

Impact of a new foot care intervention programme in two haemodialysis units in Nottingham, UK

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Article points

1. Timely podiatry care should be available to haemodialysis patients with diabetes in a manner that is convenient and easy to access to avoid the development of complications.
2. A community podiatry service was introduced in two dialysis units on an acute hospital site to try and reduce diabetic foot complications and amputations.
3. Patients reported high levels of satisfaction with the new service and there has been a reduction in amputation rates and bed days among these patients.

Key words

- Amputation prevention
- Haemodialysis
- Podiatry
- Service design

Authors

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Each year a significant number of individuals with diabetes undergoing haemodialysis suffer foot conditions that result in a hospital admission or, at worst, amputation of a limb. In light of this, a podiatry service was introduced on two haemodialysis units based on an acute hospital site in Nottingham, UK. The authors reviewed this service to establish whether its implementation had any impact on major and minor amputation rates, bed days, access to and frequency of preventative podiatry care, and patient satisfaction. The review also aimed to assess the cost of providing the service and monitor the level of referrals from the dialysis units to the local diabetic foot multidisciplinary team and other specialisms for foot problems.

A combination of factors mean that people with diabetes undergoing haemodialysis have a significantly increased risk of foot ulceration and amputation. Dialysis treatment is an independent risk factor for the development of foot ulceration in patients with diabetes and stage 4 or 5 chronic kidney disease, and is associated with a more than four-fold increase in the risk of foot ulceration among patients with diabetes (Ndip et al, 2010). Likewise, amputations disproportionately affect dialysis patients with diabetes (Lavery et al, 2015)

Introducing dialysis nurse-led foot checks

In 2013, Brand et al (2016) found that out of a total population of 95 patients on four dialysis units run by Nottingham University Hospitals Trust (NUHT), 20% had undergone some form of amputation, half of these being major lower limb amputations. This information was gathered during a collaborative study that was conducted by the renal research team and Nottingham's Foot Ulcer Trials Unit on the dialysis units run by NUHT. The study looked at the impact of foot health and foot examination education delivered to nurses working on the units by a specialist diabetes podiatrist. The nurses were educated on how to perform a simple

5-minute foot check and how to appropriately refer problems that were found. A validated foot health function behaviour questionnaire — the Nottingham Assessment of Functional Footcare (Lincoln et al, 2007) — was completed by patients, who were asked about foot health status both before and after the nurse education intervention. The results were positive, showing improved foot health behaviour and increased referrals to NUHT's multidisciplinary diabetic foot team. Following the success of these nurse-led foot checks and after collating patient responses to their foot health status, it became clear that there were patients undergoing dialysis who did not have active foot disease but who did have significant problems with self care.

The benefits of podiatric care

Evidence suggests that patients with diabetes and end-stage renal disease should have regular foot surveillance at a time convenient to them and ready access to appropriate specialists (Game, 2012). Diabetes UK's Putting Feet First (2012) campaign recommends that regular podiatry assessment at least every 1–2 months is ensured for this high-risk group. It is not always easy or practical for these patients to attend multiple community and/or hospital

appointments. Available evidence suggests, however, that if efforts are made to continue the process of integrated care throughout the phase of failing renal function, then reductions in amputations and hospitalisations as well as improvements in quality of life can be made (Game, 2012). In 2016 the Joint British Diabetes Societies for Inpatient Care published guidelines recommending that podiatry assessment be available on dialysis units as this frail, multi-morbid population may have difficulty accessing community podiatry appointments. Indeed, podiatry input on dialysis units has been found to reduce the frequency of development and the severity of diabetic foot complications among patients on dialysis (Rith-Najarian and Gohdes, 2000).

Improving access to podiatry

There is no doubt that access to regular foot surveillance, along with required referral to appropriate specialists, is vital in the prevention, detection and management of diabetic foot disease. The time commitment of dialysis in a hospital setting can render this difficult for patients and healthcare professionals to achieve.

Prior to 2014, the local podiatry team had little input into the two dialysis units within the NUHT City Hospital Campus. The pathway for obtaining foot care services was the same for those on dialysis as it was for anyone with diabetes, with no specific consideration being given to the aforementioned issues. As a result of the study conducted by Brand and colleagues (2016), there was an increase in awareness among podiatrists locally that this may be causing the risk of ulceration and amputation to be higher than it could be.

With this in mind, plans were made to introduce a podiatry service in the two dialysis units at NUHT City Campus and to establish whether this intervention, along with the nurse-led foot check previously implemented, had any effect on major and minor amputation rates and bed days/cost of foot-related problems. A further aim was to assess whether the introduction of the podiatry service had any effect on levels of access to and frequency of receipt of preventative podiatry care and whether it had an impact on patient satisfaction. It was also necessary to assess the cost of providing podiatry on the haemodialysis units and monitor the level

of referrals from the dialysis units to the local multidisciplinary diabetic foot team and other specialisms for foot problems.

Establishing a dialysis podiatry service

Support was secured to start a podiatry service on the dialysis units for an initial period of 12 months, which began in November 2014. An outline of the service is summarised in *Box 1*. Delivered by specialist podiatrists, the service comprised routine podiatry care, footwear advice, self-care advice, monitoring of pressure areas and ongoing vascular and neurological assessment. It allowed for referral, where necessary, to other services, such as vascular surgeons, orthotists, district nurses for pressure relief, and the multidisciplinary diabetic foot team.

Information on amputation and bed days was obtained through hospitalisation records. Amputations between April 2012 and March 2016 were noted. Minor amputations were defined as any amputation through or distal to the ankle joint, and major amputations as any proximal to the ankle joint.

A patient survey on the provision of podiatry care and foot condition was delivered to all patients on the two dialysis units both before the podiatry service was implemented and 12 months post implementation. A year after the service was launched, short patient interviews were also conducted with consenting individuals.

The cost of providing the service on the dialysis units, compared to the cost of providing the service

Page points

1. Podiatry input on dialysis units reduces the frequency of development and severity of diabetic foot complications.
2. The dialysis podiatry service comprised routine podiatry care, footwear advice, self-care advice, monitoring of pressure areas and ongoing vascular and neurological assessment.
3. The impact of the nurse-led foot checks and dialysis podiatry service were assessed for access to/frequency of preventative podiatry care, amputation rates and bed days.
4. Patients were surveyed before and after the service was introduced to assess their satisfaction.

Box 1. Features of the new podiatry service.

- Specialist podiatrists to attend dialysis units every 3–4 weeks to provide ongoing podiatry.
- Audit of levels of podiatry care for dialysis patients via a questionnaire.
- Feedback events on the dialysis unit via patient interviews.
- Poster campaign on the dialysis units advising patients to tell dialysis nurses if they have a foot problem or need treatment, with contact details for podiatry.
- Dialysis nurses advised to contact the podiatrist if any patients require treatment.
- Podiatrists to refer any patients with ulceration to the multidisciplinary diabetic foot team.

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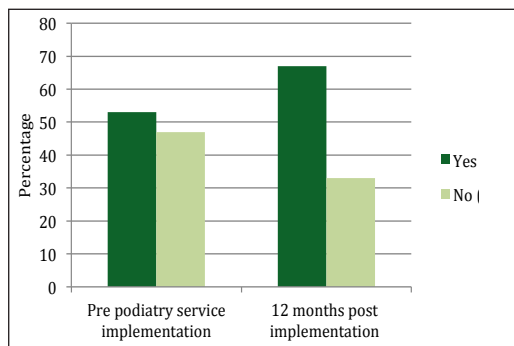


Figure 1: Patient responses to the question: "Are you currently receiving professional foot care?"

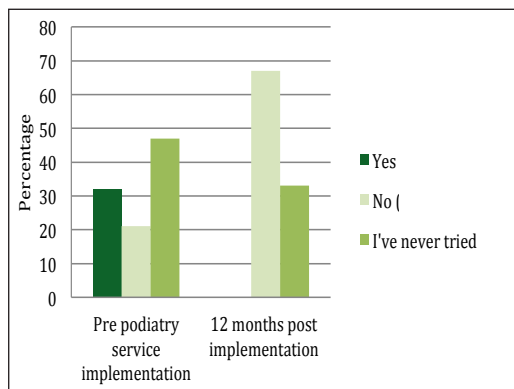


Figure 2: Patient responses to the question: "Do you have problems accessing NHS foot care?"

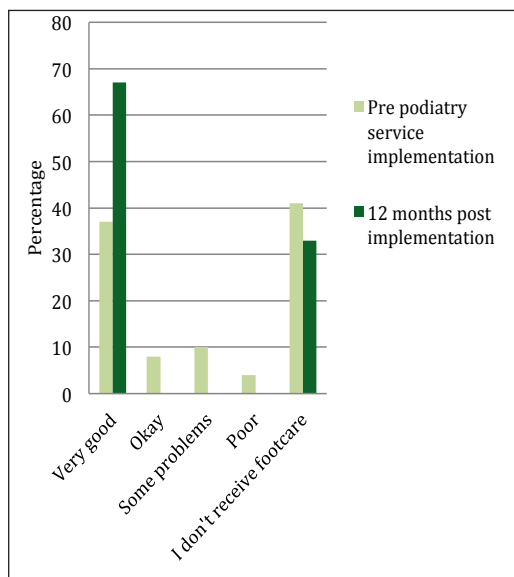


Figure 3: Patient responses to the question: "How would you rate your current foot care provision?"

in the community, was calculated using community records to determine the amount of time staff were engaged on the dialysis units and the total time

previously spent treating dialysis patients in their own homes or in community clinics. Staff costs were then calculated based on the assumption that the podiatrist's salary was at the top of the NHS Band 6 specialist podiatrist pay scale.

The number of dialysis patient referrals to the multidisciplinary diabetic foot team were calculated by reviewing all new patient referrals between April 2012 and March 2016 and identifying the original referrer.

Results

Patient questionnaires

One-hundred patients were surveyed on the dialysis units before and after the podiatry service was implemented. They were asked whether they were currently receiving professional foot care (Figure 1), whether they had problems accessing NHS foot care (Figure 2), how they would rate their current foot care provision (Figure 3), whether they had any current concerns about their feet (Figure 4) and how they would rate the current condition of their feet (Figure 5).

Patient interviews

Before podiatry service implementation

Of the 100 patients surveyed about their views on the podiatry provision before the service was introduced, 19 were interviewed. They responded with the following comments:

"I went to my doctor and they referred me to the podiatry at the Community Hospital. It's very difficult to get there. Either my brother has to take me, and he's not always available because he works, or I have to get hospital transport and sometimes it takes 3 hours. With being here at dialysis 3 days a week, it seems madness I can't have them [my feet] done whilst I'm here. I think it would be brilliant if you started coming to dialysis to do them. It would be one less thing for me to worry about."

Patient 1

"I have a lady come and see me at home. She's not a qualified chiropodist but she trims my nails. I'm diabetic and my husband lost half his foot, so I know how important it is.

I think it would be great to have someone here to do them.”

Patient 2

“I go to the big health hub. It’s lovely when you get there. The only problem is I can’t get out on my own, I have to get my daughter to help and she’s got little children. Sometimes it’s hard to get an appointment because I can only go on a Tuesday or Thursday when I’m not on dialysis. It limits the appointments I can get and I have to wait a bit longer. I would definitely use a podiatrist on dialysis – really good idea.”

Patient 3

“I have been trying to get my feet done for ages. I went to the doctor and asked, but they wouldn’t do it. I went to a private chiropodist, but they wouldn’t touch it, said they didn’t do corns. So I went back to the doctor and got in with a lady at East Leake. I’ve got to go to Keyworth now for it, as they aren’t open on Tuesdays or Thursdays and they are the only days I can go. I think it would be easier to have them done on dialysis.”

Patient 4

Twelve months after implementation

Thirteen patients were interviewed after implementation and they reported satisfaction with the service. Comments from patients interviewed to ascertain their views of podiatry care a year after the dialysis podiatry service was started are given in *Box 2*.

Amputation rates and bed days

The number of bed days and major and minor amputations for patients with diabetes attending these haemodialysis units over 4 years is given in *Table 1*.

Cost analysis and referral rates

Over 100 haemodialysis patients have used the podiatry service on the units. Referrals from the haemodialysis units to the multidisciplinary diabetic foot team and other specialisms went from zero prior to the interventions, to 35 referrals from dialysis nurses and 28 from podiatrists in

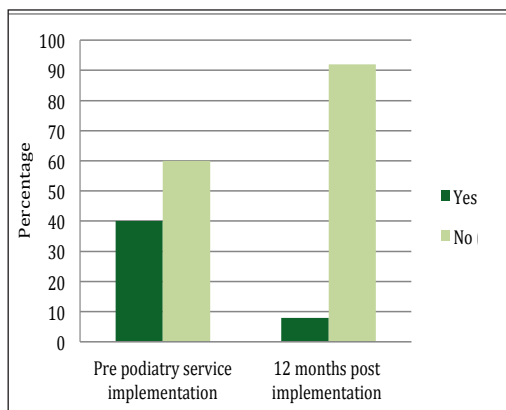


Figure 4: Patient responses to the question: “Have you any concerns about your feet at the moment?”

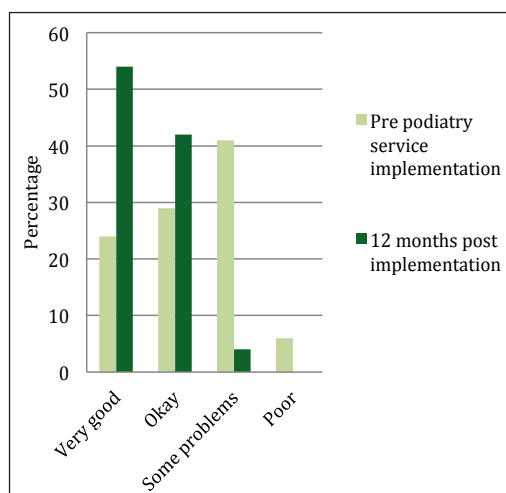


Figure 5: Patient responses to the question: “How would you rate the condition of your feet currently?”

Box 2. Patient comments on the dialysis podiatry service.

“It’s much better now. Do two jobs in one. They’ll attend to my feet, which I can’t do; cut and file the nails; advise you on shoes; it’s perfect really because I can lay on here and have my feet done, rather than try and get my feet done up there [in the community podiatry clinic] and then perhaps have to come here to dialysis.”

“Pleased we’re getting the service here, it makes a big difference to me.”

“First-rate. It can’t be any better.”

“Very helpful.”

“Helps as I can’t do them myself.”

“Brilliant, I struggle to get down to them.”

“I enjoy having them done.”

“Good service, I hope it carries on.”

“Better than having to go to the surgery.”

Table 1. Number of amputations and bed days for dialysis patients admitted due to diabetic foot disease.

| Period | Stage of programme | Number of patients admitted | Number of bed days | Cost of bed days | Amputations during admissions |
|-------------------------|--|-----------------------------|--------------------|------------------|--|
| 01/04/2012 – 31/03/2013 | Prior to any intervention | 7 | 152 | £60,800 | 2 minor (forefoot) |
| 01/02/2013 – 31/03/2014 | Nurse-led foot checks (training: August 2013 to February 2014) | 6 | 86 | £34,400 | 1 minor (toe) |
| 01/04/2014 – 31/03/2015 | Podiatry service begins (November 2014) | 7 | 377 | £150,800 | 2 major (above-knee amputation) 3 minor (1 forefoot, 2 toe) |
| 01/04/2015 – 31/03/2016 | Ongoing podiatry | 1 | 8 | £3200 | 0 |

the following 24 months. The period between nurse-led foot checks until podiatry started accounted for 26 referrals from nurses and zero from podiatrists. Once podiatry started there were 9 referrals from nurses, and 28 referrals from podiatrists.

The annual staff cost of providing the service on the dialysis units was found to be 25% less than providing the service in the community (£2,667 compared to £3,523).

Discussion

This project was very much about establishing a practical clinical service for patient benefit. It had to be justified to ensure its continuation beyond the initial trial period. As such, pre and post intervention feedback was gathered in the form of questionnaires and patient interviews.

Prior to the service commencing, less than a third of patients reported having no problems accessing podiatry care and half had not even attempted to do so. The patient interviews prior to instigating the dialysis podiatry service revealed some of the reasons for this. Many reported that their dialysis days were the same as clinic opening times. If this was not the case, then their ability to attend the clinic often relied upon transport being available.

A follow-up survey a year after the service had commenced showed an increase in the proportion of patients accessing podiatry care. Patients reported improved ease of access to a

podiatrist at the end of the trial period. They also reported improvement in their perceived foot health condition. The follow-up interviews revealed good patient satisfaction with the initiative.

Referrals to the multidisciplinary diabetic foot team in the hospital in the 24 months following the interventions went from zero to 63, showing that identification of foot complications on the haemodialysis units is occurring regularly and is an important route of access to specialist foot services in secondary care.

Costs were analysed as further justification of the service's effectiveness. It was found that podiatry staff costs in the dialysis units were a quarter lower than in the community.

Analysis of bed days and amputation rates due to foot disease in those receiving haemodialysis on the two units was carried out over a 4-year period before and after the interventions (nurse-led foot checks and dialysis podiatry service). Despite a rise in amputations and bed days in the April 2014 to March 2015 period, attributable to two patients spending a large proportion of that year in hospital, there has been a dramatic decrease in both measures in the 1 full year since the podiatry service was introduced. It is worth noting that only one patient was admitted in 2015–16, compared to six or seven in each of the previous years, and this patient did not require an amputation. It is possible that the reason that fewer patients were

admitted and underwent amputations is because their foot complications were being identified sooner and referred on for specialist care before becoming severe and requiring hospitalisation.

These figures are continuing to be monitored as there is an awareness that decreases over such a short time span may not be representative of a long-term effect.

Conclusion

There was a drop in the number of amputations and bed days among haemodialysis patients with diabetes in the 12 months since the dialysis podiatry service began. Although this may be coincidental, it is very encouraging. The dialysis nurses and podiatrists make frequent referrals to the multidisciplinary diabetic foot team and other specialisms. It has been more cost-effective to provide the podiatry service on the haemodialysis units than in community clinics and patients' homes. Patients reported high satisfaction levels with the service. It is hoped the benefits will continue to be evident

in future data and that the service can continue and be rolled out to other units on the basis of our findings. ■

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