An Evaluation of the Nurse-led Mobile Coronary Care Service at the Tyrone County Hospital and the Erne Hospital - Research Report

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An Evaluation of the Nurse-Led Mobile Coronary Care Service based at the Tyrone County Hospital and the Erne Hospital

Research Report

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Introduction

The Institute of Nursing Research at the University of Ulster was commissioned by the Western Health and Social Services Board to undertake this evaluation of the nurse-led mobile coronary care service at the Tyrone County and Erne Hospitals. The study was undertaken from June to December 2005.

Background

Changes in nursing

There have been considerable developments in nursing over the last number of years. These developments have been influenced by a growing aging population, an increase in chronic diseases, the expansion of primary care and alterations in medical working practices. The Nursing and Midwifery Council (NMC) has acknowledged that, as there have been considerable changes in modern healthcare, nurses can no longer adhere to their traditional role (NMC, 2004). In this state of flux, nurses have developed and advanced their skills and problem solving abilities so as to base their practise on sound research (Wigens, 1998). In coronary care for instance, nurses have developed specialist services in a number of ways including thrombolytic therapy for the treatment of myocardial infarction (MI).

However, a recent review noted that compared to other European countries, nurses in the UK have not been as active in the development of pre-hospital thrombolysis (Jones, 2005). Nonetheless, authors such as Smallwood (2004) have asserted that nurse-initiated thrombolysis can reduce door-to-needle time and improve recovery rates. Challenging this, Jones (2005) considered that such improvements can not be attributed solely to thrombolysis. He concluded there was evidence that cardiac nurses can be innovative and bring a more seamless, continuous, consistent and holistic approach to coronary care.

In a study carried out in Irish hospitals, Chaney (2004) investigated the attitudes and perceptions of nurses and doctors to nurse-led and nurse-initiated thrombolysis. She found that while 74% of nurses were willing to undertake this role, 43% of doctors disagreed that nurses should be initiating thrombolysis therapy. Other studies also reflect medical concerns. Qasim et al (2005) were worried that if nurses were initiating thrombolysis, junior doctors would gain less experience in the diagnosis and treatment of MIs. However, these authors did note that through senior nursing staff sharing knowledge in formal and informal teaching sessions, this loss of experience could be prevented.

Definition of terms

Nurse-led thrombolysis: nurses working within an area which deals with acute admission of MI patients and who assess and identify patients who could potentially benefit from thrombolysis.

Nurse-initiated thrombolysis: these nurses in addition to performing an assessment are responsible for administering thrombolysis to cases of MI that fulfil designated criteria (Smallwood, 2004).

Chaney (2004) noted the confusion that exists in the literature regarding these two terms. This confusion is also reflected in the present study. The service provided by Tyrone County and Erne Hospitals is referred to by the Trust as 'nurse-led thrombolysis'. Therefore, this term will be used throughout this report. However, as the nurses are administering the thrombolytic drugs, it should be termed nurse-initiated thrombolysis.

Myocardial infarction

Acute myocardial infarction occurs as a consequence of coronary artery disease (CHD). The myocardial infarction occurs when the coronary circulation is blocked resulting in cardiac muscle cell death due to lack of oxygen (Martini & Bartholomew, 2000). The affected tissue degenerates, creating a non-functional area known as an infarct. This can lead to increased mortality and morbidity. Acute Myocardial Infarction (AMI) remains one of the leading causes of death in the United Kingdom (British Heart Foundation, 2000). Benger *et al.* (2002) indicated that three hundred thousand people in the United Kingdom suffer an acute heart attack each year, of whom 50% die. Moultan and Yates (1999) showed that only 10% of the British population are free from all major risk factors associated with CHD and those who are free from major risk are still more likely to die from an AMI than any other cause. Specific to Northern Ireland, the DHSSPS (2001) stressed that although rates of deaths from CHD continue to fall, it remains a major cause of illness and death where rates of CHD remain higher than in most parts of Europe. The time it takes to initiate treatment is significant as around one third of all AMI deaths occur within the first hour (NICE, 2002).

Thrombolysis

The treatment of MIs with thrombolytic therapy has a history of over 30 years and has been proven to significantly reduce patient mortality (Perler, 2005). This treatment involves the intravenous administration of drugs which dissolve the clot formation in the coronary artery and thus allow reperfusion of the affected area of the myocardial muscle. The benefits of thrombolyic therapy are greatest when it is administered at the earliest opportunity (Carley, 2002; Heath et al., 2003). Dracup et al. (2003) noted that many patients are excluded from reperfusion therapy due to excessive delay.

However, thrombolysis therapy is associated with risk factors for the patient and a number of potential side effects. Therefore, it must only be administered by those who understand the complexities of the treatment and are competent to do the practise. Over a 6-month period in 2001, Wilson et al (2004) found a number of contraindications to thrombolysis therapy among 1638 patients with MI diagnoses in Northern Ireland. These included, late presentation, potential bleeding risk, on anti-coagulant, recent CVA/TIA, age, uncontrolled hypertension, and primary angioplasty. Humphreys and Smallwood (2004) discussed ethical issues in relation to thrombolysis and stressed that nurses who supply and administer thrombolytic drugs must engage to ensure they have obtained informed consent.

Call to needle time and pre-hospital coronary care

The 'call to needle time' equals 'the call to door time' plus 'the door to needle time'. The Department of Health in England (2000) National Service Framework established a 'call to needle' time of sixty minutes or less, i.e. that thrombolytic therapy is received by the patient within sixty minutes of calling for professional help. The Department of Health (2000) stated that the current 'call to door' times in urban areas were approximately 30-45 minutes, but considerably longer for rural areas. Often due to the geographical location of the patient, it is necessary for thrombolytic therapy to be administered in the community, if it is to be given within sixty minutes. Hindle (2002) reviewed the available options for acute services in the south west of Northern Ireland and indicated that 40%-53% of the population lived more than 30 minutes away from their closest acute hospital. Therefore, if thrombolysis were to be only administered in hospital, it would take more than 60 minutes from call to needle for many cases.

Two thirds of deaths associated with AMI occur outside the hospital environment (Jowett & Thompson, 2003). In England, Dracup et al. (2003) explored the 'call to needle time' across five countries and they found that in all the countries the call to

needle time was substantially longer than recommended; furthermore the majority of patients experienced their initial symptoms at home. These authors concluded that delayed treatment was a substantial problem in all of the countries. They recommended that further education and counselling was required so as to influence the patient's first response to symptoms.

This delay in time between the onset of pain and contacting the emergency services has been identified by other studies: Qasim et al. (2005) recommended the need for public education about the symptoms of an acute MI. This suggested that an opportunity exists to reduce substantially CHD mortality using pre-hospital thrombolysis. This coupled with the decrease in acute hospital facilities, increases the emphasis on the provision of Mobile Coronary Care Unit (MCCU) facilities.

Northern Ireland was the first country in the world to instigate a Hospital-based MCCU (Pantridge and Geddes 1967). This was staffed by coronary care unit medical and nursing staff. This was in contrast to the rest of the United Kingdom where ambulance services or general practitioners (GP) delivered initial treatment outside hospital. In 2003 the English Department of Health maintained that a MCCU was an ideal local solution for the high rates of coronary deaths (DoH, 2003).

Data collected in Northern Ireland during 2001 showed that the target call to needle time of < or =60 minutes was achieved in only 20% of patients treated in accident and emergency departments compared with 55% of those who were treated pre-hospital (Wilson et al., 2004). Reasons given for not meeting the target included slow response by GP, distance from the hospital, the need for repeat ECGs, condition requiring stabilisation and uncertainty of diagnosis (Wilson et al., 2004). NICE guidelines and the European Society of Cardiology (NICE, 2002) task force recommended that pre-hospital thrombolysis therapy is appropriate when the call to

door times are likely to be more than 30 minutes. This pertains to the predominately rural population of Northern Ireland.

Sperrin Lakeland Trust

The Sperrin Lakeland Trust is situated in the west of Northern Ireland. It has two main hospitals (the Erne and Tyrone County) supporting a predominantly rural population. A doctor-led thrombolysis service had been in operation in the Trust for many years. However due to changes in medical working practices, this service was considered to be unsustainable. As a result, the first nurse-led mobile coronary care service to administer thrombolysis was established as a pilot in 2002. It initially operated out of the Erne Hospital but in August 2003 the Tyrone County also offered this service. It remains the only nurse-led thrombolysis service in Northern Ireland. The service operates from 5pm-9am Monday - Friday and is a 24-hour service from 5pm on Friday to 9am on Monday morning and covers all public holidays. Staff resources include a Lead nurse 'F' Grade and an Associate nurse 'D/E' grade who are ALS /Thrombolysis certified and have substantial experience in coronary care.

Consideration of the effectiveness of this service is appropriate as the NICE guidelines for the use of drugs in early thrombolysis identified that

> *"In light of the on-going introduction of pre-hospital thrombolysis, it is recommended that opportunities for the evaluation of the administration of thrombolytic drugs in pre-hospital settings are explored"* (NICE, 2002, page 16).

Aim of the Study

The aim of this project was to evaluate the nurse-led mobile coronary care service in Sperrin Lakeland Trust, and to identify and make recommendations for its improvement.

Objectives of the Study

1. To undertake research interviews with a range of key professionals and members of the public regarding the service;
2. To identify opportunities for improvements to the service;
3. To identify implications for policy and practice;
4. To compare results with the findings of studies carried out on other mobile services including paramedic services;
5. To make recommendations for further development of the service;
6. To compile a research report for presentation to Sperrin Lakeland Health and Social Services Trust, the Western Health and Social Services Board and other key stakeholders.

This report will include the presentation of quantitative data, which has been provided and compiled by Sperrin Lakeland Health and Social Services Trust. The qualitative data has been collected and analysed by the University of Ulster.

Methodology

Quantitative data

Data relating to the nurse-led mobile coronary care service are collected on a routine basis by those nurses working in the nurse led service in both hospitals. The data were presented to illustrate the activity levels of the service, the treatments given, inappropriate calls, call-to-needle times and other relevant data. This data relates to the time period August 2003 to August 2005.

Qualitative data

To enhance the quantitative data and to address some of the research aims (1-4), a total of 37 research qualitative interviews were undertaken. The interviews focused on three main categories:

- members of the public attended by the service (including family members if preferred by the patient);
- key professionals; and;
- local public servants.

Members of the public

Ten interviews were completed with individuals who had been attended by the nurse-led MCCU in the previous six months. Participants were identified by the Trust and a random sample (which ensured equal representation from both hospitals) was approached through a letter of invitation to participate in this study. This letter outlined the background and aims of the study an included an information sheet prepared by the research team, a reply slip and a stamped addressed envelope. In addition, contact details of the research team were supplied to enable potential participants to discuss their participation in the study further. On receipt of a reply slip, interviews were arranged at a time and location convenient for the participant. The patient's GP was also contacted and informed about the research. This was to

ascertain whether the GP was concerned, for any medical reason, about the patient's participation in the study.

Key professionals

Twenty-seven interviews were completed with key professionals and participants represented several groups:

- the nurses who are involved in the mobile coronary care service (n=6);
- medical personnel, hospital consultants (n=2), senior house officers (n=2) and general practitioners (n=3);
- paramedics (n=4) and the Director of the ambulance service (n=1);
- a healthcare manager from one of the hospitals (n=1);
- a pharmacist (n=1).

Contact details for the key professionals were obtained from the Trust and they were approached via letter and invited to participate in the study. This letter outlined the study, included an information sheet prepared by the research team, a reply slip and a stamped addressed envelope. Contact details of the research team were also supplied if they wished to discuss further participation in the study. On receipt of a reply slip interviews were arranged at a time and location suitable to the participant.

Local Public Servants

Seven interviews were completed with local public servants representing:

- elected representatives of the local district councils (n=3);
- a representative from the Western Health and Social Service Board (n=1);
- a representative from the Western Health and Social Services Council (n=1);
- members of the cardiac support group (n=2);

As with the key professionals, these public servants were sent a letter and invited to participate in the study. This letter provided information about the study, a reply slip

and a stamped addressed envelope. Potential participants were invited to contact the research team if they required further information. On receipt of a reply slip interviews were arranged at a time and location suitable to the participant.

Informed consent

Potential participants were given a detailed explanation of the project and an opportunity was provided for them to ask any further questions. They were reassured that their personal details would not be used and would be kept confidential by the researchers. Consent was also sought to audio-tape the interviews. Following this they were asked to sign an informed consent form prior to any further participation in this study.

Interview schedules and data analysis

The content of the interview schedules was informed by a comprehensive search of relevant literature and consultation with academics who were expert in this field. The schedules used for the three different groups were similar, allowing for comparisons among and across respondents. All interviews were audio-taped and the tapes were transcribed verbatim. The transcripts were content analysed, using Jackson's (1998) approach to identify emerging themes.

Ethical considerations

Following NHS Research Governance arrangements, ethical approval was obtained from ORECNI prior to the commencement of interviews. Specific attention was placed on the ethical issues of interviewing patients. Permission to interview employees was obtained from the employing organisations. All participants signed informed consent forms prior to the interviews and these included consent to be audio-taped. Participants were informed that they could withdraw from the study at any time and that their details and the audio tapes would be kept in a secure place

and accessed only by the research team. All identifying details were removed from the quantitative data prior to analysis.

Presentation of Quantitative Data

The data available from the Sperrin Lakeland Health and Social Services Trust (SLT) regarding all the calls attended and those attended by the nurse-led coronary care service has been analysed descriptively. These are presented in Table 1 below for both the Tyrone County Hospital (TCH) and the Erne Hospital. Data relating to the initiation of thrombolytic therapy are detailed in Table 2.

Table 1: Calls attended by the mobile coronary care service

	2003/4	**2004/5**
Total number of calls - Erne	86	83
Number of calls nurse-led – Erne	63 (73% of the total calls)	63 (76% of the total calls)
Total number of calls - TCH	122	131
Number of calls nurse-led – TCH	81 (66% of total calls)	82 (63% of total calls)
Total number of calls – SLT	**208**	**214**
Number of calls nurse-led – SLT	**144 (69% of total calls)**	**145 (68% of total calls)**

It is evident from Table 1 that over two thirds of the calls attended by the mobile coronary care service are nurse-led and therefore occur between 5pm and 9am Monday-Thursday or 5pm Friday to 9am Monday.

Table 2: Number of patients given thrombolysis

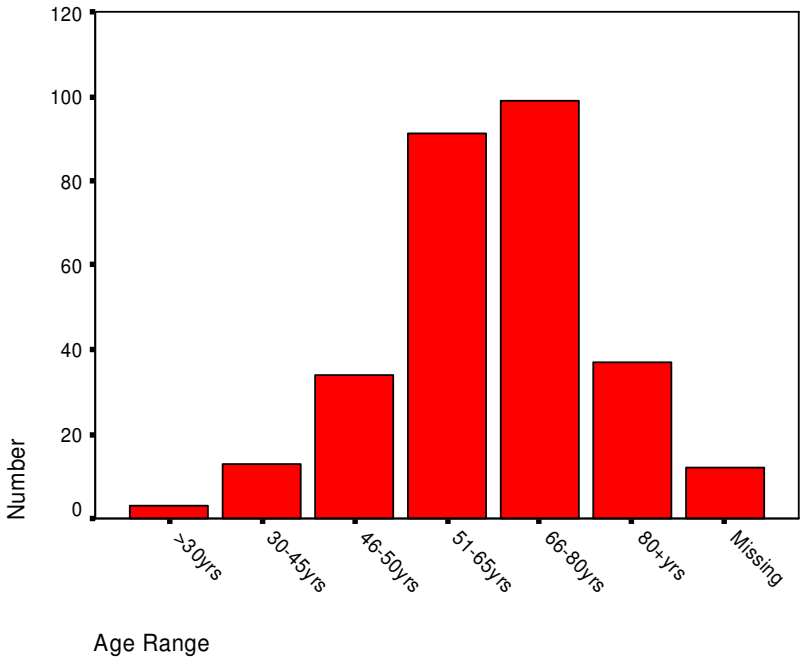
	2003/4	**2004/5**
Total number of patients given thrombolysis - Erne	10 (12% of total calls)	4 (5% of total calls)
Number of patients with nurse administered thrombolysis - Erne	10 (100% of total thrombolysis)	3 (75% of total thrombolysis)
Total number of patients given thrombolysis - TCH	6 (5% of total calls)	9 (7% of total calls)
Number of patients with nurse administered thrombolysis - TCH	5 (83% of total thrombolysis)	4 (44% of total thrombolysis)
Total number of patients given thrombolysis - SLT	**16 (8% of total calls)**	**13 (6% of total calls)**
Number of patients with nurse administered thrombolysis – SLT	**15 (94% of total thrombolysis)**	**7 (54% of total thrmobolysis)**

Table 2 shows that the proportion of patients who were attended by the mobile coronary care service and considered appropriate for thrombolytic therapy was small representing an average of 7% (n=29) of the total calls throughout the Trust over the two-year period for which the data were collected. The proportion of this treatment administered by the nurses varied between the hospitals. It also changed from 94% (n=15) of the total thrombolytic treatment being given by nurses in 2003/4 to 54% (n=7) in 2004/5. However, caution should be exercised when interpreting these percentages, as the numbers of patients who were considered appropriate for thrombolysis in total was small.

Patient details

For the period 2003- 2005, most of the patients attended by the nurse-led mobile coronary care service were between the ages of 51-80 years, n=190/277 (69%); there were 12 patients for whom this data were missing. The age range of patients is represented by Figure 1. Seventy percent (203/288, missing data n=1) of patients were male.

Figure 1: Age range of patients attended by the nurse-led mobile coronary care service



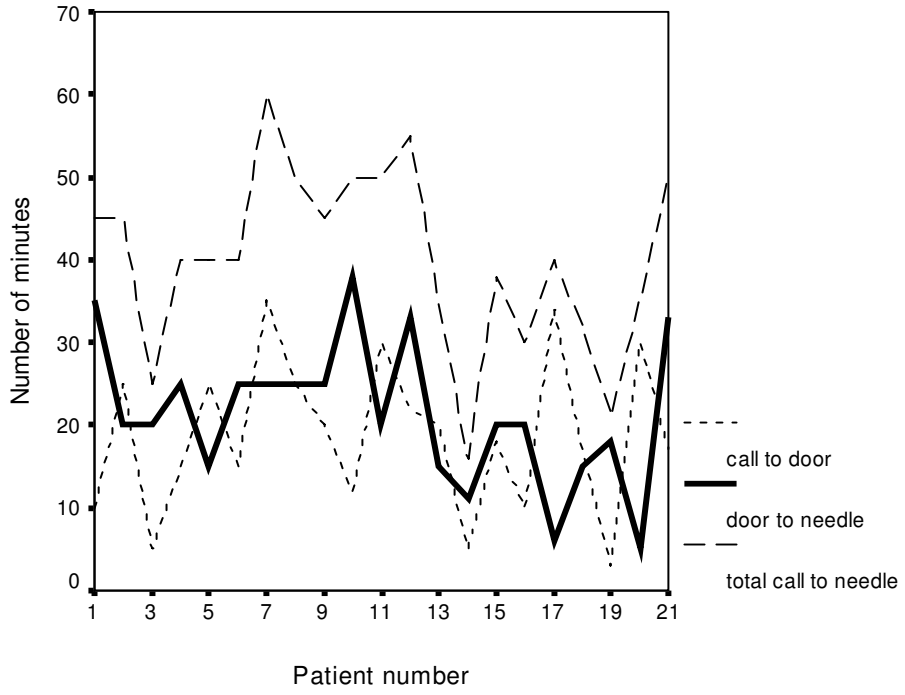
Transport

During this period, nurses travelled to the patients by ambulances in 260 (n=285, data missing for 4 calls) or 91% of cases and 25 (9%) used taxis. The usage of taxis decreased considerably from 2003/4 to 2004/5. In 2003/4 taxis were used in 14% (n=18) of calls (12.5% from the Erne hospital and 16% from the TCH), while from 2004/5 they were only used in 5% (n=7) of calls (2% from the Erne hospital and 8% from the TCH). The reasons given for the use of the taxis were either that the ambulances were already out on calls or that the ambulance was already at the scene.

Call to needle times

The call to door times, door to needle times and therefore total 'call to needle times' were available for 21 of the 22 patients who had received pre-hospital thrombolysis from the nurses in the nurse-led MCCU. The total call to needle times in all cases was under 60 minutes and these are represented in Figure 2. However, data were not available to calculate the when the GP or the ambulance was called to the mobilisation of the MCCU. Therefore, the total 'call to needle time' from the initial point of contact with healthcare services was unavailable. This has implications for the overall evaluation of the 'call to needle' times.

Figure 2: Call to door, door to needle and total call to needle times for the nurse-led service



Diagnosis

Other cardiac conditions were diagnosed by the MCCU nurses. These represented 11% of calls and were related to issues such as left ventricular failure, atrial fibrillation LVF/AF (14), supra ventricular tachycardia (6), unstable angina (12), and

hypotension (1). The Tyrone County Hospital also recorded the number of collapse calls the nurses attended; these accounted for 20% (n=33) of the calls attended in 2003/5 and is significant when the question is considered as to what is the appropriate use of this service.

How calls are initiated

Most of the referrals to the nurse-led MCCU come through either GPs (n=118, 41%) or through the Northern Ireland Ambulance Service (NIAS) (n=92, 32%). Other referrals come from relatives, accident and emergency staff and staff from nursing homes.

Outcome

Most patients attended by the nurse-led MCCU were admitted to the coronary care unit on arrival at the hospitals: 219/289, 76%. There were a total of 22 patients who were administered thrombolysis at the scene in the period 2003/5; of these 18 (82%) were alive 5 days after admission and 17 (77%) were alive at six weeks.

Qualitative Data: Interview Results

Interview analysis

There were a total of 37 interviews completed with patients, key professionals and local public servants. The interviews were transcribed verbatim and content analysed. The analysis led to the development of descriptive themes and these have been presented for each of the interview groups.

Nurses' Perceptions of the Service

There were six nurses interviewed, all of whom are currently working in a dual role as an F grade in the coronary care unit and as a lead nurse in the MCCU. These interviews were designed to explore their perceptions of the nurses' role, the skills/education/experience required for the job, the impact of the role, their relationship with patients/the public in general and other professionals, and any other issues that they thought were relevant to the evaluation of the nurse-led MCCU.

The overall impression from the nursing interviews was very positive. They valued their input into a service that covers the provision of mobile coronary care from 5pm to 9am during the week and provides 24-hour cover over the weekend and on public holidays.

Dual role

The nurses described how their dual role in the provision of senior nursing care in the in-patient coronary care and their input into the MCCU was personally and professionally fulfilling. However, they did raise some concerns about the dual nature of the role. For instance, their involvement in the MCCU can not only take the lead nurse from the in-patient unit but also the associate nurse from either the cardiac unit or the medical ward. Therefore, when the nurse-led service is required,

the in-patient unit is left without a senior nursing staff member for the duration of the call:

> *"You may have junior staff on the ward yet you are going out to …say an inappropriate call and you've left extremely ill patients here in the ward". [Nurse 4]*

The need for the nurse to be able to integrate back into the ward environment was also discussed.

> *"When you come back from the call you can pick up where you left off and take charge again and look after whatever has to be done in the ward; you are probably under more stress but again it comes with the territory, you get used to it". [Nurse 6]*

Linked to the duality of the role was discussion about the number of nurses who are able to fulfil the nurse-led mobile coronary care role. It was acknowledged that ordinarily there are sufficient nurses to achieve cover for the service. However, there is no extra provision built in to the system and so staff rostering requires careful consideration with sick leave causing potential problems.

Experience, skills and training

All of the lead nurses in the nurse-led service have substantial nursing and coronary care experience. To supplement their experience, they have completed the ACLS (advanced cardiac life support) course, thrombolysis course, pharmacy updates and ECG workshops. The nurses emphasised that training to update their knowledge and skills is ongoing with regular attendance at study days and ECG workshops and with work in research and audit. These nurses are also core members of the cardiac arrest teams within the hospitals.

Two nurse participants did discuss whether they were receiving sufficient remuneration and are graded correctly for the role they are fulfilling.

The role and its development

The nurses described in detail the role that they fulfil for the nurse-led MCCU. Although the giving of thrombolytic therapy forms an integral part of this, they emphasised the range of knowledge and skills required to assess fully the patient, to obtain the appropriate medical history, to interpret ECGs, to ascertain the correct diagnosis, to initiate the appropriate treatment (whether thrombolysis therapy or other appropriate treatment) and to establish liaison with the hospital where necessary. These nurses considered their resuscitation skills highly and that they have the skills to provide reassurance and support for both the patient and any other family members:

> *"….being nurses they are better communicators…sometimes you haven't got that much time, but I think that definitely even if it is a collapse call you are still thinking in the back of your mind about the person that's there and the family". [Nurse 5]*

As alluded to in the introduction the development of the nurse-led service came about as a result of changes in medical working practices. This threatened the ability of the Trust to continue to provide a MCCU. The nurses were aware of these issues and that their role was not stimulated by either patient need or by nursing initiative. Rather they felt that they had been brought in to 'fill the gap' and that if they didn't take on the role the service would have been lost. Nonetheless, they stressed the large amount of support they have received from medical consultants and the confidence that these consultants had in the nursing staff.

The nurses commented on whether this role should be the remit of paramedics or community nurses. However, the consensus appeared to be that with their knowledge and skills nurses are the most appropriate professionals to undertake the role. They considered that most of the calls that they attended were appropriate and that the service was used correctly; however, the admitted that as with any service, inappropriate call outs do occur.

Impact on nursing

Participants highlighted that as a result of their involvement in the MCCU there have been individual benefits for the nurses working in the service and changes in the perception of nursing as a result. As well as the increased knowledge and skills, involvement in the nurse-led service has also provided a personal challenge, impacted on the professional and educational development of staff, and facilitated the ability to expand the role as a nursing one.

> *"It has a good impact because it's a good challenge and I think nurses need a challenge and it's also extended the role of the nurse". [Nurse 2]*
>
> *"I think it's good for nurses now to take on their role…because too long we're sat back and sort of let everybody else do what we are capable of doing". [Nurse 1]*

They also felt that the profile of nursing has been raised locally. When they attend calls, it has been evident to the patients and families involved that the nurse is competent, confident and the decision-maker of the treatment and care received

The nurses have been recognised professionally through being contacted by representatives of cardiac organisations throughout the UK and Ireland. They have also presented their work nationally and internationally.

Liability and protocols

The nurses were very aware of the possibility of any difficulties relating to their individual and professional liability. They emphasised that guidelines and protocols had been drawn up in consultation with medical and pharmaceutical staff. They have worked on these to ensure that they are continually updated and their practice is based on best evidence available.

Public and patient perceptions of the service

The nurses felt that the service has been very well received by the public and that they are supportive of it. They believed that the general public were aware that if the nurses not taken on the role, the service may have had to stop.

> *"We've been accepted very well, we've had no negative things at all, all the public were afraid that the service was going to be lost". [Nurse 2]*

The nurses did state that they had had some initial concerns about the how the public would respond, but that these were unsubstantiated.

> *"Whenever we went out first that was our biggest problem; we always thought that the public maybe would be looking for a doctor…I've never had anyone saying to me 'you shouldn't be here' its all been positive really and I think they are glad to get you out there because the patients are so unwell". [Nurse 6]*

The fact that the service was being provided in a sparsely populated rural area and by the nurses who also work in the hospital was seen as significant by the nurses. They pointed out that they are known to many of the patients because they have previously been in the hospital. These meant that many patients already had rapport with and trust in them. Furthermore, it was significant that the nurse who attended them in the community with the mobile service will often subsequently care for them in hospital.

> *"We have met a lot of the patients coming through …they are very confident that you are this nurse coming out to actually treat them out in their own home and they really have faith in you to do a good job". [Nurse 1]*

Relationship with other professionals

The teamwork aspect of the MCCU provision was emphasised by the nurses. It was stressed that GPs, nurses and ambulance staff work closely together.

> *"The main thing is that everybody works well together because everybody is dependent upon each other". [Nurse 3]*

Medical Staff

The nurses considered that they have a good professional relationship with medical staff in the hospital and in the community. The nurses and hospital consultants had worked together closely in the original development of the service. Moreover, a large number of the calls for the MCCU come from GPs and the nurses considered that the GPs respected their knowledge and skills and were happy for them to manage the care of the patient. Again the nurses highlighted their experience and familiarity with the protocols and equipment and they perceived this to be an advantage that regularly rotating medical staff did not have.

Two participants noted that while most GPs use the service consistently, there are some who do not use the service at all. Various methods have been tried to ensure that GPs are kept informed about the service. However, another nurse participant pointed out that GPs fax ECGs into the nursing staff for their opinion and therefore obviously respect their knowledge and skill at reading ECGs.

Northern Ireland Ambulance Service (NIAS)

The nurses were aware that paramedics have led the thrombolysis service in England and that this may have had an influence on their relationship with NIAS. Nonetheless, they regarded their working relationship with NIAS as very positive and that the advice and treatment provided by nurses was seen by NIAS as enabling the optimal service to be given to the patients. Some participants did feel that initially NIAS staffs were dubious about the service and that the nurses were encroaching into their area. This perception of threat did not last long and nurses now feel that their role has been accepted by the NIAS and they work well together. While the medical staff and NIAS are evidently the professionals that the nurses work with most frequently in the provision of a MCCU, they also identified the input of pharmacy staff as an important resource. This collaboration ensures that they are up-dated in their knowledge of the drugs required, their dosages and their side effects.

Transport

The issue of how the nurses get to the patient when the call comes in was raised in all the nurse interviews. In essence, for insurance reasons the nurses cannot go in their own cars and so they must go by ambulance or by taxi. However, an ambulance is not always available and using taxis can delay response time, as they cannot move through traffic like an ambulance.

> *"There is only one ambulance and if it is out on a call then we have to go by taxi to the site that we are called to…so that would be our main problem, is no ambulance available at all times". [Nurse 6]*

Support

Within the hospital there is a structure of support discussion of calls with the consultant. When out on calls the support of the NIAS staff was considered highly by the nurses. Support also occurs on an informal basis with the nurses reflecting and talking through calls with other nurses back at base. The need for this discussion of calls to include both the lead and associate nurses was highlighted as important:

> *"…and yet it's important for you to revisit the good cases as well as the cases that caused you concern". [Nurse 4]*

Evaluation/Audit

The nurses stated that they have been keeping records of the patients, thrombolysis and other treatments and that on-going audits have been completed and show the service to be effective. The data obtained from the Trust relating to this has been presented in the findings section of this report.

Summary

The nurses involved in the nurse-led MCCU perceive it as the provision of a valuable service to patients. They believe it has both professional and public support and has facilitated their personal and professional development.

"We would get feedback from GPs, from relatives and the public generally and I just mean the public, other people who have not used the service and would say we were visiting somebody in the cardiac unit and we were hearing about the good work you are doing in the community". [Nurse 2]

Patients

There were ten patients interviewed for this project all of whom had received treatment from the nurses working in the nurse-led MCCU. These interviews were designed to determine their perception of the care they had received, their views of the nurse-led service generally, and any further suggestions they may have had for its improvement.

The patients interviewed were overwhelming positive about the service. There were a number of common themes that emerged from the interviews. It must be remembered that the participants were recalling a period of considerable stress for them. Therefore, while they have an impression of the service and the confidence in the care they had received; specific details may be less definite. For example, several participants were unsure how the service had been contacted and one was convinced that medical staff had given her the thrombolytic therapy.

How contact was initiated

The process by which the nurse-led unit was contacted for all patients was through the out-of-hours doctor, their own GP, or the NIAS. While patients who were previously in the coronary care unit were told about the service and given contact details, this method had not been used by any of the patient interviewees.

Prior knowledge of the nurse-led service

It is notable that only three of the interviewed patients were fully aware of the nurse-led mobile coronary care service prior to being attended by it. Three of the other patient participants were aware of the mobile unit but did not know that it could be nurse-led and had been expecting a doctor to attend. A further two had a vague knowledge that there was some sort of service but did not know what it was and the final two patient participants had no knowledge of the service at all.

Nurse-Led Service?

Although the participating patients had different levels of knowledge about the MCCU and the nurse-led aspect of it, they were consistently very happy with the care that they had received from the nurses and the professionalism displayed. Consequently, the patients found no difficulty with the service being provided by nurses:

> *"Well again I suppose there's a lot of people would prefer a doctor but sure can't a nurse do just as good as a doctor". [Patient 6]*

> *"When the team arrived that I discovered that we had two nurses which made absolutely no difference to me. They did a very professional job, were very proficient and I couldn't speak highly enough of the team who arrived". [Patient 7]*

Although he/she felt that the nurses had taken the lead when they arrived and had been very competent, one patient did comment that they felt reassured by also having a GP present:

> *"I didn't see any problems, no way, but it was still nice to have a doctor there too". [Patient 8]*

This aspect of the nurses leading the treatment and care once they arrived with the patient was highlighted:

> *"I had the impression very firmly that they* (the nurses) *were in control and that also that he* (the GP) *was deferring to them. He was saying that they were the experts and they were the people who could do the job and the sooner they would get to see me he would be happier". [Patient 5]*

The patients did state the need for training for the nurses and were aware of the reduction in available medical services due to new working directives for medical staff. One patient commented that she had felt reassured by being treated by nurses she knew from her time in the coronary care unit:

> *"Its different if you are going to a strange hospital, I sort of knew the girls". [Patient 4]*

Time factors

The literature stresses that people should be educated to recognise the symptoms of cardiac distress. This would stimulate them to contact the services sooner and reduce the 'call to needle' time. However, from the interviews it became obvious that many of the patients did not identify that their symptoms were cardiac related. Nevertheless, they were aware of the importance of the need to get rapid treatment. One patient participant was aware that the nurses had travelled to him/her in a taxi and was concerned about the impact that this might have had on the time taken to arrive.

Specific areas discussed by patients:

The nurses do at times contact the hospital for advice prior to commencing treatment. For one patient, the nurse who had treated him had contacted the hospital consultant to discuss the patient's ECG prior to administration of the thrombolysis. This patient was very positive about the nurses involved and stated that they had

> *"an excellent understanding of what they were at and they were calm and collected and they definitely instilled some degree of confidence in you"*.

Nevertheless he did reflect on the need to contact the consultant and consequently questioned if there were limitations to the service;

> *"are the nurses working within the limits of their expertise at this point in time; will they monitor options, for example, the day they attended me could they have coped with my problem if I had gotten worse?" [Patient 5].*

Nonetheless, two patients highlighted evidence of the nurses' attention to patient safety with thrombolytic therapy and ethical issues. Firstly, one patient described the nurse asking specific questions about his/her medical history and previous treatments prior to giving the thrombolysis. The second patient could clearly describe the nurse gaining his/her consent to give the thrombolytic therapy.

Possible service improvements

The patients were asked if they had any suggestions for improvement to the services. All comments made to this question were positive and emphasised that they were happy with the service and care that they received.

> *"Well I would like to say that the care that I got was first class, I couldn't fault it". [Patient 3]*

> *"I had so much confidence in them, they knew just what to do, they were able to tell just by working with you what was wrong". [Patient 10]*

Additional comments were made regarding the need to have more nurses available for the service.

Paramedics

Five representatives from the Northern Ireland Ambulance Service (NIAS) were interviewed for this study. They included four paramedics working in the Trust area and the Director of the NIAS. However, to ensure anonymity all interviews have been classified as paramedics 1-5. Their views were sought on the nurse-led service, the interaction between the service and NIAS, the impact and potential impact that it has on their role, and any further suggestions or comments on the service.

Awareness of the nurse-led service

The paramedics in the Trust were aware of the nurse-led MCCU as they are working with them on a regular basis. They praised the experience, knowledge and skills of the nurses involved. However, two of the paramedics stated that they had not been informed when the service was changing from doctor-led to nurse led. They had found this out either through general rumours and in one case when they had called for the service and two nurses arrived on the scene. Furthermore, some participants noted that they felt the service to be nurse-led prior to the service being officially conceived as such. After all they opined, the nurses had the experience and knowledge and were guiding the medical staff. As one participant commented:

> *"Even when the doctors came out, the nurses seemed to take the lead. They work to protocols the same as us and they are doing it every day, even in the ward. The doctors seemed to be there temporary and then move on somewhere else". [Paramedic 5]*

Perceptions of the service

The paramedics saw the purpose of the service to be the ability of the nurses to be able to thrombolyse the patients where that is appropriate. They would request the MCCU for patients where they suspected chest pains that were cardiac related and where it was more appropriate to call the service than to bring the patients to the hospital themselves.

Professional team working

They felt that when the nurse-led unit attends patients, they and the paramedics worked very well as a team. Having nurses with high levels of cardiac related knowledge and skills was highlighted positively by the paramedics:

> *"You know when you are out there on the roads and you come across something, they are there to back us up…they can do things to the patients we can't". [Paramedic 3]*

> *"It's a reassurance that you know if you are in a situation you have resources to call on". [Paramedic 5]*

However, concerns were raised by two of the paramedics about the lack of pre-hospital care experience that the nurses have and the impact that this can have when they are treating patients in situations with which they are unfamiliar:

> *"Essentially I work in pre-hospital all the time and essentially the nurses don't" [Paramedic 2].*

Impact on patients

The specialist knowledge which the nurses have to diagnosis and treat appropriately were considered by paramedics to have an impact on patient care and improve their chances of surviving the cardiac incident. As one participant commented:

> *"They can certainly diagnose cardiac conditions more appropriately…there are a lot of patients that I have transported with the cardiac team onboard the ambulance; after they have stabilised the medicines and I would not have been happy to transport before they have arrived". [Paramedic 2]*

However, participants did debate the appropriateness of the provision of the service. Some believed that there should be uniform provision of the service throughout Northern Ireland while others noted that it may only be appropriate for rural areas such as those found in Sperrin Lakeland Trust.

Paramedics more appropriate?

There was some discussion about the appropriateness and ability of the paramedics to take over the role that the nurses are currently providing in the MCCU. This discussion centred specifically on the ability to assess patients for thrombolytic therapy and safely deliver this to patients. Participants were aware that this is considered to be in the remit of paramedics in some ambulance services in the UK:

> *"Work that has already been done in other parts of the UK which shows clearly that the ambulance services who are administering thrombolysis are doing so appropriately and safely" [Paramedic 4]*

However participants acknowledged the potential side effects of the thrombolytic drugs and therefore there were accountability and patient safety issues:

"Some of these drugs they give for heart attacks now they could drop you like a stone if you step out of the protocol or there is some underlying illness". [Paramedic 1]

Participants noted the considerable changes in the role that paramedics currently fulfil and the additional responsibilities that they have in comparison to the role they occupied ten years ago. Nonetheless, there was no overall agreement on whether they wanted to extend their roles into initiating thrombolysis. One participant felt that with suitable training paramedics could deliver this service:

"If I had the training and equipment and the support from the service I would be happy to do that". [Paramedic 2]

Another felt that while paramedic initiated thrombolysis was viable, the training period that would be required to implement this would be considerable:

"if we were to be using those drugs we would need to spend 12 months of our time up in the cardiac ward…with these drugs you have to see them given and see what the effects are, its not just simple" [Paramedic 5]

There was a third opinion expressed which was that although the skills of the paramedics were excellent, the role of initiating thrombolysis was best filled by those nurses who had specialised training in coronary care:

"Obviously ambulance crew have some of the skills but not all of the skills, so I would never like to see a paramedic taking the role of a fully trained cardiac nurse". [Paramedic 1]

They also suggested that changes in technology could provide a valuable source of support for paramedics in the services that they provide:

"I see no reason why we cannot communicate the patients' data by mobile phone and through the radio system which is due to come into place next year, and bring the patients directly to coronary care where they can be assessed, admitted, transferred, discharged, whatever". [Paramedic 4]

Transport/delays

How nurses are transported to the patients was identified by the paramedic participants as a potential difficulty with the service. They noted that the nurses most frequently travel via the ambulances, as one commented:

"They rely on us to provide transport, which is fine for most of the time because they are going to calls and the patient will require an ambulance anyway, but I suspect it's a farce when we are not actually available"[Paramedic 2]

However, where the nurse is contacted by an ambulance team that is already on the scene, another ambulance may have to be used to transport her to the patient. This means that two ambulances are tied up on one call leading to problems with efficiency:

"There is probably an ambulance out at the scene with the patient and they need to get out to the scene as well, so that ties up the ambulances all the time" [Paramedic 3]

Furthermore, participants discussed whether calling the MCCU out to a patient is the correct option if they have to travel a distance to reach the patient:

"If you are some distance away from the hospital those times can be quite significant so you have a potentially very unstable patient, sitting in their living room for significant periods of time with an ambulance crew already in attendance, sitting there 20 miles away from the hospital while the clock ticks waiting for the nurse to come to them rather than getting them closer to definitive coronary care" [Paramedic 4]

It has been noted that waiting on and travelling to the scene by taxi could delay the nurse led MCCU. One paramedic noted that this could influence the decision to call the MCCU:

"It would influence my decision whether to call them or not if I knew they were going to be waiting on a taxi to get them to the scene" [Paramedic 2]

Medical Staff

There were a total of seven members of medical staff who were interviewed for this study; these included two consultant cardiologists, three GPs and two senior house officers (SHOs). Their views were sought on the role of the nurses in the MCCU, their impression of the service, access to the service and its impact.

Role of the nurse

The confidence held in the nurses by senior medical staff was evident throughout these interviews. The consultants involved had been integral in the development of the nurse-led service and highlighted the effectiveness of a service that is provided by nurses who have long and continuous cardiology experience. The rotation of SHOs through various clinical areas was viewed as making the continuity provided by nursing staff important:

> *"I think as the doctors are passing through it leads to a lack of familiarity and a strange person looking after the patient initially…whereas if you have the same people there all the time there is continuity, the seamlessness of care and the assurance of the patient". [Consultant 2]*

This participant further noted the seamlessness provided as the nurses assess and treat the patient in their homes and often also in the coronary care unit; *"the same nurse goes out in the pre hospital setting and in the hospital setting"*.

The confidence held by medical staff in the ability of the nurses was noted both by medical colleagues in the hospital and in the community:

> *"I'm confident with they nurses presenting the cases, they don't miss things, they have done all and usually they have come to conclusions". [Consultant 1]*

> *"to me the people in charge are the nurses; they are the people with the know how, the experience, they have a good manner in dealing with the person". [GP 2]*

The role of the nurse and the work they are delivering is recognised clearly by the senior medical staff:

> *"I mean at the end of the day, those are the posts that people should aspire to. I think that unless you can remunerate some of them, they are not going to want to do a job like that". [Consultant 1]*

The GPs perceived that the focus of the service is to deliver thrombolysis as quickly as possible and with the proposed changes to the acute services it is felt to be important that the services should be maintained. The important component of the service is the speed of delivery and that it does not matter which professional actually gives the treatment as long as they have the skills and competency to do so:

"as far as I am aware it matters little to patients if it is a nurse or doctor delivering the service as long as they get the service and get treatment – they are more than happy with that". [GP 1]

The SHOs emphasised that the service not only offers thrombolysis, but also treats other acute coronary events such as arrhythmias.

Teamwork

The co-operation and teamwork achieved by the nurse and medical staff involved in the nurse-led MCCU was evident throughout the interviews with medical staff. However, there were differences between the perception of consultants and GPs regarding the role of the latter once the mobile coronary care service arrives on the scene. The consultants identified the need for the GP to hand over the patient to the nurses when they arrive, as one commented:

"Then other times nurses will tell me, we get out to the house and the GP has disappeared, now that is bad practice, as it will only take about five minutes to handover a patient". [Consultant 1]

This was viewed differently by the GPs as they highlighted that the calls are very time consuming and impact greatly upon their other work. GPs appreciate the support of the service in attending these calls and feel that they only need to remain with the patient if they know the service are going to be delayed:

"There is no point in both GP and coronary care service in my view being there, unless there is a good chance that the coronary care team is going to be delayed or if there is a hitch or whatever, then by all means yes the GP can go out and assess the situation". [GP 1]

Transport

Participants perceived that the quick response by a MCCU was crucial within a rural and geographically disperse area. As with other participants, medical staff also highlighted the use of a taxi for transport to the site of the call as a potential limitation. However, one GP did comment:

"To me it doesn't matter what brings you…yeah they have come here by taxi, they have come here by ambulance, they've come here by cardiac car, they are on the stop and they are as good as anybody else". [GP 2]

Referral process

Further communication and training of others involved in the service such as GPs may be required, notably concerning guidance on referrals. The consultants identified that guidance on referrals may be required and felt that in some cases the service had not been called when there was significant need to do so. The SHOs noted that there appears to be times when inappropriate calls are made and feel that GPs require training in the steps they should take when contacting the mobile coronary care service. For instance they related cases where inappropriate calls were made as the patient was already in a collapsed state. Similarly, the GPs felt that they need to know what the Trust staff expect of them, as one commented:

> *"I think there is a feeling amongst GPs about the service, that they have to be sure the patient is having an MI before they call the cardiac team. There is a sense that you don't want to use resources inappropriately. So perhaps GPs do need to have a lower threshold for that". [GP 1]*

The GPs also expressed frustration when they are informed that the nurse-led service will not be dispatched, as there are no beds available for the patient. They asserted that the service should be dispatched and the patient transported to the next closest coronary care unit.

Local Public Servants

Views were sought from local public servants on their awareness and understanding of the service, the impression that people have of it and the impact that the service has. It must be stressed that this study was undertaken at a time of considerable disquiet in the Sperrin Lakeland Trust area where proposed reconfiguration in hospital provision and a perception that the sparsely populated rural west of the province was getting a lesser service generally than the more densely populated urban east.

Awareness and initial impressions of the development of the service

All of the local public servants were aware of the existence of the nurse-led MCCU. They were also aware that the service had developed from the pressures created by changes in medical practices and that this was the only nurse-led service in Northern Ireland. This caused some discussion from two of the three elected representatives concerning the appropriateness of having nurses leading this service in Sperrin Lakeland when it is medically run in other areas.

> *"I'm aware in some places that coronary ambulances are staffed by doctors and I suppose that is always an issue for me" [Council representative 1]*

> *"I suppose it begs the question which is the best, doctor-led or nurse-led services?" [Council representative 3]*

However, the third elected representative was very positive about the nurses having taken on the service:

> *"I'm aware in the recent past it could no longer be delivered by this doctor-led, as a result I'm aware that it was nurses themselves…had themselves trained up and now deliver the service which is a wonderful service" [Council representative 2]*

Training

The experience of the nurses and the training that they have received was identified and the high standards of care that must be delivered by a nurse-led service. Again comparisons were made with medical staff and these represented both the viewpoints of those who consider the service provided by the nurses highly and those who express concern that it was not medically led:

> *"One would hope that the correct drugs are being issued at the right time. I mean I suppose that is the difference between being a nurse and being a doctor, that decision you have got to make within that first thirty seconds". [Council representative 3]*

> *"I do know that these ladies have been trained to such a high degree that they are probably as good as any doctor coming out and that is my understanding of the situation. Nurse-led services, a lot of medicine now can be nurse-led and especially with the level of expertise that these people have" [Council representative 2].*

Concern about the development of the service

The council representatives expressed some disquiet about the effects of changes to medical working practices and staffing difficulties. Specifically they recognised that without the nurse-led MCCU, the service would have been compromised or would not have existed. Again a range of opinions was expressed, one participant observed that in general nurse-led services were becoming more acceptable:

> *"If the alternative is either a nurse-led service or an occasional service from perhaps the consultant-led service, I think there is only one way forward. I think it is becoming widely accepted, the nurse-led service" [Council representative 2]*

Another elected representative was concerned that the nurse-led service has been promoted as innovative but is in actuality a lessening of the service provided to patients:

> *"The attempt to supply us with quite second rate type of services when we can look at high quality provision in Belfast and Derry with this kind of lower level service some way or other being sold to us as being something innovative and new and great" [Council representative 1]*

Public perception of the service

The council representatives who participated in this study felt that the public have a very positive perception of the nurse-led service and that there were no significant adverse comments they would have been apparent and discussed at council level.

> *"Oh wonderful, wonderful comments about it, people have confidence in it, there is no issue about that" [Council representative 2]*

> *"I have absolutely no adverse comments whatsoever and believe you me, as soon as they sit in the chamber of the council, if there were adverse comments on those nurse-led services, we would be the first to hear them". [Council representative 3]*

A representative from the Western Health and Social Services Board (WHSSB) was interviewed to ascertain his/her perceptions of the nurse-led MCCU. They viewed the contribution of the nurses very positively and felt that the skills and knowledge gained through their substantial experience, their local knowledge and holistic approach to care mean that they can provide this service effectively to the patients. While he/she

was aware that the driver for the service had been due to medical changes this was not viewed as having been detrimental to quality of provision. Rather, the service provided by the nursing staff was simply plugging a gap but providing a more holistic service and challenging the view that the services can only be physician led. The knowledge and experience that the nurses posses with regard to the legislation, their approach to infection control and the management of drugs were also viewed as advantageous:

> *"As I understand they are delivering a service it's hitting where it needs to hit and it's doing a good job so from that point of view I think the service is meeting its needs".*

While the participant identified the valuable contribution of NIAS staff and the need for investment in the ambulance service, the conclusion was that nurses who work in cardiology are the most appropriate professionals to fill the role. Furthermore, the impact of this service on the profile of nursing locally, regionally, nationally and internationally was considered important for Northern Ireland as a whole. It was pointed out that as a Trust Sperrin Lakeland was open to the development of the service in a way that some of the Trusts may not have been:

> *"Other major hospitals…have a much larger medical service and a much larger cardiology sub-section of that service and a much larger workforce and you may indeed have some degree of reluctance of the more traditional mindset to allow that sort of innovative move"*

Furthermore, the WHSSB representative considered that the nurses working in the team providing mobile coronary care services promotes the value of the contribution that nurses can make to multidisciplinary teams and this is evidenced by the respect that the GPs have for them.

A representative from the Western Health and Social Services Council was also interviewed. This representative was concerned that the service had been promoted as a positive development but was actually developed due to the unavailability of sufficient doctors to run the service. However this participant emphasised faith in the nurses to be both well capable and well trained to lead such a service. This was

further validated in that they felt that patients have a very, very positive impression of the service. The issue of members of the public not having the knowledge to recognise symptoms as cardiac in origin was highlighted as being problematic and potentially dangerous.

The transport issue was raised by this participant who found the need for nurses to take taxis to patients *"astonishing".*

Two representatives from the Cardiac Support Group were interviewed. They stated that they had initial apprehensions about the service either stopping or being nurse-led. However, these were rapidly allayed once they realised that the nurses who were caring for cardiac patients in the wards were the same ones who would be delivering this service:

> *"When we realised it was the nurses that were dealing with the cardiac patients most of the time under the supervision of the doctors certainly members were concerned but their fears were soon alleviated by the fact that we were still going to maintain a service and more so a better service probably than what we had beforehand". (Cardiac Support Group rep 2)*

Participants identified the support that the Cardiac Support Group gets from the nurses who are involved in the nurse-led service. They highlighted the consistency and continuity of quality provided by having known the nurses over a number of years. They considered the care given by the nurses to be on a par to that provided by medical staff and that those who had been treated by the nurses had nothing but praise for them. The possibility of patients not recognising their symptoms as cardiac in origin and therefore delaying getting assistance was again stressed as a major public health issue.

The only concerns that were expressed about the service were that the nurses were, on occasions having to use taxis to get to patients and the impact that that may have on response times. However, they did accept that the patients were getting treated a lot quicker than they would have done waiting an ambulance to take them to hospital.

One representative did express some concern as to whether the nurses are covered for both safety and accountability:

> *"I think there is room for nurse-led services in every aspect of work. But I think that nurses need to be fully aware of their accountability and that they …ensure that at all times that everything they do, they do with safe practice". (Cardiac Support Group rep 1)*

Hospital Manager

A hospital manager from one of the participating hospitals was interviewed. This participant identified that the service came about because of changes in medical working practices and the consultants identifying that they had nurses of such a calibre that they would provide the clinical supervision for them to operate a nurse-led service. The manager stated that the development of the nurse-led service has been very good for nursing.

The manager detailed the service provided by the nurses and stated that this role was being filled following in depth training and the use of evidence based protocols. They stressed that the nurses had to be *"well qualified and highly competent"* and described the pride that they had in being their manager. Furthermore, they considered that the public had confidence in the service and the local community were very proud of it.

The manager stated that contrary to some views, the service was not a cheaper option and that it could be argued that it would be cheaper to have an ambulance man trained to provide the service. There has had to be an increase in nurse staffing levels:

> *"The reality is if you look at the figures, the number of occasions that they are called out, it does mean that there is an extra pair of hands on night duty every night of the week and more often than not that person will get staying on the ward for the entire night".*

However the manager was aware of the effect that the nurses leaving the ward could have:

> *"There is a risk when you leave a ward full of critically ill patients to send a registered nurse with all those qualifications, plus she is accompanied by an associate nurse, who also is a very well qualified person".*

The manager detailed that the service has to be suspended occasionally when there are no coronary care beds available. They stated that the regard shown to the service by GPs is evident as they react very negatively when the service is suspended. However the manager was also of the opinion that the service could be used more and that there were patients who had presented in accident and emergency that would have possibly have been optimally treated if the MCCU had attended them. The possibility of patients ringing the service directly was discussed.

Pharmacist

A hospital pharmacist working in Sperrin Lakeland Trust was interviewed to ascertain their views of the nurse-led MCCU. The pharmacist had been involved in the initial development of the nurse-led service and described how initially there had been work required in the development of protocols and guidance for the nurses. However, he/she stated that having worked with the nurses in coronary care previously the nurses had an excellent understanding of coronary conditions and had accompanying the medical staff on the mobile unit for many years. The good working relationship between the pharmacist and the nurses has continued through updating of the treatment protocols and adopting changes in government or NICE guidance. However, the structure for updating on treatments is not optimal:

> *"On my end of things would be looking to update treatment plans and stuff I would be the first one to put my hand up and say we probably don't get it done quickly enough".*

The pharmacist noted that while there has not been a lot of thrombolyic therapy given by the MCCU the nurse-led service does make a difference to patients and enhances their life expectancy or improves their quality of life:

"You would get a lot of people coming back to rehab and saying that they were lucky and all this, generally its positive, I've never heard a negative comment".

This pharmacist viewed the service as an efficient and inexpensive service for the hospital but also a high quality one. The future of the service was discussed in the interview, including the use of paramedics and whether the service would be appropriate for urban use.

Summary of Key Findings

- The nurses working in the nurse-led MCCU are considered to be appropriate providers of this service;
- The nurses occupy a dual role working as senior nurses in the coronary care unit and in the nurse-led service;
- The nurses are very experienced and have high levels of skills and training; this is supplemented by working within well developed evidence based protocols;
- The nurse-led service developed in response to changes in medical working practice and as a driver for service development this is an area of concern to some participants – particularly elected representatives;
- The public response to the nurse-led service has been very positive, though a number of the patients were unaware of the service's existence prior to being treated by the nurses;
- The relationship between the nurses and other professionals has been well established and teamwork between is valued and effective;
- Issues remain about the means by which the nurses travel to the patients, the use of taxis by the service was an area of concern for many participants;
- The development of the nurse-led service has raised the profile of the individual nurses and raised the profile of the service and nursing in general locally, nationally and internationally.

Discussion

Thrombolysis is most effective at preserving optimal cardiac muscle function when it is given as soon as is safely possible following the onset of the symptoms and determination of the correct diagnosis. Previous studies have identified that many patients are excluded from potential treatment due to excessive delay (Dracup et al., 2003). However, thrombolytic therapy has a number of potentially serious side effects. Therefore, there has been considerable discussion as to how best to ensure that patients are given thrombolysis in as short as possible time frame but also in a way that ensures patient safety. These considerations are particularly relevant for the more rural geographical areas where the time taken for a patient to reach a hospital may be a factor.

The impact of nurse-led or nurse-initiated thrombolysis within the hospital setting has been investigated previously (Jones, 2005; Qasim et al., 2005; Smallwood, 2004). However, pre-hospital care throughout the UK is generally provided by the ambulance service or by GPs; within Northern Ireland the MCCU is predominantly medically-led. Therefore, this study was designed to evaluate a unique nurse-led mobile coronary care service in rural Sperrin Lakeland Trust. This service operates between 5pm and 9am weekdays and 24-hours over weekends and public holidays and provides a lead and associate nurse who can attend and treat patients with cardiac active drugs and initiate thrombolysis.

Following detailed semi-structured interviews with relevant professionals, patients and local public servants a number of issues arose which are appropriate for further discussion and recommendations.

Nursing role

The nurses who provide this service all had considerable coronary care experience and were identified by all participants in this study as being highly skilled and knowledgeable. The confidence that these nurses inspire was considerable and alluded to by both the professional groups, public servants and by the patients. This confidence was integral to the initial development of the service. It was also stimulated by medical consultants' belief in the ability of the nurses. Furthermore, many of the patients knew the nurses from previous admissions to the coronary care unit and they found reassurance and continuity to be comforting.

The recognition of the new roles that can be filled by nurses which are outside the traditionally roles has been a feature of recent healthcare developments (NMC, 2004). The nurses feel that this role change has provided opportunities for both professional and personal development and training. The service has also raised the profile of nursing locally, nationally and internationally. The impact of highly skilled nurses leaving the wards to attend calls was highlighted and the effect this may have on critical ill patients in the unit should be continually monitored. However, it was stressed that due to an experienced nurse being deployed to cover the MCCU service overnight there is an extra highly experienced nurse on the coronary care unit and thus extra cover is provided in cases when the MCCU is not called.

Communication

The communication of changes in the health service appears to be potentially problematic as not only were there a number of patients who were not aware of the nurse-led service but also there were some paramedics who work directly with the service who were not made aware of the nurse led service being introduced. Communication with the GPs on the appropriate referral process for the nurse-led mobile coronary care service was also raised as an area where further guidance may be required. It should be identified here though that prior to the inception of the

nurse-led service a substantial effort was made to communicate clearly with the GPs and NIAS regarding the service. This included details of how it was to be run and the situations in which it should be called out. Regular meetings with GP representatives continue and updates about the MCCU are included.

Stimuli for development

All participants recognised that the driver for the development of the nurse-led service was due to changes in medical working practices. However, most participants recognised that nurse led care is integral to the changes in modern healthcare. However, there were questions raised by a few interviewees as to whether the service has been marketed as innovative but that this is a means to cover up the loss of an existing medical led service to a rural community. It was stressed by all participants that there had been no lowering of quality of provision; in fact quite the reverse. This was due to the previous medical-led service being provided by transient SHOs – many of whom sought nursing advice anyway!

Transport

The means by which the nurses get to the patients was a topic for much discussion with considerable concern expressed over both delays due to the use of taxis and the over use of ambulances which can mean two of them being tied up on one call. Interestingly, the quantitative data did reveal that taxis were only used for a minority of calls. In fact, they were only used in a total of 25 calls over the two-year period from August 2003 to August 2005. This was compared to 260 calls where ambulances were used. However, further discussion on the method of transport is required.

Professionalism and Teamwork

The professionalism of the nurses was highly regarded by all of the key professions represented in this study and by the patients that had been treated. Medical, paramedical, nursing and pharmacy representatives noted the teamwork aspect of the nurse-led service. Participants identified the importance of this in achieving the optimal treatment and care for the patients and highlighted the mutual respect that exists between the professions and the significance of interdisciplinary co-operation.

Who provides the service?

The provision of community based thrombolysis and the most appropriate profession to provide this was debated by participants in this study. While this is not the only treatment that is provided by the MCCU, it is focused on because of the significance of getting this treatment within an optimal time period. Paramedics give this treatment in some areas in the UK and so it is not surprising that there was discussion on whether they should undertake this role in Sperrin Lakeland.

This discussion is worth pursuing when one considers the following scenario: an ambulance arrives on the scene in a rural part of the Trust. After an initial assessment by the paramedic, the nurse led MCCU is called. The patient and the paramedics may have to wait 30 minutes for the nurses to arrive (possibly in another ambulance). Considering that time is of the essence for thrombolysis, this waiting for the MCCU nurses to arrive could be wasted time and potentially life threatening for the patient. It is also worth considering that thrombolysis has been as given safely and appropriately by paramedics elsewhere in the UK, and therefore could be extended to Northern Ireland.

However, in this study the experience, knowledge and skills of the nurses were highlighted as one reason why they should provide the service. The years of working in the coronary care unit were perceived as being important for the confidence and

competence required to deliver the service. There is also the issue of whether paramedics would want the responsibility and accountability of having to instigate thrombolysis. Nonetheless, further discussion is required on the optimal means of providing thrombolysis in any future MCCU service.

Use of the service

The predominant means by which the nurse-led MCCU is contacted and requested to attend a patient is *via* either the NIAS or GPs. This evaluation identified that the majority of calls to the service are considered to be appropriate by those interviewed (4% of all calls were considered to have been inappropriate from 2003/5) and therefore it is assumed that the referral agents have a good understanding of what the service aims to achieve. However, some GPs were identified as not using the service at all and some identified a lack of clarity about when to call the service. Though as there has been regular communication with GPs regarding the service and updates relating to it this may be a difficult area to improve on further. The changes to the GP contract and reduction in the supply of out of hours care by local GPs may require further consideration to be given to the means by which those doctors who are called to patients in the community are made aware of the service and the appropriateness of the referral process. Therefore, this is an area where improved networking between primary and secondary care services is advised. Further discussion is warranted on the appropriateness of encouraging patients who have been previously admitted to coronary care to contact the nurse-led service directly.

The nurse-led MCCU is the respondent unit used in over two thirds of the calls for the mobile service (69% in 2003/4 and 68% in 2004/5). However, accepting that the MCCU has a range of interventions, over that period only a total of 29 patients have been given thrombolysis. Of these, 22 (76%) had this administered by the nurse-led service and all of the total call to needle times for the service was less than 60

minutes. It is evident that the nurse-led service contributes to the overall service provided by the MCCU and where thrombolysis has been administered this was given within the NICE recommended one hour of the service being alerted. Nevertheless, it is also worth noting that the number of patients who received thrombolysis over a two-year period is relatively small.

Recommendations

Arising from the findings of this study, the following recommendations are offered:

- Further consideration should be given to the means of transporting the nurse-led mobile coronary care service to the patients.
- Data should be collected on the time taken from the initial call to either the GP or NIAS to the time of thrombolysis to ascertain the accurate total 'call to needle time' for MCCU thrombolysis.
- Communication about the service should be enhanced among NIAS, GPs and the MCCU team.
- Few of the patients interviewed were aware of the service before being treated. Therefore, greater publicity for the service should be available for the local population;
- The issue of self referral should be considered for some patients;
- Guidance may need to be provided for those (GPs, NIAS) who are calling the service out to ensure that it is used optimally.
- Consideration should be given to means of utilising the skills and knowledge of the nurses for teaching of junior medical staff and nurses.
- There should be succession planning so that new nurses are involved in providing the service.
- There needs to be further debate about the provision of pre hospital coronary care possible development of paramedic or GP initiated thrombolysis.

- The possibility of NIAS staff taking on this role in the future should be explored, especially where the geographical location of the patient would entail long delays in the arrival of the MCCU. This could reduce greatly door to needle and call to needle times, thus reducing mortality and morbidity. The need to wait for another 30 minutes for MCCU nurses to arrive could have implications for such patients
- Some respondents commented that the MCCU is suspended when the hospital has no acute beds. With a total of 289 calls over the two years, the service is undoubtedly being used. Therefore, for a rural community in need of coronary care this issue of suspension has to be resolved.
- Consideration should be given to renaming the service 'Nurse initiated' as opposed to 'Nurse led'
- All nurses involved in the service should participate in regular training programmes.
- The MCCU protocols must be updated on a regular basis or when new evidence becomes available.
- Local GPs who are currently not using the service should be informed of the benefits for their patients.

Conclusions

This study evaluated a nurse-led mobile coronary care service from the perspective of the relevant professionals, patients and public servants. Overwhelmingly, the nurses providing the service were commended for their professionalism, experience, knowledge and skills. However, there were a number of issues that merit consideration and review. These include: monitoring the 'call to needle times', the mode of transportation to the call scene, whether NIAS personnel should offer the service, the GP referral process, protocol updating and the suspension of the service when no beds are available. Questions are also raised about the relatively small number of calls for which thrombolysis is administered, However, it must also be noted that this is not the sole treatment provided by the nurse-led service. The personnel involved and the Trust and the Board should be proud of a service that has such cross community and cross professional support. Nonetheless, further discussion around the issues raised is recommended to ensure the best possible MCCU service is offered to the local population.

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