Review

Heart failure clinics and outpatient management: review of the evidence and call for quality assurance

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Despite major advances in treatment options for heart failure patients, morbidity and mortality remain unacceptably high. Frequent readmissions are distressful for patients and are associated with large costs for society. In an attempt to improve care for heart failure patients and thereby reduce morbidity and hospital readmissions, specialised heart failure clinics have emerged over the last 10 years. In particular, clinics relying, at least in part, on nurses specially trained in heart failure have gained popularity. This review of the published literature describes the wide variety of designs and the types of interventions taking place in such heart failure clinics.

A total of 18 randomised studies comparing heart failure clinics using nurse intervention with conventional care have been published to date, and the majority of these have shown either a reduction in hospital readmissions or shortening of hospitalisations in the intervention group. These findings are supported by the results of several non-randomised, controlled investigations. Thus, it is concluded that heart failure clinics using nurse intervention should be an integrated part of the care process for patients with heart failure wherever possible. We argue that ongoing attention should be paid to the quality of care delivered by the clinics to ensure that the benefit of this intervention strategy persists. Thus, it would be of importance to continuously record relevant data describing the care process using specific indicators such as ACE-inhibitor and β-blocker use and doses. One possible, practical method to apply such continuous quality assurance may be by means of electronic medical record databases.

KEYWORDS
Heart failure; Heart failure clinic; Nurse case management; Electronic medical record; Quality of care

Introduction

Despite major advances in the treatment of congestive heart failure (HF), such as introduction of ACE-inhibitors,1,2 β-blockers,3–5 aldosterone antagonists,6,7 and angiotensin receptor blockers,8–11 mortality and morbidity in HF remain unacceptably high. In several contemporary studies of unselected HF patients admitted to hospital, the one year mortality rate was 25% or greater.12–15 Hospitalisation for HF is distressing for the patient and their family and a major burden on the health care system.16 Generally, 25–50% of hospitalised HF patients will be readmitted within 6 months after discharge.17–20
frequent causes of worsening HF symptoms and readmission are poor drug compliance, poor compliance with fluid restriction, or insufficient medical therapy. In addition to these findings, it has repeatedly been shown that a substantial number of patients with left ventricular dysfunction are not treated with ACE-inhibitors and β-blockers. If the drugs are given, they are often prescribed in doses that are lower than the doses proven to be effective. In fact, it has been reported that more than 50% of acute HF admissions are preventable, at least in theory. One possible explanation for under-utilisation of proven medications may be that introduction and up-titration of ACE-inhibitors and β-blockers can be time-consuming tasks that are often difficult for physicians or clinics not dedicated to treatment of cardiovascular disease. Also, it is clear that modern HF therapy is complex and may lead to unwanted side effects or interactions, especially in inexperienced hands. Such side effects are generally more common in clinical practice than reported in randomised clinical trials as recently shown for spironolactone. It is not possible to make firm conclusions on the clinical characteristics of patients referred to current HF clinics since the data only represent clinics from which studies have been published. Also, it is plausible that the referral pattern is subject to change e.g., after a clinic is no longer part of a clinical study with strict inclusion criteria. Clearly, the populations treated in different HF clinics are likely to be highly unequal and will reflect, among other things, the clinical and research interests of the physician, the most pressing needs of different communities, and the availability of adequate resources.

Search strategy

A Medline search including papers in English from 1966 to 2003 was conducted using either the term "heart failure, congestive" or "cardiac output, low" combined with one of the following MeSH terms "disease management", "case management", "comprehensive health care" or the text words "heart failure clinic", "cardiomyopathy clinic", "nurse practitioner". This search strategy yielded 558 articles. Furthermore, reference lists of relevant original and review articles were studied to identify studies missed in the initial search. Studies, describing efficacy of specialised heart failure programmes, which included more than 20 patients, were included in the tables and analyses of this review. Studies including unselected patients with chronic diseases were only included if the results of HF patients were separately reported. Studies randomising hospitals rather than individual HF patients to various intervention strategies were not included in the tabular presentation of the randomised trials. Pilot studies were included unless the study patients were also included in the data material of a later phase study. Using these criteria 18 randomised trials and 13 non-randomised studies were identified.

Variations among HF clinics and their interventions

Patient populations

There are few available data to describe which patients are offered treatment and follow up in HF clinics. From the published randomised trials and non-randomised studies it is clear that, in some clinics, only patients who have been hospitalised with HF are referred/accepted whereas, in other clinics, outpatients who have never been hospitalised are also seen. A minority of clinics, particularly those focusing on up-titration of heart failure drugs, treat only patients with systolic dysfunction and some clinics serve only highly selected patients such as heart transplant candidates. In the identified non-randomised and randomised studies the mean age was 67.8 years and 37% of the patients were female (averages weighted for number of patients in the studies in which either mean age or gender distribution was reported). Thus, it appears that the clinics mostly serve older male patients and most clinics accept both patients with left ventricular systolic dysfunction as well as patients with non-systolic heart failure. However, from these reports, it is not possible to make firm conclusions on the clinical characteristics of patients referred to current HF clinics.
Interventions and follow-up

Interventions that take place in the clinics appear to vary considerably. In many clinics optimisation of medical therapy, particularly up-titration of β-blockers and ACE-inhibitors, has a high priority. In some cases clinical pharmacologists or pharmacists contribute to this process. Also, education of the patient and his or her relatives and promotion of self-care is an important task. Education focuses mainly on the nature of the HF disease process by teaching the patients about regular weighing and compliance with medical therapy and fluid restriction, but it may also comprise introduction of a flexible diuretic regimen (i.e., where the patient changes the diuretic doses according to symptoms and body weight) in selected patients. Patients are taught about the side-effects of cardiovascular drugs and how to react in case of worsening HF symptoms. Some clinics also provide physical training programmes directed by physiotherapists. As HF patients in general are elderly and often have limited social resources, emotional and social support is being provided (in some clinics this is the main service provided) and the task of addressing these issues may be shared among nurses, social workers and, in some instances, a hospital priest.

Follow-up of patients may take place in the clinic, by means of home visits, by telephone calls, or by a combination of these methods. Follow-up may be undertaken with fixed intervals or the visits or calls may be scheduled as needed. The use of home visits makes it possible to reach some of the most ill HF patients (NYHA class 4) who may not be followed in a conventional HF clinic simply because the transport to the clinic is too exhausting. Home visits may also give additional insights into the environment of the patient that are valuable in directing educational efforts and identifying gaps in care. Consequently, the use of home visits and telemonitoring could potentially have great impact on morbidity in HF.

Design and prevalence of HF clinics

There are few quantitative data on the organisation and prevalence of HF clinics, and most of our information is secondary coming from the clinical studies, which have been conducted in HF clinics. Furthermore, even in the published trials it is often difficult to sort out the relative contribution of nurses and doctors in the clinics. Many individual clinics have been established without any publication of the clinic design. Thus, the information available may be severely biased. Two types of HF clinics have generally been reported to date: clinics in which a nurse with special training in HF has independent patient contact, for instance: nurse-led, nurse-managed and nurse-directed. Since no clear definition of the concept exists, in the present review, we have chosen exclusively to use the term nurse-directed HF clinic for those clinics in which a nurse has been described to play a primary role in the follow-up care for HF patients.

In nurse-directed clinics, patients may also be seen by a physician, but generally the term applies to clinics in which a nurse with special training in HF sees patients independently at least on some clinic visits for evaluation and treatment, not just education. Clinics in which a physician (usually a cardiologist) primarily deals with the patients are referred to as physician-directed clinics. In these clinics, nurses and other health care professionals are a support capacity perhaps for education and routine nursing tasks but would rarely have direct independent responsibility for patient care.

To our knowledge, the only complete, published registry of the distribution of HF clinics and their design in a well-defined geographical area comes from Sweden. In 2001, Stromberg reported that a HF clinic was operating in 66% of all Swedish hospitals caring for cardiac patients. These clinics were all nurse-directed. Few reports exist on physician-directed HF clinics. These clinics appear mainly to be operating in university hospitals, and many primarily serve selected patients with the most advanced degrees of HF, e.g., heart transplant candidates. The studies describing physician-directed clinics do not provide full details about the intervention used, but it appears that pharmacological optimisation and some degree of patient education were utilised. Based on the published clinical studies, it seems that most of the HF clinics are nurse-directed. In these clinics a cardiologist typically makes an initial evaluation of the patient and decides on a treatment plan. Subsequently, nurses with special training are primarily responsible for the care of the patient, in particular fulfilling the treatment plan, including changes in medication within given limits, and follow-up of the patient. The cardiologist may or may not see the patient at fixed intervals or be called upon for supervision when further medical examination or treatment is necessary. Furthermore, both nurse and physician-directed clinics may offer services from other professionals such as pharmacists, physiotherapists, dieticians, and social workers.

HF clinics: evidence of efficacy from clinical trials

As evident from the description above, HF clinics come in many shapes and sizes and serve many different patient populations. This complicates direct comparisons of studies of the effect of different HF programmes and their interventions. Most studies focus on frequency of rehospitalisations or duration of hospital stay as the primary endpoint. Secondary endpoints vary but most often include mortality, drug utilisation or dosages, hospital...
costs, and quality of life. Some studies include indices of functional capacity. The studies fall in two categories, non-randomised and randomised studies.

**Non-randomised studies**

The non-randomised studies are designed in different ways. Either the number of hospitalisations in a cohort of HF patients is recorded in a fixed period of time before and after the patients have been referred to a HF programme, or the number of HF related admissions are recorded in a fixed period prior to and after a HF programme serving the referral area has been opened. In some studies, control groups have been defined by other criteria, e.g., patients who are admitted to departments not referring to the HF clinic. The non-randomised studies typically have fewer exclusion criteria than the randomised trials and may provide important information about the effect of HF programs that can be more easily extrapolated to patients seen in daily clinical practice. On the other hand, as well as the risk of publication bias, there are some important shortcomings of these studies. Treatment possibilities for HF patients may have changed from one follow-up period to the next (for instance, utilisation of β-blocker therapy or, in the future, cardiac resynchronisation therapy) implying that a fall in admission rates seen after the initiation of a particular HF programme may not necessarily reflect an effect of the programme but could simply be an effect of other improved therapeutic options for patients. Furthermore, selection bias may hamper the conclusions of studies in which the control groups were constructed using patients that by choice of their physician were not referred to a HF clinic, even if the groups were matched by sex and age. Obviously, data on the effect on exercise capacity and subjective measures such as NYHA functional class may be biased by the fact that patients and doctors were not blinded in the assessment.

We identified 13 non-randomised studies including up to 566 patients (Table 1). Patients were recruited from a broad spectrum of HF populations ranging from primary care patients to patients on heart transplant waiting lists. Both patients with systolic- and non-systolic HF were studied. In all but two studies, effect on readmission rates was reported and in these studies interventions were associated with a reduction of hospitalisation rate, although the reduction was not significant in one study, and was documented only in a subgroup in another. A clear reduction in mortality in the intervention group was reported in one study with a fairly well-matched control group, and one study reported low mortality compared with data from trials in the literature, but in the remaining studies mortality was unchanged or not reported. Several studies documented that doses of ACE-inhibitors and β-blockers were increased during follow-up in the HF clinic. Finally, functional status (assessed by changes in work capacity on treadmill testing, 6-min walk test, or change in NYHA functional class) was improved in the intervention group in several studies.

**Randomised intervention studies**

A total of 18 randomised trials were identified (Table 2). The table includes a pilot study, but excludes a multicentre study where hospitals rather than patients were randomised to usual care or a HF management programme. Each study included approximately 100–500 subjects representing a broad spectrum of HF patients. With few exceptions, the patients included in the randomised trials were comparable to the patient populations seen in epidemiological HF surveys, especially with regards to age and gender. Follow-up time ranged from 3 to 18 months with a median of 6 months. Intervention focused mainly on patient education and pharmacological optimisation. Nurse intervention was used in all studies whereas home visits were employed in half of the trials. With respect to readmission rates, eight studies were positive, nine were neutral and one reported increased readmission rates in the intervention group (see Table 2). The latter differs from the other studies by including not only HF patients, but also patients with diabetes and chronic obstructive pulmonary disease as the primary diagnosis. Thus, it is possible that the negative outcome is a consequence of the lack of HF-specific education and optimisation of HF-related medications in the intervention group. Among the nine neutral studies, seven resulted in a trend towards a positive effect of intervention on readmission frequency. One explanation for a fairly large number of trials with insignificant risk reduction is likely to be small sample sizes.

Two meta-analyses have been conducted and both have shown a significant reduction in readmission rates. These analyses did not include the most recently published randomised studies, but generally these have been more positive than the earlier investigations. Thus, by qualitative analysis of the available data, it appears that intervention in HF clinics reduces readmission frequency. Furthermore, the data suggest that programmes involving home visits are more effective than programmes without this option (see Table 2). This remains, however, to be proven in a clinical trial comparing usual HF clinic care with the combination of HF clinic and home care. Although mortality was lower in the intervention arm in some trials, no clear overall reduction in this endpoint was seen. Increased mortality with intervention was not observed. Several studies provided estimation of costs in the two arms and, apart from the studies by Weinberger et al. and Kasper et al., a reduction of costs in the intervention arm was reported.

Even though, in general, the randomised studies in general are well designed and conducted there are some limitations to consider; few studies reported detailed characteristics of the patients who were excluded from the trial. If study participants were, in fact, highly selected, it may be difficult to generalise the results to a general HF population. However, as noted previously, most trials included elderly individuals and mortality rates were high. Of course, it cannot be ruled out that some uncomplicated, younger, patients were in fact not included as the investigators may have felt that they were unlikely to benefit from HF clinic.
<table>
<thead>
<tr>
<th>Author</th>
<th>N</th>
<th>Intervention group-inclusion criteria</th>
<th>Mean age (years)</th>
<th>Control group</th>
<th>Mean age (years)</th>
<th>Intervention</th>
<th>FU/Mo</th>
<th>Results (intervention versus usual care)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Akosah</td>
<td>38</td>
<td>Discharged with CHF, NYHA III-IV, LVSD</td>
<td>68</td>
<td>Discharged CHF patients not referred to HFC</td>
<td>63</td>
<td>Team management, medical optimisation, education</td>
<td>12</td>
<td>Lower combined endpoint hospitalisation/mortality. Higher doses of ACE-inhibitors and β-blockers</td>
</tr>
<tr>
<td>Azevedo</td>
<td>157</td>
<td>Admitted to hospital with CHF to ward with a physician working in a HFC</td>
<td>69</td>
<td>Admitted to hospital with CHF to ward with a physician not working in a HFC</td>
<td>182</td>
<td>Physician directed clinic, medical optimisation</td>
<td>12</td>
<td>Lower mortality, fewer hospitalisations</td>
</tr>
<tr>
<td>Fonarow</td>
<td>214</td>
<td>Heart transplant candidates referred for evaluation</td>
<td>52</td>
<td>Patients are their own control</td>
<td>NA</td>
<td>Team management, medical optimisation, education</td>
<td>6</td>
<td>Fewer hospitalisations, improved functional capacity</td>
</tr>
<tr>
<td>Galatius</td>
<td>283</td>
<td>Patients with CHF and LVSD referred from hospital ward and GP</td>
<td>73</td>
<td>Historical controls</td>
<td>NA</td>
<td>Team management, medical optimisation, education</td>
<td>12</td>
<td>Fewer hospitalisations</td>
</tr>
<tr>
<td>Hanumanthu</td>
<td>134</td>
<td>Referred to specialised heart failure and transplant centre</td>
<td>52</td>
<td>Patients are their own control</td>
<td>NA</td>
<td>Physician directed clinic, medical optimisation</td>
<td>12</td>
<td>Fewer hospitalisations, improved functional capacity</td>
</tr>
<tr>
<td>Heidenreich</td>
<td>68</td>
<td>NYHA II-III, referred from general practice</td>
<td>73</td>
<td>Patients from same area not referred to program, matched for sex and resource use. Historical controls</td>
<td>86</td>
<td>Education by nurse (telephone, mail). Tele-based home monitoring, physician contact as needed.</td>
<td>7.4</td>
<td>Resource use lower, hospitalisation not significantly reduced</td>
</tr>
<tr>
<td>Holst</td>
<td>42</td>
<td>Patients referred to a HFC, NYHA III-IV, LVSD</td>
<td>54</td>
<td>Patients are their own control</td>
<td>NA</td>
<td>Team management, Medical optimisation, education</td>
<td>6</td>
<td>Fewer hospitalisations, improved functional capacity, QOL improved</td>
</tr>
<tr>
<td>McAlister</td>
<td>566</td>
<td>Patients referred to a HFC</td>
<td>66</td>
<td>Literature data</td>
<td>NA</td>
<td>Medical optimisation, education</td>
<td>Up to 78</td>
<td>Higher rates of appropriate drugs use. Improved functional status</td>
</tr>
<tr>
<td>Ramahi</td>
<td>133</td>
<td>Patients with LVSD referred to a heart failure and transplant program</td>
<td>54</td>
<td>Patients are their own control</td>
<td>NA</td>
<td>Team management, medical optimisation, education</td>
<td>12</td>
<td>No overall effect on hospitalisation. Hospitalisations reduced in function class II patients</td>
</tr>
<tr>
<td>Riegel</td>
<td>120</td>
<td>Patients admitted to 2 study hospitals with CHF</td>
<td>74</td>
<td>Patients admitted to 3 non-study hospitals matched for functional class, age and comorbidity</td>
<td>120</td>
<td>Nurse education, home visits, dietician, pharmacist counselling</td>
<td>6</td>
<td>Fewer hospitalisations, improved functional capacity</td>
</tr>
<tr>
<td>Smith</td>
<td>21</td>
<td>Patients referred to a HFC. LVSD, NYHA II-III &lt; 81 years</td>
<td>61</td>
<td>Patients are their own control</td>
<td>NA</td>
<td>Team management Medical optimisation, education</td>
<td>6</td>
<td>No overall effect on hospitalisation. Hospitalisations reduced in function class II patients</td>
</tr>
<tr>
<td>West</td>
<td>51</td>
<td>Patients admitted or referred as outpatients to hospital for CHF</td>
<td>66</td>
<td>Patients are their own control</td>
<td>NA</td>
<td>Nurse managed education, medical optimisation, counselling</td>
<td>6</td>
<td>Fewer hospitalisations, improved functional capacity</td>
</tr>
<tr>
<td>Whellan</td>
<td>117</td>
<td>Recent CHF hospitalisation, LVSD, NYHA III-IV</td>
<td>62</td>
<td>Patients are their own control</td>
<td>NA</td>
<td>Team management Medical optimisation, education</td>
<td>10</td>
<td>Fewer hospitalisations, higher rate of β-blocker use</td>
</tr>
</tbody>
</table>

Team management includes a nurse. CHF: congestive heart failure, HFC: heart failure clinic, LVSD: left ventricular systolic dysfunction, GP: general practitioner, QOL: quality of life, NA: not applicable, FU/Mo: follow-up time in months.
intervention. Due to the nature of the trials they are all unblinded. The investigators and team members are likely, on some occasions, to have been involved in the decision to admit or not to admit patients with increasing HF symptoms. Thus, there is potential to influence the primary endpoint in one group. However, there are no data indicating that patients in the intervention arms have been inappropriately denied hospitalisation. In contrast, several studies have shown higher quality of life scores in the intervention group.32,47

Can the HF clinic effect be generalised and will it persist? The need for quality assurance

When a drug is shown to be effective in a randomised clinical trial it may be recommended for future treatment of patients similar to the ones included in the trial. Unless conditions are changed (e.g., change in heart, kidney or liver function, addition of new medications, change in patient’s persistence with therapy), one may expect the effect of the drug to remain constant over time in the individual patient and the average effect should be constant in a group of patients. Although also proven effective in a well-conducted trial, a constant effect may not necessarily be true for an operator-dependent intervention such as a surgical procedure or care delivered in a HF clinic. The initiation of a HF clinic, similar to participation in a novel randomised trial, may be accompanied by a great deal of enthusiasm. If the results of a clinical trial are to be reproduced in daily clinical practice following the trial, the quality of the intervention, if not the enthusiasm, must be maintained. Change of staff, lack of updating of clinical competences or even staff wear out may clearly threaten quality. Thus it appears that regular monitoring of the quality of the intervention is desirable as previously argued by Erhardt and Cline.73

How should performance be monitored? Within the clinic, key variables such as the proportion of patients with left ventricular systolic dysfunction receiving
such information can be time consuming. To this end elec-
in clinical practice. Obviously, collecting and handling
vention strategies, one may gain insight into which
data from clinics whose programmes rely on different
sults of similar clinics in the same time period. Such feed-
clinic's performance benchmarked with the average re-
tween clinics should be considered with an individual
alities are offered. Therefore, regular comparisons

Table 3 Proposed quality assurance data to describe performance of a heart failure (HF) clinic

<table>
<thead>
<tr>
<th>Patient-oriented quality measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion of patients with documented aetiology for their HF</td>
</tr>
<tr>
<td>Proportion of patients with documented NYHA functional class or</td>
</tr>
<tr>
<td>other assessment</td>
</tr>
<tr>
<td>Proportion of patients with documentation of the presence or</td>
</tr>
<tr>
<td>absence of appropriate physical findings (e.g., weight, JVP,</td>
</tr>
<tr>
<td>sitting and erect BP, peripheral oedema, pulmonary crackles,</td>
</tr>
<tr>
<td>S3, S4, mitral regurgitation, hepatomegaly)</td>
</tr>
<tr>
<td>Proportion of patients with documentation of urea and creatinine</td>
</tr>
<tr>
<td>and electrolytes</td>
</tr>
<tr>
<td>Proportion of patients with identified target values for</td>
</tr>
<tr>
<td>cardiovascular risk factors</td>
</tr>
<tr>
<td>Proportion of patients with a satisfactory measure of LVEF</td>
</tr>
<tr>
<td>Proportion of patients with left ventricular systolic dysfunction</td>
</tr>
<tr>
<td>receiving ACE-inhibitors</td>
</tr>
<tr>
<td>Proportion of patients receiving ACE-inhibitors at target doses</td>
</tr>
<tr>
<td>Proportion of patients with left ventricular systolic dysfunction</td>
</tr>
<tr>
<td>receiving β-blockers</td>
</tr>
<tr>
<td>Proportion of patients receiving β-blockers at target doses</td>
</tr>
<tr>
<td>Proportion of patients with severe HF receiving spironolactone</td>
</tr>
<tr>
<td>Proportion of eligible patients receiving Implantable Cardiac</td>
</tr>
<tr>
<td>Defibrillator or Cardiac Resynchronisation Therapy</td>
</tr>
<tr>
<td>Proportion of patients with documentation of reason patient is</td>
</tr>
<tr>
<td>not on proven indicated therapy</td>
</tr>
<tr>
<td>Proportion of patients receiving education in self care</td>
</tr>
<tr>
<td>Proportion of patients with prompt communication letters to</td>
</tr>
<tr>
<td>referring physicians</td>
</tr>
<tr>
<td>Patient satisfaction scores</td>
</tr>
<tr>
<td>Quality of life questionnaire scores</td>
</tr>
<tr>
<td>Readmission frequencies</td>
</tr>
<tr>
<td>Mortality</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Programme-oriented quality measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time from referral to first visit in the clinic</td>
</tr>
<tr>
<td>Documentation of staff competencies</td>
</tr>
</tbody>
</table>

Apart from these data, a number of patient characteristics (age, gender, HF functional class, major co-morbidities, LVEF, etc.) are needed to make reasonable comparisons. Some parameters may be of greater importance than others, and more may need to be added, depending on the pre-defined goals of the clinic and the population it serves.

ACE-inhibitors and β-blockers and their dosages should be followed over time in the individual patients. Also HF admission frequency should be monitored. Some key data to monitor are suggested in Table 3. The suggestions are in accordance with the guidelines published by the American College of Cardiology and American Heart Association, but we have added some variables which we believe are of particular importance in the evaluation of HF clinics. Different clinics should probably monitor different parameters depending on the design of the clinic and the population it serves. A clinic exclusively serving a geriatric population may focus more on functional parameters rather than on mortality. Prospectively defining outcome measures of interest also presupposes that each clinic has, in advance, established clear objectives that are relevant to their environment and measurable.

Treatment patterns of the entire HF population may change over time, for instance when new treatment modalities are offered. Therefore, regular comparisons between clinics should be considered with an individual clinic’s performance benchmarked with the average results of similar clinics in the same time period. Such feedback to clinics would seem to offer additional useful information for improving delivery of care. By comparing data from clinics whose programmes rely on different intervention strategies, one may gain insight into which components of the care process (e.g., medical up-titration, home visits, emotional support) are most effective in clinical practice. Obviously, collecting and handling such information can be time consuming. To this end electronic clinical databases, which record these figures, have been developed. The database systems are specifically designed for HF clinics and may function solely for this purpose or, in addition, may be a HF-specific patient file replacing or supplementing the regular patient record. In some countries several HF clinics collaborate using the same database and thereby enable easy collection and analysis of performance data, which can subsequently be accessed by the individual clinics.

Conclusion

From several non-randomised and randomised clinical studies it seems well documented that treatment in specialised HF clinics using nurse intervention reduces readmission frequencies and improve quality of care for HF patients. Furthermore, the clinics do not appear to increase costs and the optimal design of the clinics and the range of services provided are yet unresolved. Based on these results, care providers should be encouraged to ini-
tiate HF management programmes including elements of nurse intervention and to design the clinics to meet the local needs in the best, and most feasible, way it can. It is advised that the performance of the clinics be monitored continuously, preferably both within the clinic over time as well as in comparison with other clinics contemporaneously. Creating networks of HF clinics and utilising common electronic medical record databases may facilitate this process and needs to be tested.

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