Standardising podiatric practice in diabetes foot ulceration management: outcomes from a regional quality improvement initiative

J Shaw, JH Cundell, D Killough

The standardisation of diabetic foot ulceration assessment and management is important. A quality improvement initiative incorporating regional training for 227 podiatrists was completed in Northern Ireland to standardise the assessment and diagnosis of peripheral arterial disease and peripheral neuropathy. The SINBAD diabetic foot classification system and risk assessment were also included in podiatry practice. Response rates for pre- and post-training questionnaires were high at 85% (*n*=194) and 76% (*n*=173). The majority (99%, *n*=191) of respondents listed pulses, Doppler sounds and ABPI results as important in vascular assessment and 70% (*n*=108) stated they had learnt new information about Doppler sounds, ABPI technique (83%; *n*=108), clinical signs and symptoms (72%; *n*=125) and their differential diagnosis (33%, *n*=51). The Edinburgh Claudication Questionnaire was new for 36.4% (*n*=63). The correct use of the Neurotip™ and neurothesiometer in neurological assessment was new for 56.6% (*n*=63) and 43.4% (*n*=75) attendees respectively. The interpretation of results was a key learning area for 81% (*n*=140). Respondents used the SINBAD classification system (65%; *n*=112) and a risk assessment tool (74%; *n*=128) in practice. This project has placed safety and the delivery of high-quality care to service users at the centre of podiatry practice in the region.

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Article points

1. A quality improvement initiative has been developed in Northern Ireland that includes a podiatry regional training programme.
2. The programme aimed to standardise the assessment and diagnosis of peripheral arterial disease and peripheral neuropathy.
3. The programme has placed safety and the delivery of high-quality care at the top of the agenda.

Key words

-Learning evaluation
- Podiatric practice
- Service improvement

Healthcare professionals recognise that diabetes and diabetic foot ulceration (DFU) are increasingly important global health issues. Northern Ireland has a population of 1.8 million and an annual DFU incidence of 4.6% (Guidelines and Audit Implementation Network [GAIN], 2016). A retrospective regional audit of DFU management provided baseline information on assessment and clinical management in 100 patients presenting with a new DFU in 2013/14 (GAIN, 2016). Results showed that the assessment of vascular and neurological status, risk and appropriate review fell below expected national targets.

In order to address inequalities in and improve quality of care for this vulnerable group, a quality improvement initiative was developed that included a podiatry regional training programme. This programme aimed to standardise the assessment and diagnosis of peripheral arterial disease (PAD) and peripheral neuropathy (PN) across Northern Ireland. The SINBAD diabetic foot classification system was reviewed and risk assignment and timely review considered.

Methods

Quality improvement is defined as the application of a systematic approach that uses specific techniques to improve quality (Health Foundation, 2014). This quality improvement initiative was developed using the Quality 2020 Attributes Framework (2010), which indicates that any clinical intervention should be safe, effective, efficient, timely, equitable and patient-centred. The framework also recognised the importance of the Berwick Principles in modern

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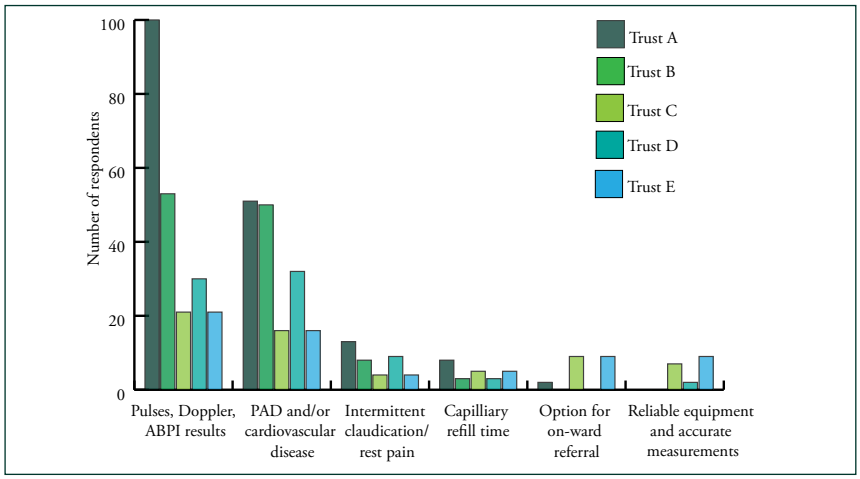

Figure 1. Important areas of vascular assessment listed by attendees prior to training. PAD = peripheral arterial disease.

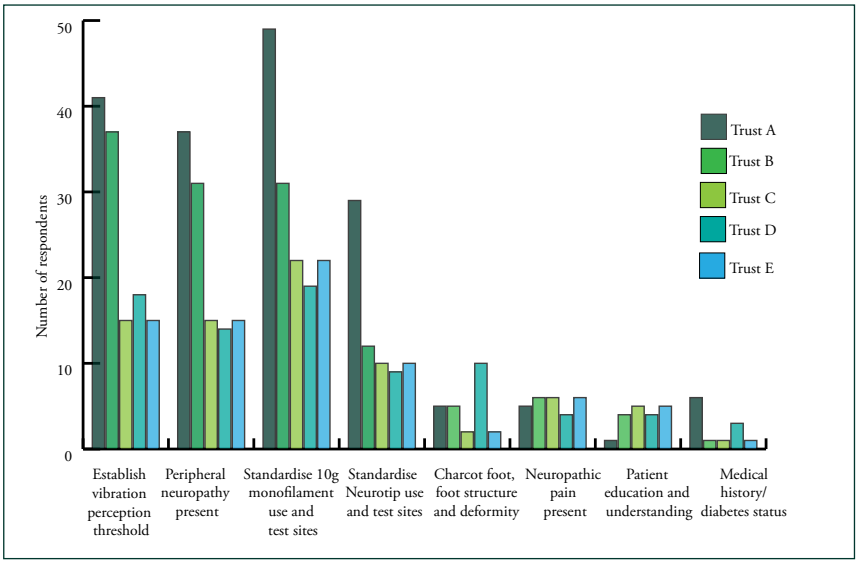

Figure 2. Important areas of neurological assessment listed by attendees prior to training.

healthcare (Berwick, 2013):

1. Place safety and quality above all other things.
2. Engage, empower and listen to patients at all times.
3. Grow and develop staff to improve the way they work.
4. Embrace transparency and openness in all areas of work.

The Plan-Do-Study-Act (PDSA) methodological approach was adopted, recognising the importance of the principles described above (Institute for Healthcare Improvement, 2018).

A regional task and finish group consisting of podiatrists from each of the five Trusts in Northern Ireland was convened. Sub-groups were established to review the best research evidence on neurological and vascular assessment of the diabetes foot and risk assignment. The SINBAD classification system was reviewed and adopted (Ince et al, 2007; 2008).

Results

Findings are reported using the framework of the Berwick Principles.

Safety and quality

The regional task and finish groups presented results from a literature review on neurological and vascular assessment of the diabetes foot, on various wound classification systems and models of risk stratification (Leng and Fowkes, 1992; Jeffcoate et al, 1993; Armstrong et al, 1998; Treece et al, 2004; Beckert et al, 2006; Ince et al, 2007; Prompers et al, 2007; Abbas et al, 2008; Ince et al, 2008; Foot Risk Awareness and Management Education, 2011; Brownrigg et al, 2012; Crawford et al, 2015; Pop-Busui et al, 2017).

Agreement was reached on how all NHS podiatrists would complete diabetic foot assessments, diagnose PAD and PN, allocate a SINBAD score and ultimately assign a risk to those patients with foot wounds.

In total, 227 podiatrists attended the training sessions. Of these, 194 (85.4%) completed the initial knowledge questionnaire and 173 (76.2%) completed the post-training questionnaire. The reason for separating the results was to enable each Trust to address their own particular issues in their local implementation plan.

When asked to list three important areas of vascular assessment, 99.1% (*n*=191) of respondents stated that pulses, Doppler sounds and ABPI results were important (*Figure 1*). Clinical signs and symptoms of PAD and/or cardiovascular disease were described as important by 72.7% (*n*=140) and the presence of intermittent claudication (IC) or rest pain listed by 16.7% (*n*=32).

Respondents regarded establishment of vibration perception thresholds (55.5%, *n*=107), diagnosis of painful neuropathy (49.3%,

n=95) and standardisation of the use of the 10 g monofilament (62.9%, *n*=121) and the Neurotip™ (30.8%, *n*=59) as important in diabetes foot assessment (*Figure 2*).

The SINBAD classification system was formally adopted to enable clinicians to begin to predict outcomes for healing (Ince et al, 2007; 2008). Participants were asked if they were aware of this system and if they used it in clinical practice. Clinicians in Trust A all stated they were aware of this system and 65% (*n*=47) currently used it in practice. In Trusts B, C, D and E, there was an awareness of the SINBAD system, but training had not yet been delivered locally to allow the system to become embedded into clinical practice (*Figure 3*).

Attendees were asked if they used a risk assessment tool in their practice and how risk was assigned to patients. Of the 194 respondents, 168 (86.6%) reported that they used a risk assessment tool, 15 (7.7%) did not use a tool and 11 (5.7%) did not respond. Following the training session, attendees were asked to identify areas of learning or new knowledge.

Attendees highlighted learning in five areas of vascular assessment. Of those who returned questionnaires after the training (*n*=173), 70.5% (*n*=122) stated they had learnt new information about the importance of Doppler sounds relating to blood flow. ABPI technique had some new learning for 83.3% (*n*=144), as had the use of capillary filling time as an unreliable marker of PAD for 35 respondents (20%). The Edinburgh Claudication Questionnaire was new learning for 36.4% (*n*=63) of respondents and how to make a differential diagnosis of PAD, critical limb ischaemia, intermittent claudication and the influence of peripheral neuropathy was new for 33.5% (*n*=58).

The key areas of learning on the neurological assessment of the diabetic foot centred on the correct use of diagnostic tools and interpretation of results. The use of the Neurotip™ and neurothesiometer were identified as new learning by 56.6% (*n*=98) and 43.4% (*n*=75), respectively. The interpretation of results was a key learning area for 81% (*n*=140) of respondents. Twenty respondents (11.5%) stated they were unaware of the patient's responsibility to inform the DVLA of the presence of PN. Fourteen attendees (8%) identified the challenges of interpreting and recording results in vulnerable patients.

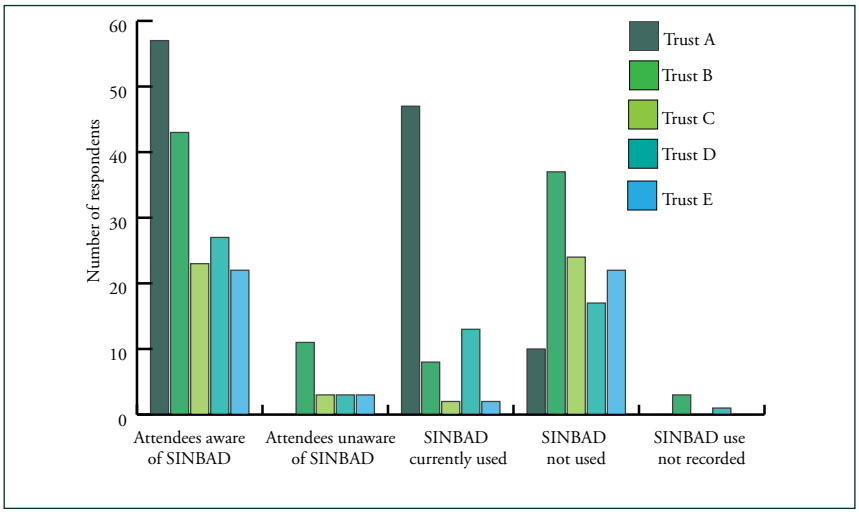

Figure 3. Knowledge and use of the SINBAD classification system by attendees.

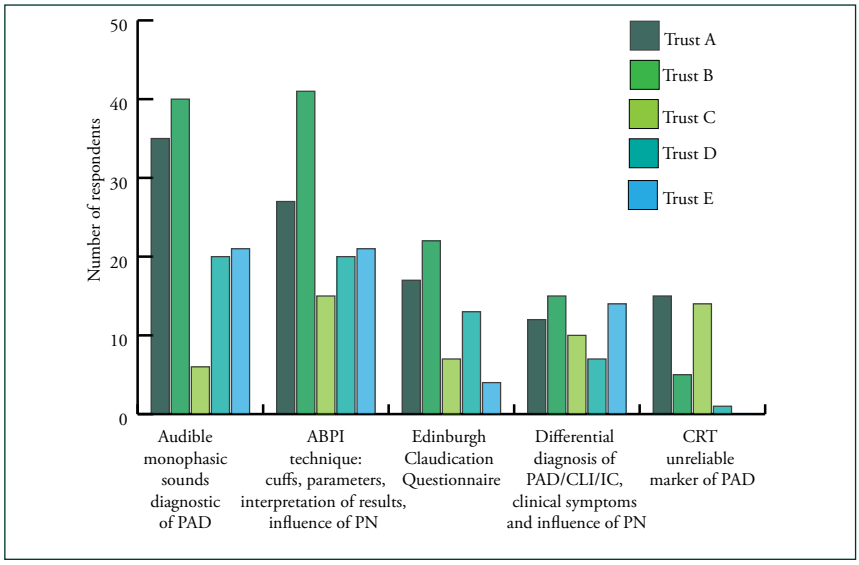

Figure 4 Areas of learning relating to vascular assessment identified by attendees. CLI = critical limb ischaemia; IC = intermittent claudication; PAD = peripheral arterial disease; PN = peripheral neuropathy.

New learning associated with the SINBAD classification system included:

- How and when to use SINBAD (49.7%; *n*=86).
- Information on scoring wounds, identifying the target wound and predicting outcome (63.5%; *n*=110).
- Recording initial and end scores in wound assessment (23.1%; *n*=40).
- Recording SINBAD scores in clinical notes

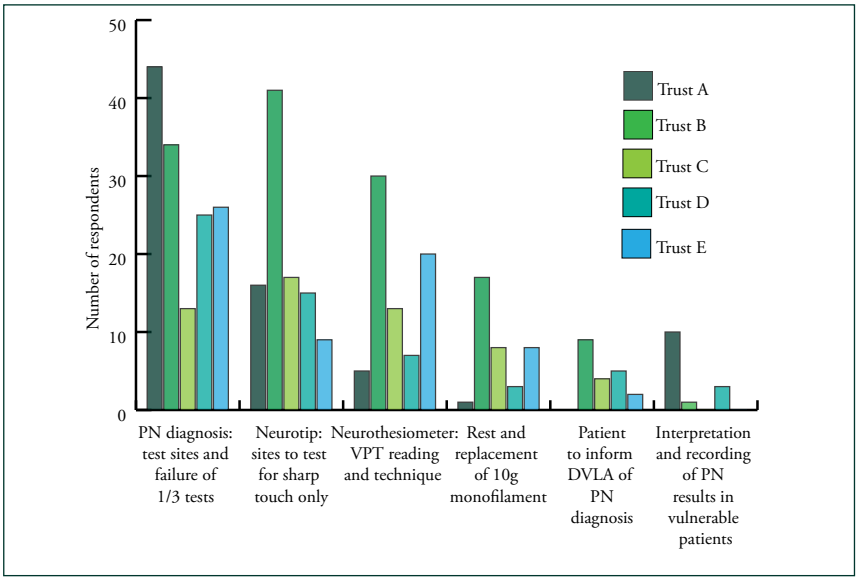

Figure 5. Areas of learning relating to neurological assessment identified by attendees. PN = peripheral neuropathy; VPT = vibration perception threshold.

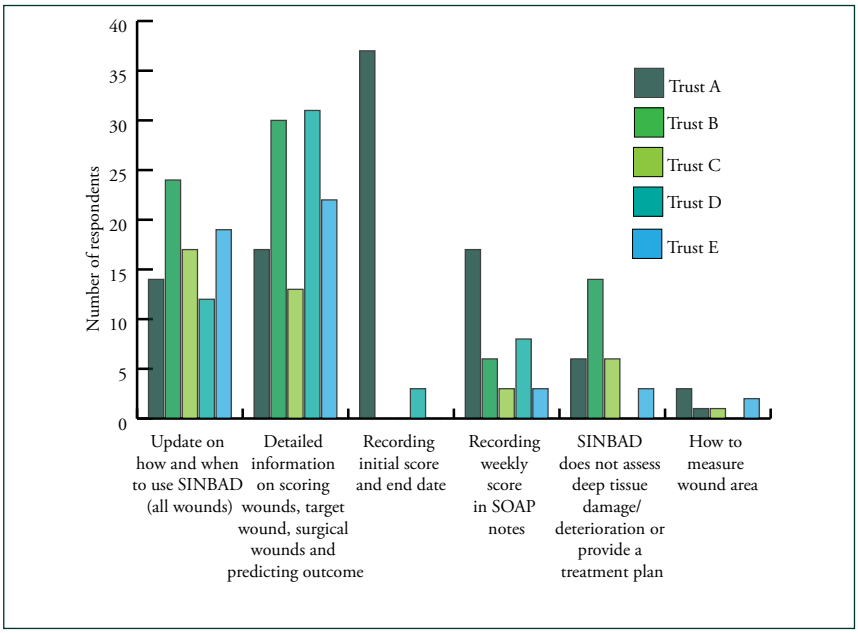

Figure 6. Areas of learning relating to the SINBAD classification system identified by attendees.

(21.2%; *n*=37).

- Limitations of the SINBAD system (does not assess deep tissue damage/ wound deterioration/ provide a treatment plan – 16.8%; *n*=29).
- Wound measurement (4%; *n*=7).

The criteria for a regional agreement on diagnosis of PAD and IC and on diagnosis of PN were highlighted as new learning by 50% (*n*=87) of respondents. The importance of the SINBAD classification system as a predictor of outcome was identified by 32% (*n*=55). There is further work to be carried out regionally on the risk assessment tool, and following this, there will be training for staff prior to implementation.

Engage, empower and listen to patients

The regional DFU audit and the regional training programme is supported by Diabetes UK and the Diabetes UK Champions Programme. This gives a patient voice and ensures that patients are involved in projects and in the dissemination of results. This work has helped address inequalities in care and will ultimately raise the standard of care within the region.

Grow and develop staff

Podiatrists from the task and finish sub-groups were given the opportunity to appraise the latest research evidence, apply results to clinical practice using the PDSA cycle. They gained confidence in evidence appraisal, their decision-making and were able to justify their rationale when questioned while disseminating information to the regional podiatry workforce.

Embrace transparency and openness

All Trusts were transparent in the challenges they faced in service delivery and worked together to seize the opportunity to enhance the quality of care across the region. Results from the regional DFU audit were presented and published locally and nationally. Results were also provided to all stakeholders involved in the commissioning process and to the Department of Health.

Discussion

The need to standardise clinical assessment and DFU management in order to address inequalities of care in Northern Ireland is recognised. To achieve this, a regional training programme was developed using the Berwick Principles and the PDSA cycle. The key aim of the programme was to standardise the assessment and diagnosis of PAD and PN and embed the SINBAD diabetic foot classification system into podiatry practice. Risk assignment was also considered.

In total, 227 podiatrists attended the regional training programme. Questionnaire response

rates were high and the training was well received. Historically, evidence-based diabetic foot assessment has been part of clinical practice for almost 20 years through the development and implementation of the CREST guidelines in 1998. These include the use of ABPIs as a diagnostic tool for PAD. This may explain why 99.1% (*n*=191) of respondents listed pulses, Doppler sounds and ABPI results as important in their vascular assessment (*Figure 1*). However, 70.5% (*n*=122) stated they had learnt new information around the importance of Doppler sounds, particularly monophasic sounds. A revision of ABPI technique had some new learning for 83.3% (*n*=144) of respondents, and this was important new information for 20% (*n*=35). Clinical signs and symptoms of peripheral arterial disease were described as important by 72.7% (*n*=126) of respondents, as expected.

The presence of claudication or rest pain was listed by 16.7% (*n*=32) of attendees as important in a vascular assessment. However, the use of the Edinburgh Claudication Questionnaire as a diagnostic tool and the influence of peripheral neuropathy on PAD were both highlighted as new learning by a third of attendees.

The importance of neurological assessment of the diabetic foot centres on the correct use of diagnostic tools and interpretation of results. As expected, clinicians listed vibration perception thresholds, diagnosis of painful neuropathy and standardisation of the use of the 10g

monofilament and the Neurotip as important.

New learning on the use of the Neurotip and neurothesiometer was important for 56.6% (*n*=98) and 43.4% (*n*=75) respectively. The interpretation of results was a key learning area for most attendees, specifically around the assessment of vulnerable patients.

The regional DFU audit (2016) showed that implementation of a DFU classification system was necessary. Clinicians in Trust A who had undergone preliminary training were all aware of the SINBAD classification system and 65% (47 perople working in Trust A) currently used it in practice. In contrast, staff in the other Trusts had yet to receive this training, although some of them were using SINBAD. A number of areas of new learning were identified by attendees; these included the appropriate use of SINBAD, scoring wounds, wound measurement, record keeping and the limitations of SINBAD. Further local teaching and review of the implementation process is planned and will be re-audited in due course.

It was evident that variation in risk tool development and implementation existed across Trusts. Work is ongoing to achieve a regional risk tool that can standardise and assign risk to people with diabetes.

Conclusion

This training programme has placed safety and the delivery of high-quality care at the top of the agenda. Successful collaboration between podiatry services has facilitated open and transparent patient care and helped to address the challenges associated with it. Importantly, we have engaged, inspired and supported the regional podiatry workforce to deliver improved outcomes and experience for our service users. ■

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