the primary care team. At times, when patients have difficulty getting appointments with their GPs, there remains an impact on cardiac status, which can lead to a deterioration

in symptoms and readmission to the service

3. Post discharge support pathways must be reviewed: collaboration between the heart

failure specialist nurses and complex case management teams must be established to

advance and evolve the discharge pathway. This should encourage multidisciplinary

teams to work in a more integrated manner, with better multimorbidity management

and improved readmission rates

4. Social care is needed to support the service: Social care, as well as support from

community navigators are required in this high-risk group of patients. This should be

integrated as part of the complex case management pathway

5. Review referral pathways into the service: Referral criteria should be reviewed to

determine if the heart failure specialist nurse service is meeting needs, or whether other

community services are more relevant to patient requirements (with or without the heart

failure specialist nurse advice and input).

Limitations

In interpreting this data, several limitations need to be taken into consideration. Ideally,

the data would have been compared to data collected prior to the service expansion,

providing a baseline. However, the pandemic caused such an extreme shift in the standards

and processes for practice that this was no longer deemed to be a valid comparison. The

impact of the COVID-19 pandemic in distorting the data must also be considered, as service

expansion may have demonstrated vastly different results had this taken place prior to the

pandemic. The data presented are also from a single service, which significantly limits the

generalisability of the findings. However, many services across the UK may have already

expanded services in this way or be in the process of expansion, so the data presented in this

study may act as a useful reference when considering service functionality and improvement.

Key points

■ Patients with heart failure with preserved ejection fraction are likely to require a similar

amount of input from the heart failure specialist nurse as patients with heart failure

with reduced ejection fraction.

■ Expanding a heart failure service to include patients with heart failure with preserved

ejection fraction without increasing the number of heart failure specialist nurses led to

compromised care for patients with heart failure with reduced ejection fraction.

■ Social support and case management review should be embedded into the care of

patients with heart failure with preserved ejection fraction

Reflective questions

■ What is the role of a heart failure specialist nurse?

■ How do service needs differ between people with heart failure with reduced ejection

fraction and those with heart failure with preserved ejection fraction?

■ What is the best model of service delivery for the two main groups of patients with

heart failure?

Conclusions

The new stream of patients with heart failure with preserved ejection fraction has had a

significant impact on the service. While patients with heart failure with preserved ejection

fraction appear to have been managed efficiently, this has impacted the effective management

of the timeline and best practice care for patients with heart failure with reduced ejection

fraction. Efficient strategies such as telephone reviews have helped to ease the workload.

However, given the increase in referrals and proportional workload in both cohorts, it is unlikely

that the service can meet key targets without an increase in staffing levels. This

evaluation has presented findings which could be used to make recommendations to optimise

future care for patients with heart failure and services.

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