

RESEARCH

Challenges faced by people with diabetes-related foot ulcers in attending hospital-based high risk foot services: results of a consumer survey

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Abstract

Introduction Diabetes-related foot ulcers (DFU) are optimally managed with a team approach to addressing infection, ischaemia, pressure offloading and sharp debridement. Treatment frequency is commonly every 1–2 weeks.

Aim To investigate the actual and preferred frequency of treatment of patients, and potential factors affecting treatment attendance including perceived benefits, mobility and mode of transport.

Method A convenience sample of patients attending urban or regional high risk foot services (HRFS) for treatment were invited to participate in the survey via a QR code, on paper or via phone. The study had ethics approval No X20-0550 2020/ETH03244.

Results A total of 60 participants from three centres completed the survey. Eight (13%) attended weekly, 28 (47%) every 2 weeks, and the remainder (40%) less often; 51 (85%) indicated they would attend weekly if this hastened healing; 33 (45%) had some level of difficulty in mobility impacting their ability to attend, with 11(18%) requiring a carer or family support for them to attend; most (84%) participants drove or were driven.

Conclusions Physical mobility deficits impact patients' ability to attend for treatment, with the majority relying on private transport to attend appointments. Family support to enable attendance was common. These factors should be considered by providers and commissioners of services.

Keywords access, chronic wound, diabetes-related foot ulcer, high risk foot service, podiatry

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Introduction

Interdisciplinary high risk foot services (HRFS), which include podiatry, vascular and endocrinology interventions, are known to improve outcomes for people experiencing diabetes-related foot complications^{1,2}. The aim of these coordinated

interdisciplinary teams is to provide rapid access to optimal care to help avoid unnecessary hospital admissions and amputations³⁻⁷. Key tenets of care provided within the HRFS include management of infection, local wound care including sharp debridement, assessment and management

of peripheral arterial disease, pressure offloading of the wound, patient education and management of their chronic disease⁸. Standards for care and clinical guidelines are outlined in state, national and international documents which emphasise the need for the model of care to include rapid access and on-site teams^{3,4,8,9}. Interdisciplinary teams are advantageous due to the emphasis on coordination and communication which may minimise the number of visits to health facilities by bringing together clinicians from different disciplines for joint consultation.

In a health environment which is seeking to deliver more care outside the hospital facilities and through telehealth, particularly in the COVID-19 era¹⁰, the need for patients to attend face-to-face appointments to receive sharp debridement and detailed wound assessment remains necessary. From the clinicians' perspective, the recommended frequency of sharp debridement is a key determinant of how often patients with diabetes-related foot ulcers (DFU) attend a HRFS for care, with visit and debridement frequency being virtually synonymous¹¹. Sharp debridement is standard care in the management of DFU, typically undertaken serially to facilitate healing¹²⁻¹⁵, with weekly or second-weekly intervals representing the usual frequency when there is adequate blood flow for healing^{11,16}. The procedure is routinely performed in the outpatient setting of the HRFS which can satisfy the requirements for infection control as well as the safety and comfort of both patient and clinician. While there is a lack of data on patients' reasons for attending or non-attendance to HRFS, a systematic review on reasons why people with diabetes could not attend diabetes education programs identified lack of transport, distance and parking, duration of appointment and other commitments, along with physical disabilities and financial reasons, as barriers to attendance. Patients' perception of the benefits of the consultation also influenced their decision of whether or not to attend¹⁷.

Given the high rate of co-morbidities, depressive symptoms and poor physical functioning in people with DFU¹⁸⁻²¹, the capacity of some patients to physically attend a hospital service may be a limiting factor and have a negative impact on the quality of life for some²². Patients' preferences regarding treatment frequency, the perceived benefits, impact of mobility and how they travel to appointments are potentially meaningful areas to investigate.

The aims of the study were to: a) investigate the actual and the preferred frequency of attendance for treatment, including sharp debridement, for patients with DFU; b) understand what patients with DFU value about their clinic attendance at the HRFS; c) determine the extent to which patient-reported mobility may affect attendance; d) document the mode of transport used, duration of time spent on their clinic visit, and any out-of-pocket costs related to attendance.

Methods

A survey was developed *de novo* by the investigators and

tested by two consumers whose input was incorporated. The study was approved by the Human Research and Ethics Committee of the lead site, with local site-specific governance approval at each of the three participating services. A patient information sheet was provided to all potential participants. Consent was enacted when the participant agreed to answer the survey questions. The three sites included two hospitals based in a capital city and one regional city hospital. Their models of care were consistent with the state-wide standards for HRFS³. All services were located within a hospital, non-admitted patient setting coordinated by a senior podiatrist and with interdisciplinary team consultations with relevant disciplines.

The estimated clinic population was n=150 patients, of which 60 participants was considered as a reasonable sample of eligible clinic patients. A convenience sample was used, with clinicians being requested to recruit to a target n=20 participants for each site. Inclusion criteria were people with DFU of minimum 4 weeks duration, attending one of three HRFS for wound management. Potential participants were given an information sheet with a QR code linked to the online survey. Participants could alternatively complete a paper version, have the treating clinician document their responses, or request that the investigator phone them to complete the survey by phone. This choice was provided to improve the uptake of the survey and eliminate the potential barriers of poor literacy, use of technology or a preference not to provide responses to their treating clinician. All responses were entered into a password protected electronic database, Research Electronic Data Capture (REDCap)²³, which was generated for the study and open to the site investigators.

Survey questions were predominantly multiple choice, with the exception of home suburb, distance walked and time taken to attend location of care, and cost of parking. One multiple choice question, "How important do you believe these are to you?", asked participants to rate the perceived importance using a 3-point Likert-style scale from 'not important' to 'very important' (and including 'not applicable') for the following: debriding with a scalpel (cleaning) of my foot ulcer to remove dead skin, slough etc; changing the dressing on my foot ulcer; offloading (special shoe, boot, cast or padding to protect my foot); getting a doctor to treat my infection; getting a doctor to treat my diabetes; getting a diabetes nurse educator to help manage my diabetes; learning about my feet and how to care for them. Open-ended questions asked why (if applicable) participants preferred to attend the HRFS more or less often, and lastly a question asked participants to write about the benefits and challenges of attending for treatment of a foot ulcer. The questions regarding whether participants would wish to attend more frequently if this meant their ulcer might heal faster was posed as follows:

About half (50%) of foot ulcers heal within 3 months. Whether a foot ulcer heals and how long it takes, depends on a number of factors. These can include how severe the

ulcer is and how long it has been present, circulation and treatment effectiveness. If attending the foot clinic every week meant that you were likely to heal 15% faster, would you attend more often?

The multiple-choice answers were: yes, no and “I already attend every week (or more often)”.

Results

Participant demographic data

During a 10-week period (July to October 2021) clinicians approached patients to participate in the survey. Since this was during the COVID-19 pandemic, the participating HRFS followed state and national guidance with regards to hospital appointments (ref DFA). All face-to-face consultations were maintained for all initial and most follow-up consultations, with follow-up consultations replaced with telehealth where clinically indicated and deemed safe²⁴. A total of 60 participants completed the survey from a possible 462 people who attended the services during the data collection period. Demographics for participants is given in Table 1. All participants were between 40 and 65 years of age and only eight (13%) were employed.

Frequency of attendance: actual and preferred

Frequency of attendance was every second week for almost half the participants (n=28). Table 2 indicates the frequency of attendance reported by respondents and their preference for how frequently they preferred to attend. A total of 12 of the 15 reporting 4-weekly attendance were from the regional city HRFS. When asked whether they would prefer to attend weekly if this were to hasten healing time by 15%, 51 (85%) indicated they would attend more often.

What patients valued about their consultation

Table 3 summarises the findings of the value to participants of attending the HRFS. Receipt of sharp debridement, dressing changes, pressure offloading and the education they received on foot self-care were the most highly rated. Not all participants were aware of or valued diabetes management as part of the service. It should be noted that five people who did not have diabetes completed the survey.

How participants perceived the impact of health and mobility on ability to attend the clinic

Around half of the participants (n=33/60) reported being “well and mobile enough to attend without difficulty”; 11 (18%) reported that they required the assistance of a family member or carer to attend the appointments (Figure 1).

How participants travelled to the clinic

Eight (13%) participants travelled by public transport to the HRFS and reported walking an average 462 metres; seven (12%) travelled by ride-share or taxi, walking an average of 218 metres; 21 (35%) drove themselves by car, walking an average of 308 metres; 19 (32%) were driven by a family member, walking an average of 276 metres; and one walked

2km from their home to the service. Five participants used a wheelchair or scooter instead of walking from their main mode of transport into the clinic. One participant used Commonwealth Aged Care funded transport and one used their National Disability Insurance-funded support worker (Figure 2).

The median time participants spent on their overall visit (travel and treatment time) was 2 hours; this was the same for all centres. Those attending the large capital city centres lived predominantly within a 10km radius of the hospital, with three (8%) travelling greater than 30km. The median distance from the participants’ home to the regional city hospital was 19km and six (30%) travelled over 30km. In addition, a total

Table 1. Survey participant demographics

Variable	Participants n (%)
Age (%)	
Over 40 and less than 65 years	25 (42%)
Over 65 and under 85 years	32 (53%)
Missing data	3 (5%)
Gender (%)	
Male	42 (70%)
Female	18 (30%)
Diabetes type (%)	
Type 1	6 (10%)
Type 2	47 (78%)
Don't know or other	2 (3%)
Nil diabetes	5 (8%)
Diabetes duration (%)	
Less than 5 years	10 (17%)
5 or more (less than 10) years	6 (10%)
10 or more (less than 20) years	15 (25%)
20 years or more	24 (40%)
Employment status (%)	
Employed full-time	3 (5%)
Part-time or casual employment	5 (8%)
Unemployed	3 (5%)
In receipt of disability pension	15 (25%)
Retired	32 (53%)
Missing data or declined to answer	2 (3%)
Marital status (%)	
Married	35 (58%)
Unmarried	25 (42%)
Carer status (%)	
No carer responsibilities	52 (87%)
Caring for a family member (not a child)	4 (7%)
Caring for a dependent child	4 (7%)

of 13 participants (22%) were aware of the parking fees they had paid, with an average spend of \$13 per visit. Additional comments from participants are shown in Figure 3.

Discussion

This consumer survey found that most participants rated debridement, dressing changes, pressure offloading, management of infection, and learning about caring for

their feet as very important. Management of diabetes was somewhat or very important for 82% of those with diabetes. Second-weekly attendance for treatment was most common, and weekly or second-weekly visits were preferred, which is consistent with other reports^{11,16}. There was an indication that some participants attending less often would attend weekly if this would hasten healing by as little as 15%, suggesting this is a meaningful difference for at least some participants. However, as this question was potentially leading, the result is not conclusive.

One quarter of the participants attended every 4 weeks or less often, which may not represent standard care¹⁴. It is not known to what extent treatment every 4 weeks is based on clinician recommendation, time constraints of the service (appointments unavailable), or due to patient factors but a similar number of participants also reported 4-weekly care as their preference. In previous qualitative research, reliance on family for travel to appointments, the indirect treatment costs which include travel and parking, as well as the challenges of maintaining employment with frequent visits, have been described as having negative effects on the quality of life for people with DFU²⁵⁻²⁷.

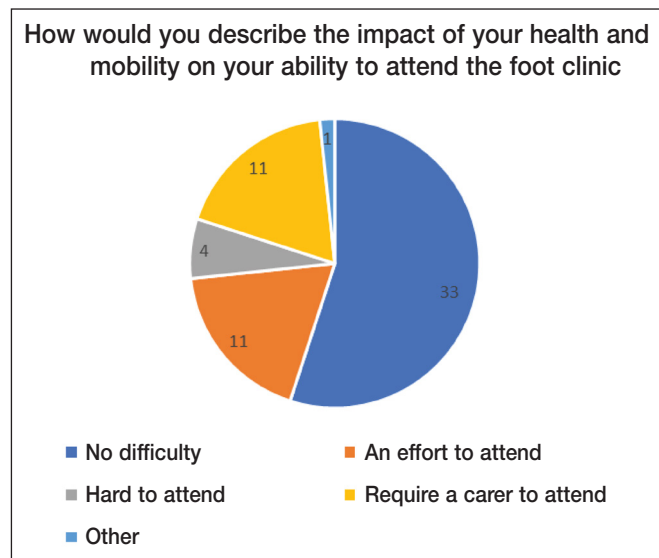


Figure 1. Participant-reported impact of health and mobility on clinic attendance

Table 2. Patient-reported visit frequency and preferred frequency

	Patient-reported visit frequency	Patient preference for visit frequency
More often than weekly	0	1
Weekly	8	18
Every 2 weeks	28	17
Every 3 weeks	9	5
Every 4 weeks (or less)	15	14
Don't know / no preference	–	5

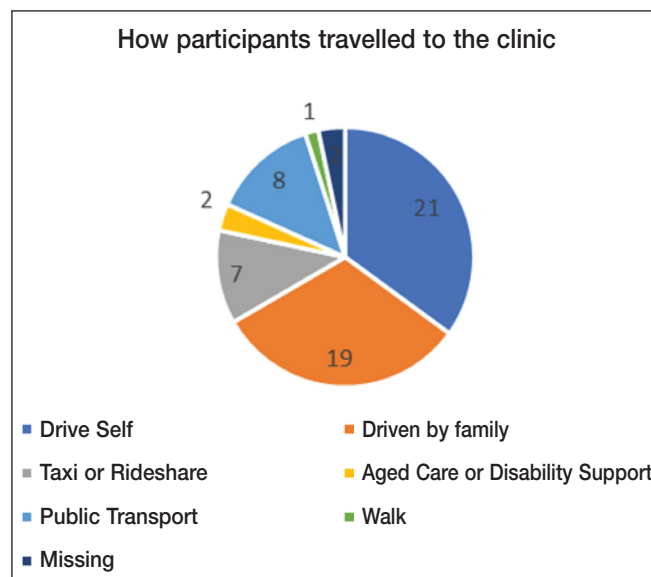


Figure 2. How participants travelled to their clinic appointments

Table 3. Participant responses to how they rated the importance of different aspects of care within the HRFS

Aspect of care	Very important	Somewhat important	Not important	Not available	Missing data
Debriding with a scalpel	53	3	1	–	3
Changing the dressing	53	3	1	–	3
Offloading	53	3	1	–	3
Getting a doctor to treat my infection	47	6	1	3	3
Getting a doctor to treat my diabetes	37	8	2	9	4
Getting a diabetes nurse educator to help manage my diabetes	30	15	3	10	2
Learning about my feet and how to care for them	52	4	0	1	3

While there is observation data and indirect evidence that more frequent debridement is beneficial in the management of DFU^{16,27-30}, the one prospective study of sharp debridement, which controlled for visit frequency (weekly), found weekly and second-weekly sharp debridement to have similar outcomes at 12 weeks²⁸. There was also a high drop-out rate, suggesting that the regimen of weekly visits was not acceptable or feasible for all participants. In practice, some wounds are likely to require more aggressive debridement than others due to the presence of infection, callus or more non-viable tissue^{11,13}. The patient's capacity and desire to attend as well as clinic resources will also impact frequency of attendance¹¹.

A key finding of the current survey was the high number of participants who relied on a private vehicle (car) to attend the HRFS, with few using other means such as public transport. Private car was the main modality used by 84% (n=50) of respondents, and 100% of those attending the regional city hospital. Furthermore, the driving responsibility was conferred to family members of 33% of respondents.

Loss of lower extremity function for people with DFU and the restriction to mobility as recommended treatment are known issues for those experiencing foot complications²⁰⁻²². Almost half of the participants in our survey reported having physical limitation affecting attendance, and travelling by car was associated with less walking, particularly if someone else drove them to the appointment. Only two respondents indicated they used age and disability supports to travel to the clinic. Reliance on social supports for transport was also identified as a key theme in small qualitative study by Palaya et al (2018)²⁷. Our survey data further highlights the needs of this patient group with respect to transport support. This should be further explored to determine why participants, many of whom would be eligible for this assistance, were not using these supports.

In terms of access, these results suggest that not having the use of a car is a limitation for those needing HRFS

- Treatment is always changing so new learning for me all the time.
- ...great podiatrists and they really know their job.
- It's just mobility is the problem. Knee and lower back pain.
- I also use a disability scooter. It's an outing for me and the podiatrists are so kind and so good. It's a pleasure for me to come in.
- The treatment I get here is very specialised and you do not get it in any other department.
- Thank you for the disability parking.
- I can't use community transport because I travel from outside your District and there is too much walking to use public transport.

Figure 3. Comments from participants

care. In our survey, a quarter of study participants were in receipt of a disability pension and only three reported being in full-time employment. Both the cost of running a car (not reported) and parking costs are potential barriers to those on low incomes who would already be burdened with costs of treatment²⁹. While there can be many influencing factors determining ease of access to services and how often, research on geographical access to healthcare services shows that distance and transport availability are important determinants of healthcare utilisation, with people in disadvantaged groups likely to rely on public transport^{30,31}. The geographical distribution of current HRFS means that many patients are not within close proximity^{32,33}. Where clinics exist, consideration as to distance from car parking and extending clinic hours to accommodate patients who rely on working family members to drive them to appointments may warrant consideration.

International data show that timely presentation to specialised services is associated with better outcomes for people with DFU³⁴. However, Australian data suggests a significant proportion of patients with DFU admitted to hospital have not accessed specialised a HRFS prior to being admitted. Manewell et al³⁵ reported that 43% of patients admitted for DFU were not known to have attended the HRFS, and Plusch et al³⁶ found 75% of people admitted for diabetes foot infection had not accessed the HRFS. These represent missed opportunities to avoid admissions and amputations. It is not known whether physical access or transport were barriers in these instances but understanding and mitigating any impediments to access are likely to improve healing outcomes.

These survey results highlight a potential problem with physical accessibility to services and raises the question as to how accessible the services are for people with chronic illness and poor mobility who are without family, aged care or disability supports to enable attendance.

Limitations of this study is the use of non-random sampling and the higher-than-expected patient clinic numbers which meant the sample size was proportionally small. Both factors limit the generalisability of the results. There is an inherent bias towards those participants who were able to attend the HRFS. Patients with DFU who did not attend or who rarely attended were not captured in the survey. Some bias toward valuing different aspects of care is also likely. While the participants' identifying information was not included in the responses, the majority chose to complete the survey via the phone or during their treatment visit with the clinicians, hence they were not fully anonymous. The option to complete electronically via a QR code link to the survey would have provided anonymity but was not preferred by participants, and only one participant elected to complete the survey this way. Provision of phone or treatment visit options for completing the survey enabled participation for those with impaired vision, reduced cognition, low literacy and anyone without the access or capacity to use a smart phone or

computer. However, we acknowledge that participants would have been disinclined to respond in a way which was negative towards the service while in the presence of their treating clinician. Results of the question “How important do you believe these are to you?” should be interpreted with respect to the likelihood of bias.

Other variables were also not explored in this study such as unavailability of appointments, time constraints for people working or with caring responsibilities, cultural safety of the HRFS for the culturally diverse patients who attend the clinics, or preferences towards particular provider(s). Moreover, while the survey was used across three HRFS sites in the current research, it has not been validated or tested with regard to reproducibility.

Lastly, our study enrolment included five respondents (across the sites), who were being treated for chronic foot ulcers related to neurological or vascular complications but who did not have diabetes. The data from these participants were retained in the study as their non-diabetes foot care requirements were closely aligned to those of people with DFU, hence their admission under the care of the HRFS for interdisciplinary management, including debridement by a podiatrist.

Conclusions

Attending specialised interdisciplinary teams for non-admitted care of foot ulcers has been shown to help reduce the risk of hospitalisation and to improve clinical outcomes; however, in this survey, a high proportion of participants had challenges in mobility impacting their capacity to attend and used travel by private vehicle to attend, with a significant number being reliant on others to drive them. While telehealth in DFU care is becoming more commonplace post the COVID era, some aspects of care such as sharp debridement need in-person HRFS specialist care. Further research to understand the reasons for non-attendance (or infrequent attendance), potential solutions and the impact on admissions and healing outcomes is needed.

A recommendation from these data is that HRFS providers aim to mitigate potential barriers to access for new and existing clients and seek to draw on supports which may be available to patients to help attendance. Government commissioners of HRFS should consider the clients for whom they are targeted. Distance required for patients to travel to services, proximity of parking, availability of drop-off bays, public transport access and opening hours should be considered, with the aim of maximising the reach and utilisation of services which can minimise hospitalisation and amputations.

Conflict of interest

The authors declare no conflicts of interest.

Ethics statement

The study was approved by the Royal Prince Alfred Hospital Research Ethics Committee (2020/ETH03244) with local site

governance approval from Royal Prince Alfred, Concord and John Hunter Hospitals.

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Author contribution

VN designed the study, prepared the ethics submission, collected data, analysed data, wrote the paper, consulted with other authors for their review and input into the final submission, prepared the submission and is responsible for the integrity of the work. JZ was consulted and agreed to the design of the study, was responsible for conduct of the study at John Hunter Hospital, contributed substantially to the acquisition of the data, reviewed and approved the final version of the work, and shares responsibility for the integrity of the work. GF was consulted and agreed to the design of the study, was responsible for conduct of the study at Royal Prince Alfred and Concord Hospitals, collected data, reviewed the paper and shares responsibility for the integrity of the work. SM, MC and PR collected data, reviewed the submission, approved the final submission and share responsibility of the integrity of the work. ST and JA provided academic oversight as academic supervisors of VN (PhD candidate) and had input into the research design, JA is the coordinator PI on the ethics submission, ST and JA contributed to the critical review of the manuscript, approved the final submission and share responsibility for integrity of the work.

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