

A small prospective population study to assess accuracy of a directed patient self-assessment foot screening tool against current practice during COVID-19

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Key words

- Covid-19
- Diabetic foot
- Screening programme
- Self-assessment

Article points

1. Routine foot screening for low-risk patients was difficult to deliver during Covid-19.
2. A small pilot study examined if patients could use a self-assessment questionnaire and sensation test and deliver comparable results to a current standard diabetes foot risk assessment.
3. All participants managed to conduct the Ipswich Touch Test and there was no difference in results when repeated by a podiatrist.

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A small pilot study was undertaken to identify if patients could use a self-assessment questionnaire and sensation test and deliver comparable results to a current standard diabetes foot risk assessment. Twenty-three participants were recruited from NHS Lanarkshire Diabetes Service — a limited number due to Covid-19 restrictions. Their last screening was more than three years ago. The Ipswich Touch Test and hair presence were used as an alternative to monofilaments and pulse palpation. At a face-to-face appointment, the self-assessment was repeated blind to previous responses and then followed by a current standard foot screening. Results showed that 19 patients remained low risk. One participant had moved to in remission/high risk of developing ulceration on the basis of questionnaire results, but had no presence of hair growth and palpable pulse palpation. All participants managed to conduct the Ipswich Touch Test and there was no difference in results when repeated by a podiatrist. The absence of hair growth could be a risk indicator in foot screening risk in future and requires further investigation.

Current practice in diabetes is to offer foot screenings either annually or biannually, but this proved challenging during the COVID-19 pandemic. NHS Scotland shifted caseload priority to those with active foot wounds, at high risk of ulceration or with conditions such as rheumatoid arthritis or peripheral arterial disease (PAD). The pandemic also caused health services to reduce numbers of face-to-face consultations.

With these changes, more services including GP consultations went online with an increased uptake in video consultations, such as Near Me. However, online consultations are not easily transferable to foot screenings as these require a physical check of pulses and foot sensation which need to be undertaken by trained clinicians.

The Scottish Diabetes Survey (2020) reported that Lanarkshire has 42,739 people with diabetes. Leese et al (2011) suggest approximately 69% of these should be at low risk of developing non-

healing foot ulceration. This means approximately 30,000 appointments are required for these patients' bi-annual reviews, in keeping with the recommendation from the Scottish Diabetes Foot Action Group (Leese and Stang, 2022). The NHS cost to fund staffing in a health centre setting delivering this service is between £39–£46 per appointment for a podiatrist to review each person. This would give NHS Lanarkshire an estimated cost outlay of £1.17 million for low-risk screening where complications of the condition may not be present (Department of Health, 2015). In a 5-day working week where service is prioritised for those at risk or with a foot wound, it is nearly impossible to keep up these screenings and even more so with reduced capacity.

With current changes to service delivery, a small pilot study was undertaken by NHS Lanarkshire Diabetes Service to examine alternative ways for patients to be able to carry out their own foot screening. It was acknowledged that this would need

A

Your circulation

Do you have hair growth on your toes, top of foot or legs? Yes / No

Do you suffer from cramps in your foot, your calves or in your buttocks? Yes / No

Do you have any pain in your feet or limbs? Yes / No

If yes, please indicate if During Activity Yes / No or at Rest Yes / No

If you have pain how do you relieve pain. Please indicate _____

Have you ever been referred to the Vascular department or attending vascular for your feet or legs? Yes / No

Other risk factors to developing ulceration

Do you have hard skin on your feet that you seek private chiropody/podiatry services to reduce? Yes / No

Do you wear any prescribed hospital shoes? Yes / No

Do you currently have a foot ulceration? Yes / No

Have you in the past had foot ulceration? Yes / No

Are you registered Partially Sighted or Registered Blind as a complication of your diabetes? Yes / No

Are you currently registered with a NHS Podiatrist? Yes / No

B

A risk to developing diabetic foot ulceration is the inability to feel touch to your feet and is known as Neuropathy.

To test if you have this, you need help of a family member or friend to assist you in the test.

- Sit in a safe environment with your socks off.
- Ask your family member / friend to light touch your toes with your eyes closed in the sequence below taking time for you to respond if light touch felt.

The Touch must be 'as light as a feather' for 1-2 seconds

TICK CIRCLE IF TOUCH FELT



Do you get any numbness, Pins needles (tingling) or shooting pains to your feet? Yes / No

Figure 1A: The questionnaire. Figure 1B: Sensation check.

to be simple, easy to carry out and did not require any form of training.

Permission was granted to carry out the study from the Head of NHS Lanarkshire Diabetes Service. Patients were invited by letter and had the right to decline. Verbal and written permission was obtained by participating patients.

Material and methods

Currently, foot screenings in the clinical setting consist of ascertaining presence of peripheral artery disease (PAD) by palpation pedal pulses and presence of intermittent claudication. Sensation loss is detected using a 10g monofilament. Risks are identified, such as active or previous ulceration, painful neuropathy, foot deformity, diabetes-related amputation and attendance to vascular or podiatry clinics.

The Scottish Diabetes Foot Action Group's CPR for Feet campaign, promotes the use of the Ipswich Touch Test (IpTT) instead of a monofilament. Rayman et al (2011) found that the results of foot screening with the IpTT were substantially not different to the results using a 10g monofilament. Several follow-up studies have confirmed accuracy comparable to the monofilament (Madanat et al, 2014; Sharma et al 2014; Basir et al, 2020).

Due to this level of accuracy, the IpTT was deemed suitable to recommend as the sensation test in patient self-foot screening in this pilot study.

When considering palpation of pedal pulses, Magee et al (1993) highlighted that accuracy is dependent on the experience of the clinician performing the examination, suggesting that false readings would be inevitable when done by patients

as part of self-screening. The International Working Group for the Diabetic Foot stated that pulses may still be palpable in cases of significant ischaemia, palpation has only moderate reproducibility dependant on clinician experience and results could also be affected by room temperature (Schaper et al, 2012).

In patients with PAD, key physical changes in the lower limb, such as hair loss and brittle nails, are caused by inadequate blood flow and oxygen; therefore, they should be indicators of the disease (Halperin, 2002; Varu et al, 2010; Creager and Loscalzo, 2018).

To keep it simple for the patient to undertake a vascular assessment, it was decided to replace a pulse check with hair growth, because it would be simplest to explain what to look for. Interestingly, no study has investigated hair growth as a substitute for pulses in untrained people to detect PAD.

Study design

This was a prospective cohort study to assess accuracy of a directed patient self-assessment foot screening tool, repeated blind by a podiatrist and then compared to the normal foot screening given by clinical support workers, nurses and podiatrists.

Participants were recruited from the diabetes service database in the East Kilbride locality of NHS Lanarkshire. Invited participants were those previously deemed at low risk and who has not had a foot screening in more than 3 years.

The key aims were to investigate the accuracy of IpTT versus monofilament, hair growth versus pulse palpation, and if patients would undertake a

Table 1. Study participants.

Participants recruited	n=23
Participants who completed pilot study	n=20
Age range	54–78 years (mean 65 years)
Sex	11 men; 9 women
Diabetes type	1 type 1; 19 type 2
HbA _{1c}	41–75 mmol/mol (mean 59 mmol/mol)
Diabetes duration	4–43 years (mean 12 Years)
Scottish Index of Multiple Deprivation (SIMD) deprivation scale	1–6 (all levels in this study)

self-assessment to reduce burden on the NHS. Small numbers were expected due to COVID-19.

Study

The patients were given a two-page sheet self-assessment tool, consisting of a questionnaire and IpTT response recording sheet (*Figure 1*).

The questionnaire asked for yes or no responses on hair growth on the toes, cramps, pain and any vascular intervention. It also asked about presence of other ulceration factors, including hard skin, if surgical footwear had been prescribed, amputation and current ulceration status.

The sensation check included instructions, information about why a sensation check is needed, and a suggestion to get help to carry out the IpTT.

A clinical support worker trained in foot screening was assigned to follow up these letters approximately 2 weeks later, gain verbal consent due to current COVID-19 measures and offer follow-up face-to-face appointments to verify accuracy. Initially, 23 patients agreed to take part; however, only 20 patients attended the follow-up. The three who did not attend were followed up and asked their reasons. One had concerns about attending a health centre during COVID-19, one had work commitment and one was no longer interested in participating.

Results

IpTT versus monofilament

Only one participant did not have all the IpTT points of sensation on their self-test. However, all points were felt when a podiatrist carried out this test blind to previous results. The same five points in the foot indicated as sensation present with the IpTT foot test were exactly matched when using a monofilament by the podiatrist.

Hair growth versus pulse palpation

Four participants said they had no hair growth on their toes. When checked by the podiatrist at the face-to-face appointment 2–3 months after the initial self-assessment, two of the participants had hair. Further investigation revealed that the original self screenings were carried out in the summer and the follow-up review was in winter, when the participants were no longer shaving hair. One patient had hair loss as a side-effect of her medication. One had no explanation for the hair loss. All 20 participants had palpable pulses.

If the responses to the questions on ulceration risk factors were used to replace pulse, 19 participants would be classed as low risk of developing non-healing ulceration.

One participant had sensation intact and no hair growth, and indicated yes to previous ulceration. When verified, this would mean his risk status would automatically change from low risk to in remission/high risk. However, previous ulceration was excluded and the lack of hair growth included, this would have raised risk to moderate, with hair loss a sign of PAD instead of pulses.

Discussion

The Scottish Diabetes Survey (2020) estimated that there are 317,128 people with diabetes in Scotland. Leese et al (2006) suggested up to 69% of people with diabetes population are at low risk, based on an analysis of a population of 140,000 people with diabetes and with the risk assessment performed by staff trained in foot screening.

The Scottish Diabetes Survey (2020) indicated that approximately 38% of people with diabetes had their foot screening. This highlights the need

for action to develop self-assessment tools for patients such as the current small study.

There is limitation in this study due to size, but it does illustrate that some patients can do their own self assessments and further studies should be done.

All social deprivation levels were represented in this study, but it should be noted that this area is more affluent than other areas in Lanarkshire. Where high social deprivation is prevalent, there is increased risk of ulceration (Leese et al, 2013). A point to consider is whether these patients would be as involved in their own self-care as the participants in this study.

Leese and Stang (2022) indicated one of the risk factors in ulceration is the presence of PAD; however, this is based on absent/abnormal pulse palpation and the presence of symptoms such as claudication. Diaconu et al (2018) suggested that where peripheral neuropathy is present, people with diabetes are more likely to present as asymptomatic. Although this study only found one participant with no hair growth, he did have a history of previous ulceration, but was asymptomatic of PAD and had palpable pulses. As diabetes is a major risk factor for atherosclerosis, an area of future research could examine hair loss as a risk factor for developing foot ulceration rather than waiting for symptomatic signs that may not occur, such as claudication.

Technology is improving diabetes care, with advances in blood monitoring allowing patient involvement in their care, but foot screening currently has no online or at-home options. Therefore, patients need to attend screening appointments, which may be difficult for them due to work or other pressures.

This study confirms the work of Sharma et al (2014), with both studies showing that patients are capable of carrying out foot screening at home. However, larger studies are needed to assess methods of determining PAD rather than pulse palpation, as hair loss. If such methods are found to be accurate, then they could be integrated into an online assessment tool that patients can use easily.

Future directions

A larger population cohort is required to investigate the feasibility of using hair loss rather than pulse palpation for at home assessment. Self-screenings could be linked to existing patient

and clinician apps. In Scotland, the patient app My Diabetes, My Way is linked to the clinician version Sci-diabetes, so if the patient uploads self-screening results that change risk to moderate, they can be followed up by a podiatrist. An app could also help patients to better understand their results and seek information on diabetes control. Future studies are required on foot screenings by patients themselves as part of patient empowerment and patient-focused care. ■

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Online CPD activity

Visit www.diabetesonthenet.com/cpd to record your answers and gain a certificate of participation

Participants should read the preceding article before answering the multiple choice questions below. There is ONE correct answer to each question. After submitting your answers online, you will be immediately notified of your score. A pass mark of 70% is required to obtain a certificate of successful participation; however, it is possible to take the test a maximum of three times. A short explanation of the correct answer is provided. Before accessing your certificate, you will be given the opportunity to evaluate the activity and reflect on the module, stating how you will use what you have learnt in practice. The new CPD centre keeps a record of your CPD activities and provides the option to add items to an action plan, which will help you to collate evidence for your annual appraisal.

1. What approximate percentage of people with diabetes should be at low risk of developing non-healing foot ulceration, according to Leese et al (2011)? Select ONE option only.
 - A. 55%
 - B. 60%
 - C. 65%
 - D. 70%
 - E. 75%
2. What is the approximate cost range of each appointment for a podiatrist to review each low-risk person in a screening programme? Select ONE option only.
 - A. £20–29
 - B. £30–39
 - C. £40–49
 - D. £50–59
 - E. £60–69
3. Which of the following is not a risk factor for ulceration? Select ONE option only.
 - A. Aged <40 years
 - B. Claw toes
 - C. Diabetes-related amputation
 - D. Painful neuropathy
 - E. Previous ulceration
4. Which of the following is used to assess for the presence of foot sensation when carrying out the Ipswich Touch Test? Select ONE option only.
 - A. Gauze pad
 - B. Finger
 - C. 10g monofilament
 - D. Tuning fork
 - E. Cotton wool
5. Which one of the following risk factors is more likely to be prevalent in those people with foot ulcers than without? Select ONE option only.
 - A. History of foot deformity
 - B. History of stroke
 - C. Higher social deprivation
 - D. Male sex
 - E. Smoking
6. According to the Scottish Diabetes Survey (2020), how many people in Scotland have diabetes? Select ONE option only.
 - A. 160,000
 - B. 320,000
 - C. 480,000
 - D. 640,000
 - E. 800,000
7. Lower-extremity arterial disease has a much higher risk of cardiovascular morbidity and mortality than for other atherosclerotic diseases. How much higher is this risk? Select ONE option only.
 - A. Two to three times higher
 - B. Three to four times higher
 - C. Four to five times higher
 - D. Five to six times higher
 - E. Six to seven times higher
8. What is the recommended screening frequency for people at low risk of foot ulceration currently suggested by the Scottish Diabetes Foot Action Group? Select ONE option only.
 - A. Six-monthly
 - B. Annually
 - C. Bi-annually
 - D. 3 yearly
 - E. 5 yearly
9. According to Leese et al (2006) what is the approximate chance of people with diabetes and low-risk feet being ulcer free at a 2-year follow-up? Select ONE option only.
 - A. 55%
 - B. 66%
 - C. 77%
 - D. 88%
 - E. 99%
10. In Scotland, what percentage of people with diabetes are attending their foot screening appointments, according to data from the Scottish Diabetes Survey (2020)? Select ONE option only.
 - A. 28%
 - B. 38%
 - C. 48%
 - D. 58%
 - E. 68%