An investigation into why expert assessment of new diabetic foot ulcers is delayed

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Key words

- Delayed assessment
- Diabetic foot ulcers
- Mental and physical health

Article points

1. Outcomes of diabetic foot ulceration are better if there is early expert assessment, but delays are common.
2. It is widely accepted that delay in referral to multidisciplinary foot care services can ultimately delay healing times, often it is perceived this is due to other healthcare professionals.
3. This retrospective case record review suggests that patient comorbidities and behaviours are also very important influences on delay.

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NICE guidance recommends prompt expert assessment of new diabetic foot ulcer (DFUs). Data taken from the National Diabetes Foot care Audit (NDFA) have shown that timely referral of less than 14 days improves outcomes for patients while delayed referral >2 months leads to worse outcomes for patients, such as greater risk of amputation and reduced life expectancy. Aim: The aim of this study was to investigate the potential reasons for delayed expert assessment of new DFUs. Methods: The records were reviewed of patients with new DFUs who had taken more than 2 weeks to reach expert assessment and compared with those from a similar number who had been assessed within 2 weeks. Factors related to referral systems, comorbidities and personal characteristics that may have influenced time to expert assessment were abstracted and compared between the groups. Subsequently, to increase numbers, delayed presenters were identified among NDFA patients for a later cohort. The data from the two groups of late attenders have been combined and reported together. Results: The personal characteristics of the groups were similar except that there were more smokers in the delayed group (21% vs 6%). Mental health issues were more prevalent and severe among the delayed group. SINBAD is an ulcer classification tool where ≥ 3 is a complex DFU, ≤ 2 is a non-complex DFU. Those with a SINBAD score of above 4 were only found in late presenters. Patients aware of a new ulcer and failed to seek help or who were unaware of new ulceration until it was identified by a clinician were common in the delayed group and mental health issues were more frequent among them. Delays by referring services contributed to a smaller proportion of the delays in receiving expert assessment. Conclusions: Reducing the delays between ulcer onset and expert assessment will require attention to comorbidities and human behaviours, as well as referral pathways. Delayed expert assessment of DFU is associated with poorer outcomes.

The National Diabetes Foot care Audit (NDFA) is part of the National Diabetes Audit Programme. The first report in March 2016 covered eligible people with a new incidence of diabetic foot ulceration. The NDFA reported as part of their findings that patients who present for expert assessment 14 days or later after first contact with a healthcare professional had worse outcomes such as delayed healing, amputation or death (NDFA, 2018). In Salford, an integrated foot protection and multidisciplinary foot care service operates allowing easy access to specialist foot care in both community and hospital locations. Structurally, the model is designed to minimise barriers to access for patients with DFU and it is not known why some patients are delayed in their presentation.

Therefore, a retrospective records review was undertaken to identify possible patient related and non-patient related (e.g. referral system) reasons for delay.

Methods

Between July 14, 2014 and December 31, 2019 there were 52 late DFU presenters among the Salford NDFA cohort; their case-records were audited to identify possible reasons for delay. The auditing process included:

1. Hand-written podiatry notes — comprising subjective data from the patient, structured ulcer records and objective data from the podiatrist, including treatments and action plans.
2. The trust electronic patient records (EPR) — which include all inpatient and outpatient notes, letters, results and linked GP data. Comorbidities were identified from coded health issues formally recorded on EPR.
3. Patient Centre — an electronic administrative record of appointment dates and attendance, non-attendance and cancellation history in community and hospital podiatry clinics.
4. Referral forms to identify how patients came to podiatry either through self-presentation or via an external referral.

All electronic records and all but one set of written notes were retrieved. The extracted data was categorised into comorbidities (physical and mental health), referral related and behaviour related contributions to late presentation. Similar data was extracted for a comparator group of the NDFA cohorts who presented within 14 days and are termed as early presenters in the text.

Table 1. Demographics of early and late presenters.

Characteristic	Late presenters >=14 days	<14 days
Male %	77%	78%
Type 2 diabetes %	88%	84%
Age mean (range)	65years	68.8 (36-91)
White British	92%	97%
Smoker	21%	6%
Ex-Smoker	25%	19%
Neuropathy	63%	81%

Table 2. SINBAD ulcer classification score.

Category	Definition	Score
Site	Forefoot	0
	Midfoot and hindfoot	1
Ischaemia	Pedal pulse palpable	0
	Clinical evidence of reduced pedal blood flow	1
Bacterial Infection	None	0
	Present	1
Area	< 1 cm^2	0
	>/= 1 cm^2	1
Depth	Ulcer confined to skin and subcutaneous tissue	0
	Ulcer reaching muscle, tendon or bone	1

Results

The characteristics of the people in the two cohorts are shown in *Table 1*. Late presenters were: slightly younger and slightly more ethnically diverse; and they were appreciably less likely to have sensory loss and more likely to be current or ex-smokers.

Under the SINBAD classification system (*Table 2*), a score of 3 or more is considered a severe or complex ulcer and a score of 2 or below is considered a less severe or non-complex ulcer (NDFA 2016). Therefore, 14/31 (45.1%) of early presenters and 19/47 (40.4%) of late presenters had a severe ulcer. SINBAD scores of 4 and 5 were found only in late presenters (*Figure 1*).

A thematic approach for data analysis was taken to review the comorbidities. Health issue coding was sought that might have a link to delayed presentation by using codes from the electronic records, these were categorised into mental health illness, alcohol or drug misuse and 'unwell adult'. Unwell adult is a term for frailty used in the electronic records where physical health is so diminished as to undermine cognitive function. Some 50% (26/52) of late presenters had recorded mental health or cognitive comorbidity, these are broken down into the following; mental health illness 23% (12/52), and 12% (6/52) were recorded as unwell adults (the EPR term for 'frailty'). Misuse of drugs or alcohol to was recorded in 15% (8/52) of late presenters. In contrast, the early presenters there was 23% (7/31) with mental health issue, 3% (1/31) unwell adult and 13% (4/31) with misuse of drugs or alcohol.

Behaviour-related factors

Some patients were recorded as having had no

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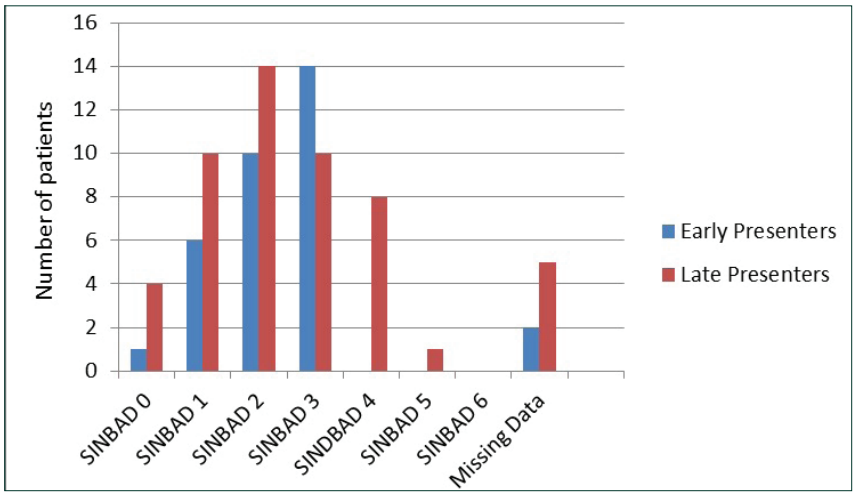

Figure 1: Breakdown of SINBAD scores from late presenters and early presenters.

recollection of events leading up to the discovery of the DFU, i.e. a healthcare professional discovered the DFU rather than the patient; 23% (12/52) of late presenters had not recognised their DFU. Further review of the records showed that in this category of late presenters 50% (6/12) had a comorbidity affecting their cognitive function or mental health issues (three mental health; two unwell adults; one alcohol misuse). In contrast, overall 39% (12/31) of early presenters had recorded mental health or cognitive comorbidity; mental health illness 23% (7/31), 3% (1/31) unwell adult and 13% (4/31) with misuse of drugs or alcohol.

Some patients were recorded as having suspected they had a DFU but nevertheless delayed seeking health professional advice. 22/52 of late presenters were in this category. Among these 12/22 (54%) had a recognised cognitive impairment or mental health comorbidity (five alcohol or drug misuse, four mental health issues, two unwell adults and one learning difficulties). No patients presenting before 14 days had identified a DFU but delayed presentation.

Referral-related risk factors

Through analysing referral sources it was possible to identify if patients had any other involvement with another healthcare professional before assessment by a podiatrist for their DFU or whether other services were involved before expert foot assessment of their DFU.

Sixty-three-percent (33/52) of late presenters had not accessed any other service prior to podiatry assessment. The other 37% (19/52) of late presenters had at least one other healthcare profession contact before assessment by podiatrist. Meaning that on discovery of their DFU (if aware) the patient had accessed another health professional before it had reached podiatry for assessment and completion of the NDFA. The other services were; nursing homes 2/19 (10%), Accident and Emergency 4/19 (21%), Nursing 10/19 (53%), GP 2/19 (11%) and post-surgical 1/19 (5%). In early presenters, 18/31 (58%) of DFU were seen first by a podiatrist, and 15/31 (48%) had involvement in another service before assessment by a podiatrist (GP 1/15 (7%), nursing 5/15, (33%) Accident and Emergency 6/15 (40%) and hospital wards 3/15 (20%).

Discussion

Prompt assessment by an expert team of patients with new diabetic foot ulcers has been recommended in guidelines for over 17 years and its association with better outcomes has been clear in both of the first two NDFA reports. Salford has an integrated community and hospital high-risk foot service that was designed to minimise delays in assessment and by comparison with other services fewer patients are delayed. This study has sought to identify factors that may be associated with higher risk of delay in such an environment. A comparator group was used with early presenters to see if they had similar trends. One limitation of the study was this group had much smaller cohort but this was due to time constraints.

These findings suggest that in about a third of late presentations a range of services to which the patient first presented with their DFU could have expedited podiatry assessment. However, in two thirds there had been no prior assessment and mental health diagnoses, alcohol/drug misuse and frailty were more common findings. Such problems are more common in areas such as Salford.

According to the national index of multiple deprivation (IMD) Salford ranks as 22nd out of 326 local authorities with a total of 70% living in areas classed as highly deprived or disadvantaged (UK Ministry of Housing, Communities and Local Government, 2019). The combination of mental and physical health issues is known to be associated with poorer health outcomes severe mental illness, such as schizophrenia and

bipolar disorder, is more common in people with diabetes. Dementia is more common in people with type 2 diabetes, it has been reported that up to 70% of patients with dementia and type 2 diabetes have foot disease (Biessels et al, 2006). Sinbad scores of 4 and 5 were only found in late presenters (Annamalai et al, 2013). The number of late presenters involved in another service before expert assessment implies more awareness is needed of the risks associated with delayed assessment of DFU. Reducing the number of healthcare professionals in the referral trajectory has been shown to improve DFU resolution rates (Sanders et al, 2013).

Conclusion

It seems likely that reducing the delays between ulcer onset and expert assessment will require attention to comorbidities and human behaviours, as well as referral pathways, it seems there is a greater issue than delayed referral from other healthcare professionals or patients on its own, there is potential hidden health issues that are having an impact. The findings of this study suggest that developing pathways which offset the risk of delay in people with both diabetes and mental health illness may be beneficial. Studies to better understand the links between DFUs, mental health, coping strategies and behavioural models are warranted. Delayed expert assessment of DFU is associated with poorer outcomes. A case record review was undertaken of patients from Salford included in the NDFA to identify factors that may influence delayed presentation of people with new DFU for expert assessment. The finding suggests that a delay in accessing MDFS may have a role, the link to mental health and related behavioural issues may also be an important factor in the delay. ■

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