

ORIGINAL RESEARCH

Mixed-method exploratory study of general practitioner and nurse perceptions of a new community based nurse-led heart failure service

E MacKenzie¹, A Smith¹, N Angus², S Menzies¹, F Brulisauer³, SJ Leslie¹

¹NHS Highland, Raigmore Hospital, Inverness, United Kingdom

²Department of Nursing & Midwifery, University of Stirling, Inverness, UK

³Epidemiology Research Unit, SAC Research, Scottish Agricultural College, Edinburgh, UK

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MacKenzie E, Smith A, Angus N, Menzies S, Brulisauer F, Leslie SJ

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ABSTRACT

Introduction: The treatment of patients with chronic heart failure (CHF) remains sub-optimal. Specialist CHF nurses are proven to improve care and reduce admission but developing such services, especially in remote areas, can be difficult. This study aimed: first, to assess the perceived acceptability and effectiveness of a new community based nurse-led heart failure service by general practitioners (GPs) in an area with a dispersed population; second, to assess the knowledge and learning needs of GPs; and third, to assess perceptions of the use of national guidelines and telehealth on heart failure management.

Methods: The study was conducted in the Scottish Highlands, a large geographical area in the north of the UK which includes both rural and urban populations. The area has a total population of 240 000, approximately 60% of whom are within 1 hour travel time of the largest urban centre. A postal survey of all GPs ($n = 260$) and structured email survey of all CHF specialist nurses ($n = 3$) was performed. All responses were entered into a Microsoft Excel spreadsheet, summarised and subjected to thematic analysis. Differences between GPs in 'rural', 'urban' or both 'urban & rural' was investigated using an F -test for continuous variables and a three-sample test for equality of proportions for nominal data.



Results: Questionnaires were returned from 83 GPs (32%) and all three CHF specialist nurses. In this sample there were only a few differences between GPs from 'rural', 'urban' and 'urban & rural'. There also appeared to be little difference in responses between those who had the experience of the CHF nurse service and those who had not. Overall, 32 GPs (39%) wished better, local access to echocardiography, while 63 (76%) wished access to testing for brain natriuretic peptide (BNP). Only 27 GPs (33%) referred all patients with CHF to hospital. A number of GPs stated that this was dependant on individual circumstances and the patient's ability to travel. The GPs were confident to initiate standard heart failure drugs although only 54 (65%) were confident in the initiation of beta-blockers. Most GPs (69%) had had experience of the CHF specialist nurse service and the responses were mixed. The GPs who had experienced the service appeared less confident that it would lead to reduced admission of patients to hospital (51% vs 77%, $p = 0.046$). Three main themes emerged from the nurse responses: *service planning*, *communication* and *attitudinal changes* after service embedment.

Conclusions: This study demonstrates that a community based heart failure nurse service was not universally valued. Differences between urban and rural localities (communication) suggest that models of care derived from evidence based practice in urban areas may not be directly transferable to remote areas. Clearly, good communication among staff groups at all stages of implementation is important; however, despite best efforts and clinical trial evidence, specialist nurse services will not be welcomed by all doctors. Service providers and commissioners should be cognisant of the different roles of urban and rural GPs when designing such services. Among GPs there was a high degree of confidence with initiation and titration of drugs for heart failure with the exception of beta-blockers so clearly this is an area of ongoing educational need and support. Education and support should focus on ensuring that all doctors who care for patients with CHF have the skills and confidence to use medical therapies and specialist services as appropriate.

Ke ywords: barriers, community, heart failure, Scotland, specialist nurse.

Introduction

Despite major advances in drug and device therapy in chronic heart failure (CHF), morbidity and mortality remain high¹. The reasons for this are multifactorial but in part due to suboptimal diagnosis and treatment of patients². The diagnosis of patients with CHF can be difficult and may be inaccurate if based on clinical findings alone. Furthermore, access to tests such as echocardiography may be restricted in remote and rural areas. Even when the diagnosis is confirmed, ensuring all patients receive appropriate therapies appears difficult². The management of patients with CHF is best delivered by specialists³ in a disease management program that include a central coordinating figure, most commonly a CHF specialist nurse⁴⁻⁶.

Most CHF specialist nurses will facilitate drug initiation and titration, facilitate discharge from hospital, improve patient education and self-management and improve communication with, and access to, specialist hospital based services. Recently, there has been an increase in the number of CHF specialist nurses in many parts of the UK but there remain some areas where there is no provision for this. Access to CHF specialists (doctors and nurses) may be particularly difficult in remote areas where there are fewer (or no) specialists and travel times are long for both staff and patients. Identified barriers to the implementation of modern therapies are complex but include inadequate communication between primary and secondary care, restricted access to tests such as echocardiography and inadequate provision and access to specialists⁷. The design of nurse-led heart failure services is generally based on evidence derived from urban or large city practice⁸ but the difficulties of implementing an effective CHF disease management programme in remote



and rural areas have not been specifically examined. Furthermore, the role of guidelines and telehealth in areas where access and exposure to specialists is more restricted is unknown.

In 2005 a nurse-led heart failure service (3 whole-time equivalent nurse posts) was funded by the British Heart Foundation in the northern most part of mainland UK (Highland Region). This area represents 40% of the land mass of Scotland with less than 5% of the population and thus has many remote communities. The implementation of this CHF service faced significant challenges. Decisions about how to distribute nurses' time were difficult and resulted in a pragmatic balance between ensuring a nurse had a sufficient work load to maintain skills while at the same time striving to provide a local service. Travel time for home visits for remote patients was a particular challenge for some of the nurses.

Aims

This study aimed: first, to assess the perceived acceptability and effectiveness of a new community based nurse-led heart failure service by general practitioners (GPs) in an area with a dispersed population; second, to assess the knowledge and learning needs of GPs; and third, to assess perceptions of the use of national guidelines and telehealth on heart failure management.

Methods

Setting

The study was conducted in the Scottish Highlands, which covers a large geographical area including both rural and urban populations. The area has a total population of 240 000 and 260 GPs. Approximately 60% of the population live within 1 hour travel time of the largest urban centre. The region includes mountainous terrain and many islands with the consequent difficulties of poor communication and long

travel times. There is one district general hospital and two rural general hospitals which offer echocardiography, although specialist cardiology services are centralised in the district general hospital. In addition, there are 12 community hospitals with no on-site access to echocardiography.

Study design and questionnaire

This was a postal survey of all GPs ($n = 260$) and structured email survey of all CHF specialist nurses ($n = 3$) in the Highlands. In the absence of a validated instrument a questionnaire was developed *de novo* in several iterative stages. Some questions were adapted from a previously used questionnaire³ and modified in several iterative stages by local managed clinical network team members. Questionnaires were distributed by surface mail once (Appendix I), and the structured e-mail survey was sent once to each of the CHF nurses (Appendix II).

Self-assignment to locality type by participants

For reasons of data protection and to achieve a maximum of data accuracy, this survey was anonymous to individuals although details of practice location were sought. The classification into 'rural', 'urban' or both 'urban & rural' locality was based on the self-assessment of the participants.

Formal ethical approval was not deemed necessary for this review of service provision. The concept and design of the questionnaire was guided by the local multidisciplinary cardiology managed clinical network.

Data collection and analysis

Questionnaires filled in by general practitioners were returned by fax or mail. The structured email responses from CHF specialist nurses were received electronically. All responses were entered into a Microsoft Excel spreadsheet, summarised and subjected to thematic analysis. Differences between GPs in 'rural', 'urban' or both 'urban & rural' were investigated using an *F*-test for



continuous variables and a three-sample test for equality of proportions⁹ for nominal data.

Results

Questionnaires were returned from 83 GPs (32%) and all three CHF specialist nurses and the data were collated (Tables 1-3). This sample contained few differences among GPs from 'rural', 'urban' and 'urban & rural'. There also appeared to be little difference in the responses of those who had experience of the heart failure service from those who had not. A full results summary is provided (Tables 1-4).

Diagnosis and treatment of chronic heart failure

Overall, only 32 (39%) GPs wished for better, local access to echocardiography, while 63 (76%) wished for access to testing for brain natriuretic peptide (BNP). Only 27 GPs (33%) referred all patients with CHF to hospital. A number of GPs stated that it was dependant on individual circumstances and the patient's ability to travel as 'some are very elderly and frail don't want to go to hospital' (rural GP). It was clear that some GPs believed that referral to hospital is necessary 'in order to do an echo' (rural GP). Whereas other GPs stated that they 'managed the majority [of CHF patients] in the community' (urban & rural GP). Most GPs were confident to initiate standard heart failure drugs, although only 54 (65%) were confident in their initiation of beta-blockers (Table 1).

Acceptance of chronic heart failure specialist nurses by GPs

The GPs were given further opportunity to comment on a variety of different models for care delivery. The main area that received comment was that of the specialist nurse service where opinions varied greatly. Most GPs (69%) had had experience of the CHF specialist nurse service and generally the responses were positive (Table 2), although GPs who had experienced the service appeared less confident that it would lead to reduced admission of patients

to hospital (51% vs 77%; $p = 0.046$). Some GPs stated that the specialist nurse service had 'improved care for patients and is an invaluable liaison with cardiology' (urban GP), while others stated problems with a 'disjointed service' (urban GP) and 'lack of clarity' (rural GP) regarding the specialist nurses role. The GPs appeared to value direct communication with consultants as 'most helpful' (rural GP) and 'very important' (rural GP), along with access to guidelines flow charts on the local National Health Service intranet site.

Suggested improvements of existing chronic heart failure services

With regard to how the current service could be improved, the responses fell into two main themes. Communication was the most dominant theme where positive comments were reported, such as: 'excellent service - great communication and much appreciated by patients and me!' (rural GP) and 'all patients with heart failure should see a heart failure nurse' (rural GP). However, there were also a number of negative comments where 'better communication between GP and nurse' (urban & rural GP) and '...not clear what role the heart failure liaison nurse has' (urban & rural GP) demonstrate areas for improvement. The GPs also highlighted a preference 'for a locally based service' (urban & rural GP).

Perceived educational needs in primary care

All but one GP ($n = 82$; 99%) answered 'yes' to the hypothetical offer of additional training in heart failure. A majority of GPs also would appreciate training for their practice nurses ($n = 60$; 72%) and district nurses ($n = 56$; 67%). There were no statistically significant differences between urban, rural or urban & rural responses (all $p > 0.05$). With regard to location and time of teaching sessions, many preferred local protected learning sessions within the working day, although evening meetings were also acceptable.



Table 1: Attitudes of 83 GPs in the Scottish Highlands towards the provision of care for patients with chronic heart disease, stratified by location

Question	Location			Total n (%)	P value [†]
	Urban n (%)	Urban & rural n (%)	Rural n (%)		
Total N (%)	21 (25)	18 (22)	44 (53)	83 (100)	
How many years have you been a GP?	16.0±7.4	14.1±8.7	15.1±8.1	15.1±8.0	0.68 [‡]
Fraction of sample answering 'yes'					
Would like better local access to echo?	8 (38)	5 (28)	19 (43)	32 (39)	0.527
Would you like access to BNP?	13 (62)	15 (83)	35 (80)	63 (76)	0.211
Do you refer all new patients with CHF to hospital?	5 (24)	6 (33)	16 (36)	27 (33)	0.598
Have you read the SIGN guidelines?	15 (71)	16 (89)	39 (89)	70 (84)	0.170
Have the SIGN guidelines influenced your management of patients with CHF?	11 (52)	14 (78)	33 (75)	58 (70)	0.126
Are you confident in treating patients with heart failure?	11 (52)	17 (94)	33 (75)	63 (76)	0.059
Are you confident in <i>initiation</i> of the following drugs?					
ACEi	21 (100)	18 (100)	42 (96)	81 (98)	0.403
ARB	20 (95)	17 (94)	39 (89)	76 (92)	0.592
Beta blocker	12 (57)	16 (89)	26 (59)	54 (65)	0.056
Diuretics	21 (100)	18 (100)	43 (98)	82 (99)	0.639
Sprionolactone	15 (71)	16 (89)	36 (82)	67 (81)	0.373
Digoxin	14 (67)	16 (89)	28 (64)	58 (70)	0.135
Are you confident in <i>dose escalation</i> of the following					
ACEi	21 (100)	18 (100)	42 (86)	81 (98)	0.403
ARB	14 (67)	15 (83)	41 (93)	70 (84)	0.023
Beta blocker	10 (48)	15 (83)	30 (68)	55 (66)	0.058

ACEi, Angiotensin converting enzyme inhibitors; ARB, angiotensin receptor blockers; BNP, brain natriuretic peptide; SIGN, Scottish Intercollegiate Guidelines Network.

[†]3-sample test for equality of proportions without continuity correction (unless otherwise stated); [‡]F-test.

Table 2: General practitioners' views on community based chronic heart failure specialist nurse service, according to location

Question [¶]	Location n (%) [§]			Total n (%) [§]	P value [†]
	Urban	Urban & rural	Rural		
Have you had a patient looked after by nurse?	17 (81)	11 (61)	29 (66)	57 (69)	0.349
Did you find the service useful?	14 (82)	9 (82)	16 (55)	39 (63)	0.091
Was the advice given wanted/expected?	14 (82)	10 (91)	18 (62)	42 (74)	0.113
Was communication with the nurses appropriate?	17 (100)	9 (82)	20 (69)	46 (81)	0.036
Did the nurse service help patients?	12 (71)	8 (73)	16 (55)	36 (63)	0.442
Do you think the service will prevent admissions?	11 (65)	5 (45)	14 (48)	30 (53)	0.486

[†] 3-Sample test for equality of proportions without continuity correction; [¶]% of total GP responders – subsequent percentages are of those who had experience of the nurse service; [§]N (%) represents those responding 'yes' to the question.



Table 3: General practitioners' views on general clinic provision for chronic heart failure patients, according to location

General clinic views	Location n (%)¶			Total n (%)¶	P value [†]
	Urban	Urban & rural	Rural		
Total N (%)	21 (25)	18 (22)	44 (53)	83 (100)	
There is a need for...					
Community based nurse led heart failure clinics	11 (52)	8 (44)	14 (32)	33 (40)	0.257
Community based consultant led heart failure clinics	9 (43)	9 (50)	24 (55)	42 (51)	0.677
A GP with a special interest in Highland	9 (43)	8 (44)	14 (32)	31 (37)	0.539
Community based nurse led heart failure service (current)	14 (67)	12 (67)	28 (64)	54 (65)	0.959
Hospital based heart failure specialist clinic	12 (57)	7 (39)	27 (61)	46 (55)	0.266
A CHF specialist nurse service will reduce admissions?	14 (67)	12 (67)	23 (52)	49 (59)	0.413
Access to telehealth would improve patient care?	4 (19)	6 (33)	17 (39)	27 (33)	0.288
Access to telehealth would reduce hospital admissions?	4 (19)	6 (33)	12 (27)	22 (27)	0.593

CHF, Chronic heart failure.

†3-sample test for equality of proportions without continuity correction; ¶N (%) represents those responding 'yes' to the question.

Table 4: Comments from GPs about the community based chronic heart failure specialist nurse service

Type	Comment
Positive	<ul style="list-style-type: none"> • 'It's a brilliant service.' • 'Discuss with GP first if nurse specialist required. Can see how service would be very helpful if GP not able to provide the support required less relevant in remote/rural care if GP involved with patient.' • 'All patients with HF should see a HF nurse.' • 'Excellent service - great communication and much appreciated by patients and me!' • 'My personal experience is that the heart failure nurse specialist has improved care for patients and is an invaluable liaison with cardiology' • 'Specialist nurse service excellent for a couple patients - perhaps we should aim for an agreed 'shared care' model - I suspect the numbers would overwhelm 'secondary care' community nurses.'
Negative	<ul style="list-style-type: none"> • Need 'better communication between GP and nurse' • 'Holistic care between GP and trained up district nurses' • 'I think it [nurse service] is a waste of money.' • 'Be a locally integrated resource rather than a bolt on that doesn't enhance the local multidisciplinary team' • 'Would prefer locally based service' • 'Various specialist nurses in the community just cause a disjointed service. GPs/practice nurses/community nurses already exist. It would be better to strengthen the existing service rather than add in new branches.' • 'I am not clear what role the heart failure liaison nurse has. She does seem good at basic surveillance and checking bloods. I am not sure how confident I am in her recommending drug changes and correct assessment of patients who become less well.'

Responses from chronic heart failure specialist nurses

Three main themes emerged from the nurse responses: *service planning, communication and attitudinal changes* after service embedment. The CHF nurses consistently believed that greater pre-launch planning of the service could have helped implementation: '4-6 months of planning time' (nurse 1). It was a 'challenge trying to arrange to see all the

GP practices' (nurse 2). 'Not a lot of research into how best to establish and maintain a heart failure service' had been conducted and that the implementation felt very 'ad hoc' (nurse 3). The nurses often felt that communication between the GP and the nurses was often suboptimal 'it was one way as we are not always kept in the loop' (nurse 1), another nurse commented that it felt like 'a one way road at times but I accept that this is just the way it is' (nurse 3). Access to GPs for urgent advice was also raised as an issue:



'communicating with GPs can be difficult, especially if you need to discuss a patient with them and they are in surgery' (nurse 2). The nurses collectively noted changes in GPs' attitudes after a period of time had passed. It was said that in the beginning of the service it was difficult to 'gain confidence and trust from the GPs' (nurse 2) and that 'some [GPs] feel that we complicate the picture' (nurse 1). However, it was noted that after some initial negative experiences, GPs were now 'happier with the service' (nurse 2) acknowledging that 'it takes time to develop a rapport with the GPs' (nurse 2).

Discussion

Implementation of community heart failure services is potentially difficult⁷. This study demonstrates that a community based heart failure nurse service was not universally valued, despite evidence from well-conducted randomised controlled trials which demonstrate their benefit⁸. This study also demonstrated some differences between urban and rural localities (communication) suggesting that models of care derived from evidence based practice in urban areas may not be directly transferable to remote areas. However, more striking were the similarity in responses between remote and rural GPs, despite great geographical diversity and relatively poor access to echocardiography in remote areas, that may reflect a negative adaptive response within primary care to historically poor access to tests.

Management of chronic heart failure in primary care and referral to hospital

In the current study a large number of GPs did not refer all patients with heart failure to a cardiologist and many appeared to see the hospital referral only as a mean to obtaining an echocardiogram. The widespread belief that heart failure can be treated without referral to specialists is despite evidence suggesting that management of heart failure by specialists is advantageous¹⁰. Important differences exist in the treatment of CHF patients between specialists and

non-specialists^{3,11}, while the skills and interest of GPs vary considerably¹². This does not imply that GPs are not key to the diagnosis or the treatment of patients with CHF; however, unless GPs have a specialist interest they are unlikely to know which patients should be referred for more advanced heart failure therapies such as cardiac resynchronisation therapy, implantable defibrillators or transplant. This may be particularly true in more remote areas with small practice lists and fewer GPs.

Furthermore, although in the UK the 'new GP contract' aimed to standardise treatment with certain performance indicators¹², these are extremely limited and include only the identification of patients, the documentation by echocardiography of left ventricular systolic dysfunction, and the use of angiotensin converting enzyme inhibitors (ACE-I) and, more recently, beta-blockers. Thus, even a GP score of 100% in these performance indicators does not necessarily represent comprehensive or high quality care in the modern era of CHF treatments.

In the current survey only 24% of urban GPs would refer all patients with heart failure while only 52% reported feeling confident in treating CHF. Referral rates from urban GPs were low, with a trend towards rural GPs being more confident in treating heart failure. This is in contrast to data from Australia where referral rates are significantly lower in rural towns compared with metropolitan areas¹³. It is of interest that in our study the referral rate appeared to be greater from GPs who were more confident in treating heart failure, which suggests that a lack of knowledge, perhaps regarding what specialist services might offer, results in fewer referrals. This deserves more study.

Access to diagnostic services

Reduced access to diagnostic tests such as echocardiography has previously been identified as a barrier to the delivery of good care¹⁴⁻¹⁷. In the present study the desire for better access to echocardiography was lower than expected. This may be due to the fact that a direct access service has already been established in this geographic area for some time and



the comments regarding this service have been favourable. However, this service is only available at the 3 district/rural general hospitals and there is no local or domiciliary service. Indeed, echocardiography is not available for inpatients at any of the 12 community hospitals in this area. Nevertheless, surprisingly, fewer than 50% of rural GPs wished for better local access to echocardiography. Local audit data (S Leslie; pers data; 2009) found that patients who were most remote were least likely to have an echocardiogram; however, in the present study it was urban GPs who were least likely to refer all new patients with left ventricular systolic dysfunction to a hospital clinic (24%).

A high proportion of GPs expressed a wish for access to measurement of plasma BNP. The utility of BNP as a screening test for heart failure has been proven in a number of clinical settings including outpatients^{17,18}, and is supported by many national CHF guidelines¹⁹⁻²¹. Nevertheless, the clinical use of BNP is not widespread in the UK, probably due to concerns about cost effectiveness. It might have been expected that GPs in more remote and rural practice would have greater support for the use of BNP, but in the current study, BNP appeared to be equally highly favoured by urban GPs. This support of the use of BNP is of particular interest in rural areas where access to echocardiography is less easy. For BNP could have a greater impact as a screening test in rural primary care and in remote community hospitals where there is no on-site access to echocardiography.

Role of guidelines

The majority of general practitioners in this survey reported having read the recent national guidelines²¹. This is encouraging, although it could be that the questionnaire responders were GPs with an interest in CHF. However, in the study sample, only 50% of urban GPs reported that their treatment of patients was influenced by guidelines. This is surprising because the new guidelines include significant changes to practice from previous guidelines. While the response of the present GPs may reflect that they had implemented these treatments already, it is possible that despite reading the guidelines, the GPs were not using

current CHF treatments. Furthermore, it has been recognised that the impact of written guidelines on affecting management changes may be limited^{11,22}. Alternative approaches to improving diagnosis and management have been attempted, including computer decision-support software, although these technologies are difficult to implement for a variety of reasons²³. Implementing evidence based therapies is one of the key roles of CHF specialist nurses and the presence of clear national guidelines supports this process.

Confidence in treating chronic heart failure

As expected, there was a high level of confidence in the initiation of drugs such as loop diuretic and ACE-I and angiotensin receptor blockers, although confidence was somewhat lower for spironolactone, digoxin and beta blocker. These data are consistent with findings from previous studies^{7,13-16,24}, with major concerns relating to side-effects, contraindications and co-morbidities. In particular, confidence in initiating beta-blockers was relatively low. Interestingly, confidence in initiation and escalation of angiotensin receptor blockers (ARBs) was lower than for ACE inhibitor despite almost identical 'risks' for these two therapies. Perhaps greater confidence with ACE inhibitors reflects greater familiarity with these less expensive drugs due to more widespread use in patients with renal disease and hypertension. While most GPs were happy to initiate ARBs, GPs were less confident in dose escalation and this represent a specific area of educational need.

Telehealth

In general, there was little confidence expressed in the role of telehealth from this cohort of GPs. There are several studies supporting the use of telehealth in the outpatient setting. However, the benefits were variable between studies²⁵ and the cost-effectiveness of telehealth systems in CHF is not yet fully determined by the UK national health service. The appropriate use of technology has the potential to improve patient care, but the clinical usefulness of such technology in patients with heart failure is unclear.



Community based nurse-led heart failure service

The value of the specialist CHF nurses is well established⁸, and a national charity (British Heart Foundation) has been heavily involved in developing a network of CHF nurses throughout the UK. In the present study the GPs service ratings were generally lower than expected; however, when asked about need for a community based nurse-led heart failure service, the majority agreed there was a need.

A major 'theme' from the CHF nurses' responses was of initial resistance to the implementation of specialist nurse-led services in primary care by many GPs, which had lessened once the GPs experienced the benefits of the service. However, our study demonstrated that the views GPs who had personal experience of the service did not differ substantially from those of GPs with no personal experience of the service. This could either be because it is difficult to change views, or that the service was genuinely poorly received by GPs - although there was no reduction in support for the service in GPs who had used it, suggesting that the service at least met these GPs' expectations. The GPs seemed inappropriately pessimistic about the effects of the nurse-led heart failure service on readmission rates. There is compelling evidence that heart failure nurses reduce admissions to hospital by approximately 50%⁸, although only 53% of GPs in our survey thought the service would reduce admissions. Either the GPs were not cognisant of the data, thought that it did not apply to their patients, or did not believe that the local heart failure service could deliver this benefit.

'Primacy' or control remains an issue between GPs and specialist nurses. This may be more so in remote areas, where professional boundaries are likely to be more jealously guarded as GPs have traditionally been expected to treat a wide range of conditions with less easy access to specialist advice than their urban or city counterparts. In the study area, it was decided not to enable drug prescribing privileges for local heart failure nurses. Despite this, they are trained (and able) to make medication changes but this is done via the patient's GP, ensuring the GP remains in overall

'control' of a patient's treatment. The issue of control was echoed in the heart failure nurses responses, where difficulties in gaining GPs confidence and trust was reported. It was also noted that some GPs were happy for the nurses' involvement while others felt it complicated matters, a response supported by the GPs' qualitative comments.

Defining rurality

Defining rurality and remote medical practice is complex^{26,27}. This current study took a pragmatic approach to this issue with individual doctors asked to report if they worked in a 'rural', 'urban' or both 'urban & rural' locality. Because the questionnaire was anonymous and no geographic information available, it was not possible to classify answers objectively according to location. This approach may have introduced some misclassification; however, there was no reason for GPs to classify themselves incorrectly (introduced bias). In fact, the Scottish Highlands as a whole is a very rural area when compared with conurbations around major cities in the south of England or central Europe. In this study, the term 'urban' therefore should be interpreted as 'relatively urban'. This may explain why the responses of GPs from rural and urban localities did not differ strongly. However, that a pattern of differences was observed, suggests that these differences would have been more pronounced if data had been collected from metropolitan areas as well.

Limitations

This study was conducted on a convenience sample in an overall sparsely populated area and so the sample size was small. Furthermore, the response rate was relatively low from GPs and this limits generalizability. Nevertheless, the low response rate probably reflects the comparatively low priority that heart failure is afforded in healthcare systems. This may be due, in part, to the historical lack of treatments and difficult diagnostic tests; however, this is no longer the case. Finally, this questionnaire was administered by some members of the heart failure service as well as the local managed clinical network for cardiology. While the



questionnaire responses have been reported accurately, the authors accept there is a potential for bias.

Conclusions

This study demonstrates that a community based heart failure nurse service was not universally valued. Differences between urban and rural localities (communication) suggest that models of care which have been derived from evidence based practice in urban areas may not be directly transferable to remote areas. Clearly, good communication between staff groups at all stages of implementation is important, but despite best efforts and clinical trial evidence, specialist nurse services will not be welcomed by all doctors. Nevertheless, particular attention should be made to maximise clear aims and objectives of any new service prior to launch, and there should be surveillance of communication within the service. Service providers and commissioners should be cognisant of the different roles of urban and rural GPs when designing such services. Among GPs, there was a high degree of confidence with initiation and titration of drugs for heart failure with the exception of beta-blockers. Clearly this is an area of need for ongoing education and support. Education and support should also focus on ensuring that all doctors who care for patients with CHF have the skills and confidence to use medical therapies and specialist services as appropriate.

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Appendix I: Survey of Community Based Highland Heart Failure Service

(Please complete by ticking or circling your answer where appropriate)

About you and your patients

1. Number of years as a GP? _____
2. Is your practice mostly *rural / urban / both*
3. Practice location / locality? _____

Diagnosis and treatment

4. There is need for better access to echocardiography at Raigmore? *Yes / No / DK*
5. There is need for better access to echocardiography locally? *Yes / No / DK*
6. Do you have access to Brain Natriuretic Peptide measurement (BNP)? *Yes / No / DK*
7. Would you like access to BNP? *Yes / No / DK*
8. Do you refer all new heart failure patients to hospital? *Yes / No*

Comments

9. Have you read the SIGN or NICE heart failure guidelines? *Yes / No*
10. These guidelines have influenced your management of CHF patients.
Strongly disagree / Disagree / Impartial / Agree / Strongly agree
11. I am confident about treating patients with heart failure
Strongly disagree / Disagree / Impartial / Agree / Strongly agree
12. I am confident about **initiating** the following drugs in patients with heart failure
- | | |
|----------------|--------------------------------------------------------------------------|
| ACEI | <i>Strongly disagree / Disagree / Impartial / Agree / Strongly agree</i> |
| ARB | <i>Strongly disagree / Disagree / Impartial / Agree / Strongly agree</i> |
| Beta-blockers | <i>Strongly disagree / Disagree / Impartial / Agree / Strongly agree</i> |
| Diuretics | <i>Strongly disagree / Disagree / Impartial / Agree / Strongly agree</i> |
| Spironolactone | <i>Strongly disagree / Disagree / Impartial / Agree / Strongly agree</i> |
| Digoxin | <i>Strongly disagree / Disagree / Impartial / Agree / Strongly agree</i> |
13. I am confident about **dose titration** of the following drugs in patients with heart failure
- | | |
|---------------|--------------------------------------------------------------------------|
| ACEI | <i>Strongly disagree / Disagree / Impartial / Agree / Strongly agree</i> |
| ARB | <i>Strongly disagree / Disagree / Impartial / Agree / Strongly agree</i> |
| Beta-blockers | <i>Strongly disagree / Disagree / Impartial / Agree / Strongly agree</i> |



Heart Failure Nurse Service

14. Have you had a patient looked after by the heart failure nurse service?
(if 'no' go to Q13) *Yes / No*
15. Did you find the service useful? *Yes / No / DK*
16. Was the advice given what you wanted/expected *Yes / No / DK*
17. Was communication between Nurse and GP appropriate? *Yes / No*
- Please turn over**
18. Did the nurse led heart failure service help the patient? *Yes / No / DK*
19. Do you think the service will prevent hospital admission? *Yes / No / DK*

How could service be improved? / Comments _____

The Future

20. There is a need for community based (nurse led) heart failure clinics.
Strongly disagree / Disagree / Impartial / Agree / Strongly agree
21. There is a need for community based (cardiologist led) heart failure clinics.
Strongly disagree / Disagree / Impartial / Agree / Strongly agree
22. There is a need for a GP with a special interest in CHF in Highland?
Strongly disagree / Disagree / Impartial / Agree / Strongly agree
23. There is a need for community based heart failure nurse specialists in Highland (current service).
Strongly disagree / Disagree / Impartial / Agree / Strongly agree
24. A heart failure nurse specialist will help to reduce hospital admissions and increase compliance.
Strongly disagree / Disagree / Impartial / Agree / Strongly agree
25. There is a need for a hospital based heart failure specialist clinic.
Strongly disagree / Disagree / Impartial / Agree / Strongly agree
26. Access to telehealth would improve patient care?
Strongly disagree / Disagree / Impartial / Agree / Strongly agree
27. Access to telehealth would reduce hospital admissions?
Strongly disagree / Disagree / Impartial / Agree / Strongly agree

Comments _____

Training and Education

28. Would specific education on heart failure management be useful for
- a) GPs? *Yes / No*
- b) Practice Nurses? *Yes / No*
- c) District Nurses? *Yes / No*

How could training be best delivered? / Comments _____

Thank you for taking the time to complete this survey



Appendix II: Structured Questionnaire for CHF Specialist Nurses

How do you feel the implementation of the service went?

Would you change anything about the implementation?

What do you think has gone well with the service / GPs?

What do you think has not gone well with the service / GPs?

What were/are your experiences of perceived attitudes from the GPs to the service?

Was communication with GPs effective?

How do you think the service could be best improved?

Any other issues?
