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Introducing nurse-led heart failure clinics in Swedish primary care settings

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Abstract

Aim: According to clinical guidelines, it is recommended that patients with heart failure (HF) receive structured multidisciplinary care at nurse-led HF clinics in order to optimise treatment and avoid preventable readmissions. Today, there are HF clinics with specialist-trained nurses at almost all Swedish hospitals, but HF clinics remain scarce in primary care (PC).

The aim of this study was twofold: firstly, to evaluate the effects of systematically implementing nurse-led HF clinics in PC settings with regard to hospital healthcare utilisation and evidence-based heart failure treatment, and secondly to explore patients' experiences of HF clinics in PC.

Method: The study had a pre-post design. Annual measurements between 2010-2017 regarding in-hospital healthcare consumption and medical treatment after the implementation of HF clinics in PC in one county council in Sweden 2011-2017 was compared to baseline data collected before the implementation in 2010.

Results: The implementation of HF clinics in PC significantly reduced the number of HF related hospital admissions by 27% ($p < 0.001$), HF hospital days by 24% ($P < 0.001$) and HF emergency room visits by 24% ($p < 0.001$). Further, patients were to a higher extent medically treated according to guidelines and satisfied with the care they received at the PC HF clinic.

Conclusion: Nurse-led HF clinics in PC seem to be effective in reducing the need for in-hospital care and provide high quality person-centred care.

Keywords; Heart failure management, primary care, Nurse-led heart failure clinics, Healthcare utilisation

Introduction

Heart failure (HF) is a progressive chronic condition, occurring in about 2% of the population, and rising to over 10% in the population over 75 years and 15% in those over 85 years.^{1,2} The symptom burden is often extensive. Physical symptoms lead to limitations in daily life and decreased quality of life, and periods of deterioration often lead to hospital admissions and adverse outcomes.^{1,3,4} Hospitalisations place a burden on patients, and independently predict a higher risk of death.⁵ Hospitalisations and readmissions are often driven by inadequate self-care management.⁶ HF self-care involves adherence to a treatment plan (such as medication, diet and exercise recommendations) and monitoring weight changes,⁷ among other factors.

According to clinical guidelines,^{1,8} it is recommended that patients with HF receive structured multidisciplinary care, and one established model is the nurse-led HF clinic. At these clinics, nurses optimise the medical treatment, provide HF-specific education and support self-care. Nurse-led HF clinics have been found to significantly decrease all-cause readmission and mortality.⁹⁻¹¹ Today, there are HF clinics with specialist-trained nurses at most Swedish hospitals, but HF clinics are scarce in primary care (PC).^{12,13}

In Sweden, as in European countries, many elderly patients are treated in PC with a general practitioner (GP) who most usually establishes the HF diagnosis and handles the treatment and follow-up visits.¹⁴ Previous research has found a poor prognosis for these elderly patients.¹⁵ One contributing reason could be that patients' ejection fraction (EF) is known to be poorly recorded in PC, which might lead to a delay before the HF diagnosis is established and the patient receives medical treatment. Heart failure patients with EF missing from their medical records are known to have poor outcomes regarding hospitalisation and survival, and tend to be older and more fragile.¹⁶ Another reason could be that – due to a lack of time – the GP does not provide the patient with HF-specific education.¹³ A considerable amount of the HF self-care is performed in the patient's home supported by family caregivers, and insufficient knowledge could lead to adverse outcomes for the patient. Both patients

and their family caregivers want close healthcare contact with the possibility to receive guidance throughout the whole illness trajectory.^{17,18}

It is also known that adherence to guidelines in PC is still suboptimal, particularly with regard to medication dosage. A recent study including patients treated in PC in Sweden revealed that renin angiotensin system antagonists (RAAS) were prescribed to 78% of patients, although only 29% received the target dose of RAAS. Beta blockers were prescribed to 76% of patients, with 18% receiving the target dose.¹³ The same study also evaluated to what extent patients were engaged in self-care activities and found that patients' lowest adherence was to daily weighing and consulting behaviour.¹³

The above data points out that there is room for improvements in the HF care provided at PC centres, since PC settings are the most frequent point of consultation for elderly patients with HF.

In 2008, a review of medical records for patients admitted to the medical department at Sörmland County Council showed suboptimal medical treatment at discharge and a high volume of in-hospital healthcare consumption, including emergency room visits and rehospitalisations. It was also found that many patients were not followed-up at a nurse-led HF clinic. This led the county council to start a region-wide HF process in 2010 to ensure evidence-based care for HF patients throughout the chain of care by establishing HF clinics in PC.

The process of implementing HF clinics in PC

The first step in the process was to initiate a working group, including representatives from all professions involved in the care of patients with HF from hospitals, PC and the municipality. Guidelines were drawn up for how HF clinics in PC and care pathways between hospital and PC should be designed to ensure efficient care transitions.

It was emphasised that the team at the PC HF clinic should consist of at least one nurse, a GP and a physiotherapist, and the HF clinic should also have access to dietitians, occupational therapists and social workers when needed. The team members should also be able to consult cardiologists and nurses at the HF clinics at the hospitals if and when they found it necessary. Patients with elevated risk of complications or in need of interventions (for example angiography, percutaneous coronary interventions or coronary artery bypass surgery) should be followed up by

the in-hospital HF clinics until the intervention had been carried out and the patient was in a stable condition. Patients with or devices (pacemakers, CRT and/or ICD) is followed up in-hospital HF clinics. All other patients were referred to the HF clinics in PC directly after discharge from hospital and receive a scheduled visit within 2-3 weeks, Figure 1.

Insert Figure 1.

All HF team members (nurses, physiotherapist, GP, dieticians, occupational therapists and social workers) were invited to participate in a one-day HF educational course. A HF nurse education at university level with the extent of 7,5 ECTS was developed by the county council in collaboration with the university. This course is following the content of The HF nurse curriculum developed by The Heart Failure Association och the European Society of Cardiology.¹⁹ Between 2011 and 2016, a total of 50 nurses have graduated from the course. Further, between 2011 and 2017, yearly one-day network meetings were held where education about HF and treatment was provided to the whole team, and web-based education directed at different team members has been designed, see Figure 2. On several occasions each year, cardiologist from the hospitals lectures to the GPs, which have increased knowledge about HF in the whole chain of care. Also, if GPs need to consult a cardiologist, there is a direct phone line to call during office hours.

Insert Figure 2.

At the start, 2 out of 27 (7%) primary health centres and all three hospitals in the county council had a nurse-led HF clinic and almost all follow-up visits were done by the in-hospital HF clinic. Implementation has taken place gradually as shown in Table 1. Today, 25 out of 27 (93%) primary health centres have nurse-led HF clinics and approximately 80% of the nurse-led follow up is done in PC. The nurses working at the HF clinics have a specialist university-level HF qualification. Both hospitals and PC follow national guidelines, and local guidelines have been designed for care transitions. It became mandatory for the HF clinics to register their patients in the Swedish Heart Failure Registry (SwedeHF)²⁰ to be able to evaluate the care provided at each HF clinic. Since HF clinics in PC are a new way of working, there is a need to describe and evaluate the effects of the implementation of this nurse-led HF model for follow-up after hospitalisation in PC.

The aim of this study was twofold: firstly, to evaluate the effects of implementing nurse-led HF clinics in PC settings with regard to hospital healthcare utilisation and evidence-based heart failure treatment, and secondly to explore patients' experiences of HF clinics in PC.

Method

Design, sample and setting

The study had a pre-post test design. Annual measurements of in-hospital healthcare utilisation and HF treatment after the implementation of HF clinics in PC in one county council in Sweden were compared to data collected before the implementation.

Sörmland County Council has about 300,000 inhabitants, and there are three hospitals with a total of 270 hospital beds on medical wards. There are 27 primary health centres, and during the period 2015-2016 GPs had 3,500 consultations with patients with HF as the main diagnosis.

Procedures

Measures and data collection

Data regarding hospital admissions, rehospitalisation <30 days after discharge due to deterioration of HF, number of hospital days and emergency room visits were collected using the county council's administrative healthcare system during the period 2010-2017. The Swedish Heart Failure Registry (S-HFR)²⁰ was used to collect data on the pharmacological HF treatment. The registry protocol, registration form, and annual reports are available at <http://www.ucr.uu.se/rikssvikt>.

Data about patients' experiences of the HF clinics in PC were collected via an annual patient survey delivered to all patients visiting the HF PC clinics during one month/year between 2012 and 2017. The survey was designed by the HF process working group with help from statisticians at the county's Centre for Clinical Research, and consisted of three questions regarding: 1. The patient's perceived satisfaction with the information given by the HF nurses, 2. The patient's perceived

satisfaction regarding how easy it was to get in contact with the HF clinic, and 3. The patient's perceived satisfaction with the quality of care at the HF clinic. The response statements were divided into the following answers: very dissatisfied, dissatisfied, satisfied, very satisfied.

Further, there were three questions about which areas the patients perceived that they had received information about, which areas they wanted more information about and whom they should contact in case of deterioration of their HF. The patients received the survey from the HF nurse at the visit to the PC clinic. They completed the survey at home and sent it back to the research team in a pre-paid envelope.

Data analysis

Categorical data are expressed using frequencies and percentages, while continuous data are expressed using means and standard deviations (SDs).

To evaluate the long-term effect of healthcare consumption, possible differences in the medical treatment of patients followed up in PC in the county council vs patients in S-HFR, independent t-test, Chi², Mann-Whitney tests and ANOVA test were used depending on the scale and data distribution.

Descriptive statistics including percentages were used to describe the answers from the patient survey.

Ethical considerations

The study was approved by the Regional Ethics Committees for Human Research (ref. 2017/441-31), and was conducted in accordance with the World Medical Association Declaration of Helsinki and the Code of Ethics for Nurses.^{21,22}

Results

Demographics

In 2016, 762 patients from Sörmland were registered in the SwedeHF registry, with a mean age of 72,8 (median 75,1) years, 60% were men of the in-patients registered during hospital admissions. This should be compared to all 68 604 registrations in the

SwedeHF where there the patients had a mean age of 75 years (median 78) and 61% being men, Table 1.

The mean age for patients in primary care was 79,1 (median 80,5) and in the registry the mean age was 79,0 years (median 81). In Sörmland, 56.6% of the patients had an EF <40%, and in the whole registry there was 53,2% of the patients with an EF <40%.

In-hospital healthcare utilisation

From 2010 to 2017, the number of emergency room visits decreased by 35.7% ($p=.001$), and the number of hospital admissions decreased by 17.3% ($p=.001$). The number of hospital days decreased by 22.2% ($p=.001$) during the same period, Table 1. There were significantly fewer early readmissions within 30 days after discharge from hospital between the 2010 and 2017 ($p=.01$).

The decreased number of hospital admissions was larger for patients with HF compared with the total number of hospital admissions due to all other types of medical diagnoses, which decreased by 3.2% during the same period, Figure 3. The number of admissions due to stroke decreased by 8.3%, and admissions due to COPD admissions increased by 7.3% ($p=.032$).

Insert Table 1.

Medical treatment in patients with follow-up in PC care settings

The number of registrations in S-HFR in the county council has increased from 149 registrations in the whole county council IN 2009 to 752 registrations in 2016, ($p<.05$).

The result from the SwedeHF registry showed that patients with HFREF follow-up by PC HF clinics were medically treated according to HF guidelines with RAAS antagonists and beta blockers to the same or a greater extent than in general, However, in Sörmland 44% reach target dose of RAAS antagonists and 30% reached target dose of betablockers vs. in the SwedeHF registry where target dos of RAAS antagonists was reached by 49% and betablocker 26%. There were no differences with regard to device therapy, although there was a trend toward more patients in Sörmland getting a CRT-D compared to the rest of Sweden ($P=.087$), Table 2.

Insert Table 2.

Patients' experiences of the implementation of HF clinics in PC

In 2017, the annual patient survey was sent to 140 patients and 84 patients responded (response rate 70%), with a mean age of 78.8 years and 50% were female.

The results showed that 97% of patients were satisfied or very satisfied with the information about the HF and self-care and with the quality of the care they received at the PC HF clinic. Regarding patients' perceived satisfaction regarding how easy it was to get in contact with the HF clinic, 64% were very satisfied, 29% were satisfied and 3% were dissatisfied (4% missing).

A total of 91% of patients responded that they should contact the nurse at the PC HF clinic as the first instance in the event of deterioration of HF, and the rest (9%) answered that they should contact the emergency ward at the hospital in the event of deterioration.

At the HF clinics, patients stated that they had received information about medical treatment (76.1%), HF symptoms (58.3%), physical activity (66.7%), diet (40.5%), alcohol (28.6%) and tobacco (25.0%) and sexuality (6%), Table 3. Half of the patients (48%) considered that they had received sufficient education about HF and self-care.

Insert Table 3.

Discussion

This study aimed to evaluate the effectiveness of implementing nurse-led HF clinics in PC. The study is unique since the implementation included an entire county council. Important findings were that this model of follow-up was associated with reduced hospital care utilisation, improved health care providers' adherence to prescribing and optimising evidence-based HF treatment as well as a high patients' satisfaction with care.

We found that the implementation of HF clinics in PC significantly reduced the number of hospital admissions, hospital days and emergency room visits. National data from the open statistical database of the National Board of Health and Welfare on heart failure admission showed a decrease by 8% in Sweden between 2010-2016 compared to a decrease of 23% in Sörmland during the same period of time.²³ A previous Swedish single-centre study evaluating the effect of HF clinics in PC also

found beneficial effects in terms of a significant reduction in the number of hospital admissions and instances of healthcare contact, and concluded that HF clinics in PC could be recommended.²⁴ The same result has previously been described for in-hospital HF clinics, where a recent review including 16 RCT studies aimed to find out whether multidisciplinary HF clinics was associated with lower hospital care utilisation and mortality. The results showed that patients had a lower incidence of HF hospitalisation and all-cause mortality when followed up at a HF clinic for more than 3 months, but not when followed up for less than 3 months.¹⁰

The Danish NorthStar trial compared the follow-up of stable HF patients receiving optimal medical therapy at in-hospital HF clinics versus patients referred back to their GP. After a median follow-up of 2.5 years, no differences were seen in time to death or hospital admission between the groups, nor in any of the secondary outcomes of mortality, HF admission, quality of life, number of days admitted and number of admissions.²⁵ Further, the Dutch Comparative Study on Guideline Adherence and Patient Compliance in Heart Failure Patients (COACH-2) also found no difference between follow-up in PC versus in-hospital HF clinics regarding the number of deaths and CV hospital admissions in stable optimally treated HF patients.²⁶ These results underline the feasibility and safety of transferring stable HF patients to long-term follow up by a GP. Our study evaluated a model taking the organisation of care one step further and developing a clinic for both optimisation of treatment and self-care as well as long-term support and easy access to healthcare in PC. Our model included close collaboration between hospital-based and primary care throughout the whole illness trajectory and a key to success was that it was initiated and financially supported by health care stakeholders.

Another main finding was that patients in our study were prescribed beta-blockers and RAAS antagonists according to guidelines to a higher extent. Previously, a gap between recommended pharmacological treatment and actual practice in PC had been seen.²⁷ The dosages have been found to be suboptimal, and patients with more severe HF had a lower probability of being treated according to pharmacological recommendations.²⁷ One RCT study evaluated whether the use of nurse-led HF management programmes had beneficial effects regarding medical treatment in PC. At the end of the study, significantly more patients in the intervention group were

treated with RAAS blockade, and the mean dosage was 69% of the optimal dosage in the control group and 94% in the intervention group. The average dosage of beta blockers was 33% of the optimal dosage at baseline in both the intervention and control groups. At the end of the study, the average dosage was 36% of the optimal dosage in the control group and 46% of the optimal dosage in the intervention group ($P = 0.10$).²⁴ It should be acknowledged, as also pointed out by the HF guidelines,¹ that in HF patients with comorbidities, e.g. atrial fibrillation and renal failure, target doses of HF drugs may be unfavorable. For example, it has been shown that a heart rate below 70 bpm were associated with worse outcomes in patients with HFrEF and AF,^{28,29} underlining that betablockers should be carefully up-titrated.

The current results showed that the majority of patients were satisfied with the care they received at the PC HF clinic, and that they felt safe knowing they could turn to the HF nurse in case of deterioration. The majority stated that they had received information regarding self-care management and medications, which is comparable to findings from studies performed at in-hospital HF clinics.^{30,31}

These results contrasted to studies where patients been only followed up by GPs or cardiologists and not by a HF clinic. Rutten et al.³² found that HF self-care advice was given to patients by GPs or cardiologists in less than 20% of cases, and a study including 42 PC practices in the Netherlands showed that self-care advice was given by the GP in about 40-60% of patients; medication intake was discussed with 54% of patients and HF symptoms with 58%.²⁷ Giezeman et al. found a low adherence to self-care recommendations in patient followed up by the GP, particularly concerning daily weighing and consulting behaviour. There was no difference in self-care behaviour between the participants who were aware of their HF diagnosis and those who were not, which suggests an insufficient system of patient education and monitoring.¹³ One possible explanation for the low adherence to self-care recommendations could be that GPs do not provide patients with HF-specific education due to a lack of time and/or knowledge of the importance of self-care. These findings emphasise that easy access to structured multidisciplinary care including HF nurses, where patients receive repeated HF education and support, is also needed in PC.

Limitations

A clear limitation of the study is the pre-post design. However, since this study is an evaluation of the implementation of a new model for organisation of HF care in a complete health care region it was not feasible to use the RCT design. The strength of the study is that it included the complete HF population in a health care region in Sweden and not a selected group as in many previous RCT evaluating the organisation of HF care. In this study all HF patients from 2010-2017 were included in the analysis.

The initiative of having HF nurses in the primary care setting evaluated in this study is in line with the change in the ESC HF guidelines between 2012³³ and 2016¹ where primary care and GPs are emphasised as part of the core HF team in the most recent guidelines from 2016¹.

Conclusion and implications

This study showed that a systematic implementation of HF clinics in PC seems beneficial for most elderly patients with HF. This patient group is often affected by multimorbidity and are already treated by GPs in PC. Introducing HF clinics at primary health centres gives patients an opportunity to receive evidence-based HF care that they otherwise would not have been given.

The evaluation of the implementation also showed that HF clinic in PC may be likely to be cost-effective since it significantly reduced the number of HF related hospital admissions, hospital days and emergency room visits due to HF. Further, the patients received pharmacological treatment according to guidelines to a higher extent than is seen in the Swedish HF registry, and they were satisfied with the care they received at the PC HF clinic.

Thus, it is of great importance that care pathways between hospital and PC are designed to ensure efficient and seamless care transitions for patients.

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Conflicts of interest: none

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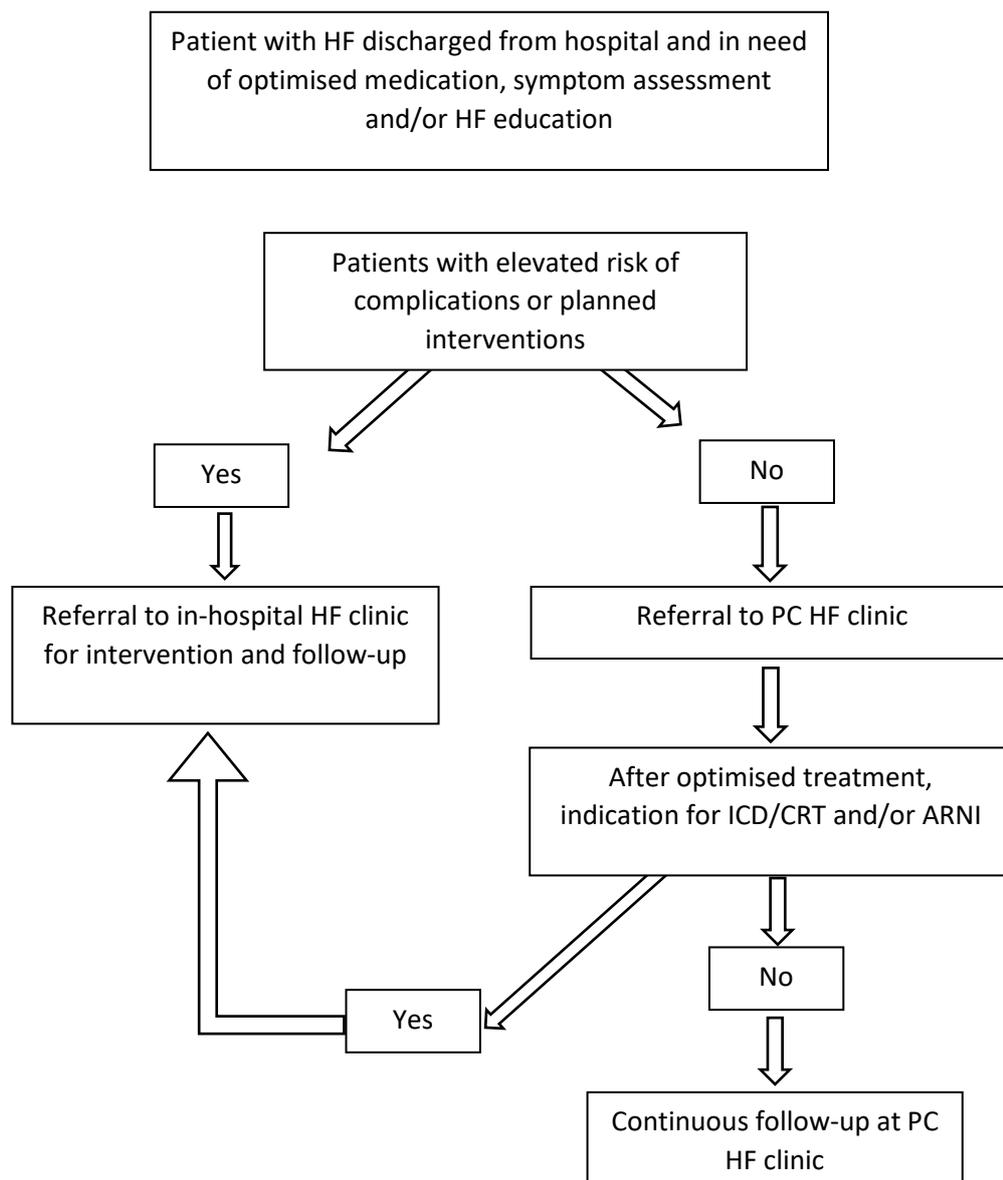


Figure 1. Flowchart of patients' follow-up in PC or at in-hospital HF clinics.

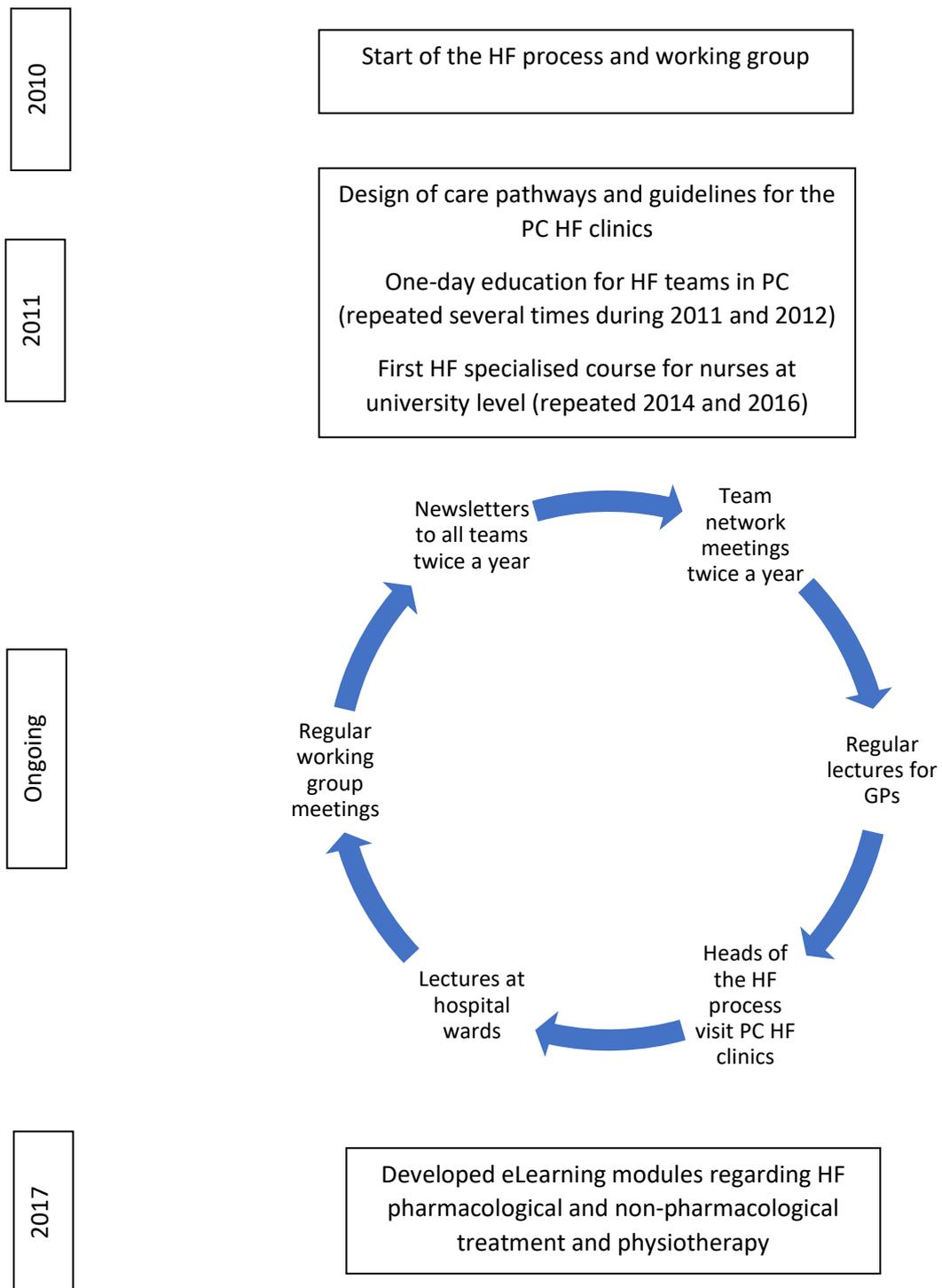


Figure 2. Flowchart of HF process activities during the years 2010-2017.

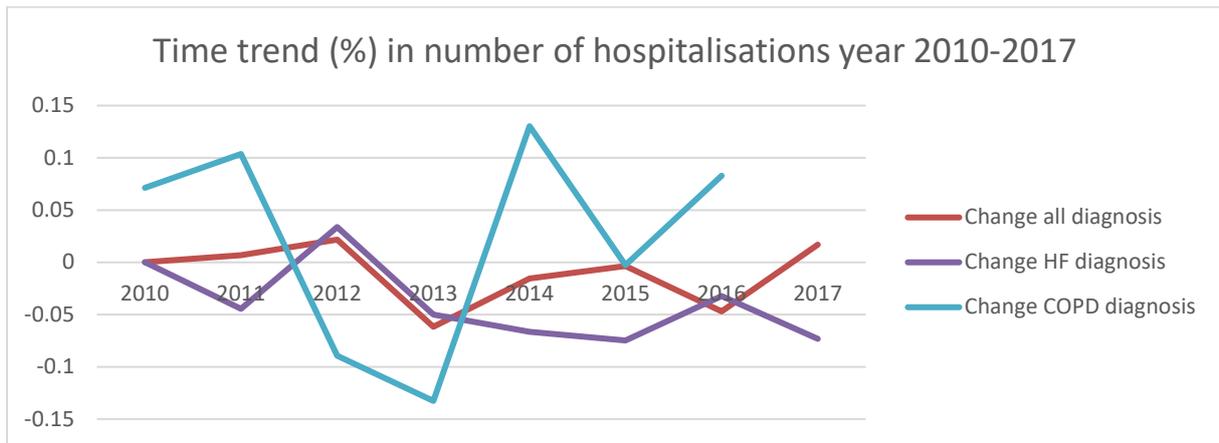


Figure 3. Time trend regarding the change of hospitalisations due to all diagnosis and HF diagnosis in the county council between 2010-2017.

Table 1. Changes in organisation of heart failure care including the increasing number of primary care heart failure clinics and its association with in-hospital heart failure healthcare utilisation from 2010 to 2017 in Sörmland County Council and also in comparison with all hospital admissions and admissions due to COPD.

	2010	2011	2012	2013	2014	2015	2016	2017	<i>p</i> value
Total number of inhabitants in Sörmland	270738	272563	274723	277569	280666	283712	288097	291341	
Mean age of HF patients at in-hospital HF clinics	71.8	70.5	70.5	71.6	66.8	69.9	72.8	70.5	
Mean age of HF patients in PC	78.9	79.1	79.0	79.1	76.8	78.7	79.1	79.0	
Number of the 27 PC centers with a PC HF clinics n (%)	2 (7,4)	10 (37,0)	14 (51,9)	17 (63,0)	21 (77,8)	24 (88,9)	25 (92,6)	25 (92,6)	
Number of emergency room visits HF, mean	169	164	153	218	233	172	196	128	<.001
Number of hospital admissions HF, mean	992	948	980	931	869	804	778	722	<.001
Number of days in hospital HF, mean	7 228	6 915	6 616	6 187	5 888	5 551	5 509	5 225	<.001
Number of HF readmissions within 30 days, mean	248	235	231	228	199	176	148	122	0.01
Number of hospital admissions all diagnoses, mean	17173	17286	17633	16507	16506	16540	15724	16186	0.081
Number of	399	453	345	393	379	352	357	311	0.065

hospital
admissions
stroke, mean

Number of hospital admissions COPD, mean	378	405	447	407	353	399	398	431	0.032
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HF=heart failure, COPD=chronic obstructive pulmonary disease

Table 2. Pharmacological and device therapy in Sörmland County Council compared to all registrations in SWEDE-HF in 2016 in patients with reduced ejection fraction <40.

	Sörmland n=326	S-HFR n=4453	<i>p</i> value
RAAS antagonist, %	90.4	80.2	0.034
Target dose RAAS antagonist, %	44.0	49.4	
Beta blockers, %	89.6	87.4	0.048
Target dose Beta blockers, %	30.0	26.5	
RAAS and beta blockers, %	81.4	72.2	0.037
CRT with no ICD, %	2.8	1.6	0.403
CRT including ICD, %	4.8	3.5	0.087
ICD with no CRT, %	3.2	3.3	0.283

Chi-square test, presented as %.

CRT=cardiac resynchronisation therapy, ICD=implantable cardioverter defibrillator, RAAS=renin-angiotensin-aldosterone system

Table 3. Patients' perception of lifestyle advice received and their desire for more information at the HF clinics for 84 patients diagnosed with HF.

	Received information n (%)	Insufficient information n (%)
Medical treatment	65 (76.1)	13 (15.5)
HF symptoms	49 (58.3)	8 (9.5)
Physical activity	56 (66.7)	7 (8.3)
Diet	34 (40.5)	9 (10.7)
Smoking	21 (25.0)	2 (2.3)
Alcohol	24 (28.6)	3 (3.6)
Psychological reactions	12 (14.3)	5 (6.0)
Advice regarding work	3 (3.6)	0 (0)
Sexuality	5 (6.0)	3 (3.6)