

Personal perceptions of the impact of diabetic foot disease on employment

Nicola Waters, Samantha Holloway

The presence of diabetic foot disease often requires extensive adaptations of employment practices and, in many cases, reduces or ends the working lives of those affected. This study explores peoples' perceptions of the impact of diabetic foot disease on their working life, and analyses trends in identified work-related issues. An awareness of the employment experiences of working-aged people with diabetic foot disease should inform future initiatives in the education and support of this vulnerable population.

With the rapid increase in prevalence of diabetes among working-age adults (Von Korff et al, 2005), the number of people with diabetic foot disease in the workforce can likewise be expected to rise.

People with diabetic foot disease are often labelled by healthcare professionals as "non-compliant" with treatment protocols, and reports of poor self-care practices and "risk-taking" behaviours are commonplace (Kinmond et al, 2003). Anecdotal evidence suggests that these issues are particularly prominent in those who are currently working. The present study evolved from a desire to identify work-related issues specific to the population with diabetic foot disease currently in employment, to provide a better understanding of how employment-related concerns may be addressed.

To date, measurement of the impact of disease in general on employment has generally

been driven by employers' need to account for health-related absences in monetary terms, and the impact of diabetes on employment has largely been described in terms of productivity-loss statistics (Mattke et al, 2007).

Diabetic complications, particularly when associated with reduced mobility, are consistently identified as affecting participation in the workforce, absenteeism and work performance, although specific conditions are rarely defined (Mayfield et al, 1999; Kraut et al, 2001; Ng et al, 2001; Lavigne et al, 2003; Tunceli et al, 2005; Von Korff et al, 2005). The quantitative nature of most research into this phenomenon means that very little is known about the psychosocial impact of the findings and few, if any, recommendations are offered for healthcare professionals or people with diabetic foot disease.

Evaluation of work-related issues, from the point of view of those with the condition, is

Article points

1. The working lives of men with diabetic foot disease, especially those whose jobs required prolonged periods of walking or standing, were more often negatively impacted than those of women with the same condition.
2. Mobility restrictions and pain were the most common factors in whether or not respondents were currently working, and were the greatest causes of work impairment for those in employment.
3. Respondents described treatment protocols, especially off-loading, as impeding their work life.
4. Those currently working had their ulcers longer, experienced more wound-related issues and visited the diabetic foot clinic less frequently than those who were not working.

Key words

- Diabetic foot disease
- Employment
- Patient perception

Author details can be found on the last page of this article.

Page points

1. The authors of the present study aimed to assess peoples' perceptions of the impact of diabetic foot disease on their working life.
2. A self-report survey, which respondents completed during scheduled diabetic foot clinic visits, was determined to be the most appropriate means of data collection.
3. People were included in the study if they were receiving either preventative care, treatment for active diabetic foot disease, or protection of a healed ulcer at the diabetic foot clinic at which the research was conducted.

key to informing healthcare professionals and employers about the kind of support that people with diabetic foot disease need to enable them to remain in the workforce (Kraut et al, 2001).

Several qualitative studies that explored quality-of-life issues among people with diabetic foot disease addressed aspects of the impact on their working life (Brod, 1998; Hjelm et al, 2002; Kinmond et al, 2003; Ribu and Wahl, 2004; Fox, 2005). However, research that focuses directly on the work-related experience of people with diabetic foot disease remains limited. In an effort to redress this paucity of data in the literature, the authors of the present study aimed to assess peoples' perceptions of the impact of diabetic foot disease on their working life. Beyond this, the authors looked to identify those people with diabetic foot disease most at risk of experiencing a negative impact on their working lives and to analyse trends in work-related issues in this population.

Methods

Based on feedback from an initial fact-finding stage, a self-report survey was determined to be the most appropriate means of data collection (Oppenheim, 2006). Respondents completed the survey during scheduled diabetic foot clinic visits, thus avoiding additional time lost from work.

Questionnaire content was based on pertinent themes identified from semi-structured interviews with key opinion leaders, previous studies of the impact of ill-health on employment (Mayfield et al, 1999; Kraut et al, 2001; Ng et al, 2001; Lavigne et al, 2003; Tunceli et al, 2005; Von Korff et al, 2005) and areas of health-related quality of life deemed likely to impact the working lives of people with diabetic foot disease (Brod, 1998; Kinmond et al, 2003; Ribu and Wahl, 2004; Fox, 2005).

Content validity was increased through the adaptation of applicable questions from pre-existing tools and previous studies (Vileikyte et al, 2003; Price and Harding, 2004; Goodridge et al, 2005). Embedding open-ended questions

in a primarily quantitative survey allowed the phenomenon under investigation to be explored at two levels. This also aided in the cross-validation and substantiation of the findings (Creswell, 2003). Purposeful sampling was used, based on the premise that the individuals had experienced the central phenomenon to be explored (Creswell, 2003). Revisions were made to the questionnaire following a pilot study before the version used was arrived at and distributed (Waters, 2008).

Criteria for participation

People were included in the study if they met each of the following criteria:

- 18–65 years of age, regardless of whether they were employed or unemployed.
 - Diagnosed with type 1 or type 2 diabetes.
 - Were receiving either preventative care, treatment for an active diabetic foot ulcer, or protection of a healed ulcer at the diabetic foot clinic at which the research was conducted.
 - Able to comprehend and complete the questionnaire (translation and transcribing were available for those who were unable to complete the questionnaire due to a language barrier or physical impairment).
- People were excluded from the study if they:
- Were <18 or >65 years of age.
 - Were at no current risk of experiencing diabetic foot ulceration.
 - Were unable to attend the diabetic foot clinic during the study period.
 - Had a severe cognitive impairment.

Statistical analysis

Descriptive statistics were used to summarise quantitative responses. Non-parametric tests of association between demographic variables and likelihood of working were undertaken. Data transformation of the qualitative responses was achieved using a thematic coding system (Pope et al, 2000; Creswell, 2003).

Ethical considerations

The study was presented to the applicable ethics board and received approval. Respondents' expectations and concerns

were addressed in a cover letter. Participation in the study was voluntary. Return of the questionnaire was considered to imply consent (Polit and Hungler, 1991).

Results

Participant characteristics

The characteristics of those who returned the questionnaire are summarised in *Table 1*. A total of 66 people returned the questionnaire, although not all of the respondents answered all of the questions. Values in the text are reported as percentages with the absolute number of respondents for that line of inquiry alongside for clarity.

Gender and age distribution were skewed markedly within the study group: 78.8% (52/66) of respondents were male and only 10.6% (7/66) were under 40 years of age. The mean age of respondents was 52.2 years. More than half (56.1%, 37/66) considered themselves to be the primary wage earner in their household, whether or not they were currently working. Almost one-quarter (24.6%, 15/61) of respondents reported that a household member had taken time off from paid work to accompany them to an appointment related to their diabetic foot disease.

Diabetic foot disease

Data on the nature of the diabetic foot disease among the respondents are summarised in *Table 2*. The majority of respondents (89.4%, 59/66) were currently being treated for an active foot ulcer, while 10.6% (7/66) were attending for maintenance and prevention. Almost one-third (31.8%, 21/66) of the total sample described having had a previous foot ulcer. Therapeutic footwear was being worn by 45.5% (30/66) and off-loading devices by 16.7% (11/66) of respondents. A statistically significant number of wound-related problems – specifically dressing leakage (Chi-squared=4.593 [degrees of freedom {df}=1]; $P<0.05$) and malodour (Chi-squared=4.421 [df=1]; $P<0.05$) – were reported among the working group when compared with those not working (*Table 3*).

The percentage of respondents with active diabetic foot disease was higher in the currently working than the not currently working group (95.7% [22/23] vs. 86.1% [37/43], respectively). However, working respondents were attending the diabetic foot clinic less frequently than those who were not working (an average of once every 26 days vs. once every 18 days, respectively; $P>0.05$). A statistically significant number of respondents currently working reported having knowledge of how their ulcer may have occurred (81.8%, 18/22; Chi-squared=4.639 [df=1]; $P<0.05$), compared with 54.1% (20/37) of those not working. Although a greater percentage (82.6%, 19/23) of respondents currently working reported symptoms of peripheral neuropathy than those not working (65.1%, 28/43), the difference was not statistically significant ($P>0.05$).

Impact of diabetic foot disease on employment

Participation in the workforce

Almost two-thirds (65.2%, 43/66) of respondents were not currently working, and 67.4% (29/43) of that group described themselves as being unable to work due to disability. One in five (21.2%, 14/66) respondents (including four people <40 years of age) reported having left a job as the direct result of their diabetic foot disease. The same percentage (21.2%, 14/66) reported having changed the type of work they did because of their diabetic foot disease. Of the men who reported having previously left a job as the result of their diabetic foot disease, 91.7% (11/12) were not currently working (Chi-squared=5.352 [df=1]; $P<0.05$).

Working life with active diabetic foot disease

Within the group with active diabetic foot disease who were currently working, two-thirds (63.6%, 14/22) reported difficulty performing tasks at work, and more than one half (54.5%, 12/22) reported some level of difficulty completing all of the daily requirements of their job. Among those currently working, the average number of working hours reported as lost directly due

Page points

1. A total of 66 people returned the questionnaire, although not all of the respondents answered all of the questions.
2. Gender and age distribution were skewed markedly within the study group: 78.8% (52/66) of respondents were male and only 10.6% (7/66) were under 40 years of age.
3. The majority of respondents (89.4%, 59/66) were currently being treated for an active foot ulcer, while 10.6% (7/66) were attending for maintenance and prevention.

to their diabetic foot disease was 122 over the past 12 months (range 0–750 hours). The total number of working hours reported lost in the past 12 months, directly due to diabetic foot disease, was 2684, or the equivalent of 67 full-time work weeks.

Difficulty performing job tasks was strongly associated with respondents' self-reports of the amount of walking, or prolonged standing, involved in their role (Spearman's rank correlation coefficient=0.431 and 0.728 [$n=22$], respectively; both $P<0.05$). Prolonged standing was also strongly correlated with the number of working hours lost due to diabetic foot disease (Spearman's rank correlation coefficient=0.691 [$n=19$]; $P<0.05$). Almost three-quarters (72.7%, 8/11) of respondents who were required to wear regulation footwear at work had been prevented from doing so at some point, due to their diabetic foot disease. More than one quarter (27.3%, 6/22) of those currently working had not revealed their diabetic foot disease to their employer.

Restricted mobility, pain and "change" were the most common themes identified in response to open-ended questions directly related to the impact of diabetic foot disease on respondents' working lives. Concerns relating to treatment protocols, footwear and local foot and wound issues featured prominently in respondents' descriptions of their experiences (Table 4).

Discussion

Gender

While the high proportion of male respondents in the current study is in line with other studies of diabetic foot disease affected populations (Ribu and Wahl, 2004; Fox, 2005; Nabuurs-Franssen et al, 2005; Marston, 2006), reasons for this asymmetrical gender distribution remain unclear as the prevalence of diabetes in the age group surveyed is almost the same for men and women (Wild et al, 2004).

The percentage of male diabetic foot clinic attendees in the current study, and the number of male respondents who reported that a female family member accompanied them to clinic appointments, appears to reflect significant

gender-specific differences in people with diabetes who have a severe foot lesion. This finding is supported by Hjelm et al (2002), who found that women of working age with diabetic foot disease were more likely to use preventative measures, and act independently between clinic visits, while men with the same condition were more likely to rely on the lay sector (most commonly their wife) for support

Table 1. Demographic characteristics of respondents.

	Total sample ($n=66$)	Currently working ($n=23$)	Not currently working ($n=43$)
Age (years) [‡]	52.2 ± 9.1	48.2 ± 9.8	54.3 ± 8.1
Male [†]	52 (78.8)	19 (82.6)	33 (76.7)
Marital status [†]			
Single	15 (22.7)	6 (26.1)	9 (20.9)
Married/common law	38 (57.6)	15 (65.2)	23 (53.5)
Divorced/separated	10 (15.2)	2 (8.7)	8 (18.6)
Widowed	2 (3.0)	0 (0)	2 (4.7)
Data missing	1 (1.5)	0 (0)	1 (2.3)
Living arrangements [†]			
Alone	18 (27.3)	4 (17.4)	14 (32.6)
Partner only	29 (43.9)	11 (47.8)	18 (41.9)
Other family	15 (22.7)	8 (34.8)	7 (16.3)
Non-relations	4 (6.1)	0 (0)	4 (9.3)
Number of dependants [‡]	0.75 ± 1.14	1.18 ± 1.22	0.51 ± 1.03
Highest level of education [†]			
Primary school	5 (7.6)	0 (0)	5 (11.6)
High school	29 (43.9)	10 (43.5)	19 (44.2)
College/trade school	21 (31.8)	10 (43.5)	11 (25.6)
University	8 (12.1)	3 (13.0)	5 (11.6)
Post-graduate	3 (4.5)	0 (0)	3 (7.0)
Primary wage earner [†]			
Self	37 (56.1)	17 (73.9)	20 (46.5)
Partner	15 (22.7)	3 (13.0)	12 (27.9)
Self and partner	3 (4.5)	2 (8.7)	1 (2.3)
Other	11 (16.7)	1 (4.3)	10 (23.3)

[†]Data are n (%). [‡]Data are mean ± standard deviation.

Page points

1. Difficulty performing job tasks was strongly associated with respondents' self-reports of the amount of walking, or prolonged standing, involved in their role.
2. More than one quarter (27.3%, 6/22) of those currently working had not revealed their diabetic foot disease to their employer.
3. Restricted mobility, pain and "change" were the most common themes identified in response to open-ended questions directly related to the impact of diabetic foot disease on respondents' working lives.

and only seek professional care for acute problems. Further investigation into these trends is warranted to determine whether the incidence of diabetic foot disease is higher in working-age men, and what factors influence treatment-seeking behaviours in this group.

Pain, mobility, footwear and off-loading

As seen in previous quality-of-life studies in diabetic foot disease affected populations (Brod, 1998; Kinmond et al, 2003; Fox, 2005; Ribu et al, 2007), mobility and pain issues in the current study were frequently related to off-loading protocols and therapeutic footwear (*Figure 1*).

Previous reports that suggest the incidence of pain among those with diabetic foot disease is rare due to peripheral neuropathy-associated sensation loss, unless accompanied by infection or Charcot foot (Gordois et al, 2003; Sibbald et al, 2003; Vileikyte et al, 2003), appear to be contradicted in the

current study. Forty per cent of respondents reported pain associated with their diabetic foot disease, and pain was frequently cited as a reason for reduced work performance or having to leave their job.

Respondents employed in jobs requiring prolonged periods of standing or walking perceived a significantly greater impact on their working lives as the result of their diabetic foot disease than those in more sedentary jobs. Interestingly, respondents perceived more difficulty in performing work tasks than in completing them, suggesting that they felt able to get the work done in spite of the challenges faced. This performance-completion interaction has not been previously described in the literature and warrants further investigation.

Local foot and wound issues in the workplace

Table 2. Diabetic foot ulcer characteristics of the study respondents.

	Total sample (n=66)	Currently working (n=23)	Not currently working (n=43)
Active foot ulcer [§]	59 (89.4)	22 (95.7)	37 (86.0)
Ulcer duration (months) [†]	16.1 ± 30.4 (0.3–166.0)	19.7 ± 38.9 (0.75–166.0)	13.5 ± 22.9 (0.25–120.0)
Previous ulcer [§]	21 (31.8)	8 (34.8)	13 (30.2)
Time since first clinic visit (months) [†]	9.3 ± 12.6 (0.0–60.0) [‡]	9.9 ± 16.6 (0.0–60.0)	8.75 ± 8.6 (0.2–24.0)
Frequency of clinic attendance (days) [†]	21.0 ± 27.3 (1.0–150.0) [‡]	26.0 ± 41.0 (2.0–150.0)	18.4 ± 17.1 (1.0–90.0)

[†]Data are mean (± standard deviation). [‡]Data missing for 16 respondents, figures are calculated based on data from 50 respondents. [§]Data are n (%). [¶]Data missing for 22 respondents, figures are calculated based on data from 44 respondents.

Table 3. Diabetic foot ulcer-related experiences reported by respondents for a current ulcer.

	Respondents in total sample with an active ulcer (n=59)	Currently working (n=22)	Not currently working (n=37)
Pain	24 (40.7)	11 (50.0)	13 (35.1)
Swelling	35 (59.3)	13 (59.1)	22 (59.5)
Odour	13 (22.0)	8 (36.4)	5 (13.5)
Leakage	30 (50.8)	15 (68.2)	15 (40.5)
Other	5 (8.5)	1 (4.5)	4 (10.8)

Nb. Data are n (%) and respondents were asked to select as many categories as applied to them.

Malodour and leakage from wounds have been previously identified as having a negative impact on the social lives of those with diabetic foot ulcers (Brod, 1998; Price, 2004; Fox, 2005; Watson-Miller, 2006). Respondents in the current study who were working reported more wound malodour and leakage than those not working, and it is possible that these factors may be related to the increased activity associated with their employment.

The authors suggest that those respondents with active diabetic foot ulcers who were currently working may have had a heightened awareness of, and sensitivity to, wound-related concerns. Given that employment outside the home ordinarily requires interaction with a variety of people, working with an active diabetic foot ulcer may increase the instance of perceived negative reactions to wound leakage and odour from clients and co-workers encountered during daily working life.

Impact of diabetic foot disease and employment on caregivers and the family

Previous quality-of-life studies have identified that caregivers and family members experience emotional difficulties during periods of active diabetic foot disease experienced by their partner or family members (Brod, 1998; Nabuurs-Franssen et al, 2005). However, no investigation into the impact on a caregiver or family member's working life has been conducted to the authors' knowledge.

In the current study, the higher percentage of those currently working who reported having dependants, compared with those not working (Mann-Whitney U -test=301.5; $P<0.05$), may indicate that the need to support family members is a motivating factor to remain in the workforce. Furthermore, in addition to the time at work lost by respondents, one-quarter of the sample reported that a household member had taken time off from paid work to accompany them to the diabetic foot clinic. Although an improvement in the primary caregiver's quality of life has been associated with healing

of an ulcer (Nabuurs-Franssen et al, 2005), it is possible that if – as was the case for several respondents in the present study – the person with diabetic foot disease has had to cease employment because of health considerations, the effect on the caregiver or family may be more long-term than the ulcer itself.

Making difficult choices: Treatment protocols or work requirements?

The frustration that people with diabetic foot disease experience in relation to restrictive treatment protocols has been reported elsewhere (Kinmond et al, 2003; Fox, 2005). A striking finding in the current study was the frequency with which respondents described being faced with difficult choices between treatment regimens and work requirements.

Some respondents experienced deterioration of their ulcers when they ignored treatment protocols because of work commitments, while others reported difficulty in performing work tasks due to treatment compliance. In particular, the decision to follow off-loading advice, especially among those with active jobs, meant that some respondents felt forced to either change occupation, or leave the workforce altogether.

To complicate matters further, several respondents reported experiencing additional trauma to their feet during work, some as a direct result of wearing off-loading devices or orthotics and others from continuing to wear regulation work shoes. This suggests that there was no guarantee of positive outcome whichever option was selected.

Adapting to change

“Change” was identified as a consistent theme in respondents' surveys. Respondents described the need to adapt work practices to accommodate the restrictions imposed on them by diabetic foot disease, or by the treatment protocols prescribed. This is in line with Price's (2004) description of the “lifetime of behavioural adaptations” that people with diabetic foot disease face.

The sense of loss of control, altered self-identity and self-blame previously described by people with diabetic foot disease may be especially profound among those of working-

Page points

1. The percentage of male diabetic foot clinic attendees, and the number of male respondents who reported that a female family member accompanied them to clinic appointments, appears to reflect significant gender-specific differences in people with diabetes who have a severe foot lesion.
2. Forty per cent of respondents reported pain associated with their diabetic foot disease, and pain was frequently cited as a reason for reduced work performance or having to leave their job.

age (Kinmond et al, 2003; Fox, 2005), a finding that was clearly identifiable in the qualitative responses in the current study. Differences, often gender-specific, could be seen in the way individuals coped with these changes, which in turn influenced employment-related decisions and, ultimately, determined whether a person remained in the workforce.

The high number of male respondents who were unemployed at the time of the survey, and who also reported having left a job at some

point due to diabetic foot disease, suggests that, having left paid employment, it may be more difficult to return.

Limitations

While these findings demonstrate the impact of diabetic foot disease on employment within this sample, caution should be used when applying the results to other populations. This study was undertaken at a diabetic foot clinic that required a referral for attendance and it is probable that those in the sample represent the more severe cases of the disease. However, those physically unable to attend the clinic were not included, and may represent a still further disadvantaged population. Expansion of the recruitment area, and an increase of the sample size, would likely provide a more representative distribution of demographic and employment data.

Conclusion

This exploratory study has important implications for working-aged people with diabetic foot disease, their families, caregivers, employers and healthcare professionals. It contributes to an understanding of the physical and psychosocial difficulties experienced in the workplace by people with diabetic foot disease.

Given the rising prevalence of the condition among those of working age, an understanding of these factors should help to inform future initiatives in the education and support of this vulnerable population. ■

Nicola Waters is Assistant Professor, School of Nursing, Mount Royal College, Calgary, Alberta, Canada; Samantha Holloway is Senior Professional Tutor and Course Director, Department of Wound Healing, Cardiff University, Cardiff, UK.

Brod M (1998) Quality of life issues in patients with diabetes and lower extremity ulcers: patients and care givers. *Qual Life Res* 7: 365–72

Creswell JW (2003) *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. 2nd edn. Sage Publications, Thousand Oaks, CA

Fox A (2005) Innocent beginnings, uncertain futures: exploring the challenges of living with diabetic foot ulcers. *Can J Diabetes* 29: 105–10

Goodridge D, Trepman E, Embil J (2005) Health-related quality of life in diabetic patients with foot ulcers: literature review. *J Wound Ostomy Continence Nurs* 32: 368–77

Table 4. Responses, in respondents' own words, to open-ended questions on the impact of diabetic foot disease on their working life.[†]

Question: Have you ever experienced difficulty performing or completing day-to-day tasks at work due to your diabetic foot ulcer?

- *Feet would swell and [it] hurt to stand.* Male, welder (25 years old)
- *[Yes], after foot treatment.* Female, merchandiser (28 years old)
- *Had [a] blister from new shoes.* Male, field supervisor (47 years old)
- *Standing too long on my feet ... they become sore and swollen.* Female, sales clerk (50 years old)
- *In wheelchair [for off-loading] in office and steel fabrication shop.* Male, workshop supervisor (51 years old)
- *Sore feet from being on my feet.* Male, truck driver (52 years old)

Question: Has your diabetic foot ulcer ever prevented you from wearing regulation work footwear?

- *I cannot wear [a] work-boot on foot with my ulcer.* Male, workshop supervisor (51 years old)
- *Yes – shoes orthotics.* Male, security officer (53 years old)
- *Will now – going to wear an air-cast sandal.* Female, transit operator (57 years old)
- *[A] bad pair of steel-toed boots caused [the] ulcer.* Male, welder (25 years old)

Question: Have you had to leave a job due to your diabetic foot ulcer? If so, what were the circumstances of your leaving?

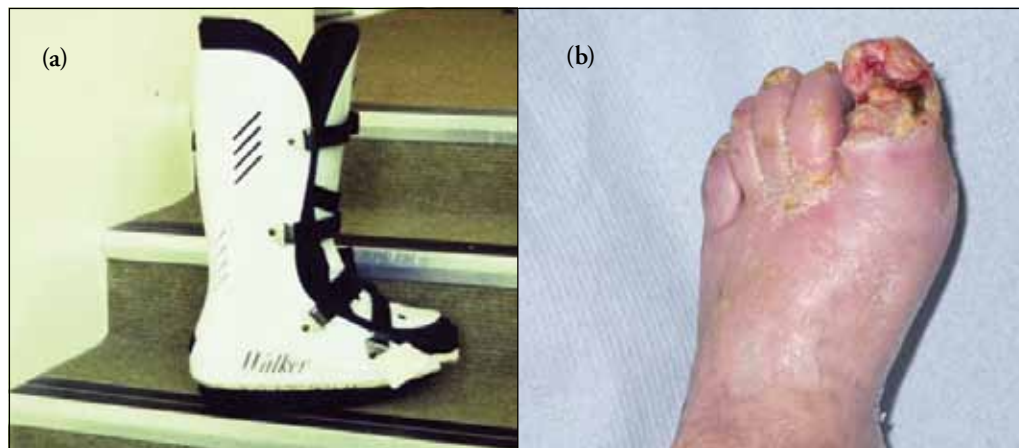
- *Foot infection, pain, surgery.* Male, kitchen worker (51 years old)[‡]
- *I got Charcot feet – cracks in both my feet. I had to wear air-cast boots.* Male, security officer (57 years old)[‡]
- *Hurt to walk any distances in steel-toe boots.* Male, stonemason (36 years old)[‡]
- *Because [my ulcer] got worse when I was standing and walking around.* Female, sales clerk (50 years old)[§]

[†]The questions have been adapted from the original questionnaire. [‡]Respondent unable to work at the time of the survey due to diabetic foot ulcer. [§]Respondent working at the time of the survey.

Page points

1. Respondents described the need to adapt work practices to accommodate the restrictions imposed on them by diabetic foot disease, or by the treatment protocols prescribed.
2. The high number of male respondents who were unemployed at the time of the survey, and who also reported having left a job at some point due to diabetic foot disease, suggests that, having left paid employment, it may be more difficult to return.
3. While these findings demonstrate the impact of diabetic foot disease on employment within this sample, caution should be used when applying the results to other populations.
4. This exploratory study has important implications for working-aged people with diabetic foot disease, their families, caregivers, employers and healthcare professionals.

Figure 1. (a) An Aircast Walker (DJO, Guildford) customised to encourage mobility during offloading. (b) A 61-year-old man with extensive tissue destruction of the distal phalanx of the first toe, a challenge to the offloading process. Photographs courtesy of the Wound Healing Research Unit, Cardiff University.



Gordois A, Oglesby A, Scuffham P et al (2003) The health care costs of diabetic peripheral neuropathy in the US. *Diabetes Care* **26**: 1790–4

Hjelm K, Nyberg P, Apelqvist J (2002) Gender influences beliefs about health and illness in diabetic subjects with severe foot lesions. *J Adv Nurs* **40**: 673–84

Kinmond K, McGee P, Gough S, Ashford R (2003) 'Loss of self': a psychosocial study of the quality of life of adults with diabetic foot ulceration. *J Tissue Viability* **13**: 6–12

Kraut A, Walld R, Tate R, Mustard C (2001) Impact of diabetes on employment and income in Manitoba, Canada. *Diabetes Care* **24**: 64–8

Lavigne J, Phelps C, Mushlin A, Lednar W (2003) Reductions in individual work productivity associated with type 2 diabetes mellitus. *Pharmacoeconomics* **21**: 1123–34

Matte S, Balakrishnan A, Bergamo G, Newberry S (2007) A review of methods to measure health-related productivity loss. *Am J Manag Care* **13**: 211–17

Marston W (2006) Risk factors associated with healing chronic diabetic foot ulcers: the importance of hyperglycemia. *Ostomy Wound Manage* **52**: 26–39

Mayfield JA, Partha D, Whitecotton L (1999) Work disability and diabetes. *Diabetes Care* **22**: 1105–9

Nabuurs-Franssen M, Huijberts M, Niewenhuijzen Kruseman A (2005) Health-related quality of life of diabetic foot ulcer patients and their caregivers. *Diabetologia* **48**: 1906–10

Ng Y, Jacobs P, Johnson J (2001) Productivity losses associated with diabetes in the US. *Diabetes Care* **24**: 257–61

Oppenheim AN (2006) *Questionnaire Design, Interviewing and Attitude Measurement*. Continuum, London

Polit DF, Hungler BP (1991) *Nursing Research Principles and Methods*. 4th edn. JB Lippincott, Philadelphia, PA

Pope C, Ziebland S, Mays N (2000) Qualitative research in health care: analysing qualitative data. *BMJ* **320**: 114–66

Price P, Harding K (2004) Cardiff Wound Impact Schedule: the development of a condition-specific questionnaire to assess health-related quality of life in patients with chronic wounds of the lower limb. *Int Wound J* **1**: 10–17

Price P (2004) The diabetic foot: quality of life. *Clin Infect Dis* **39**(Suppl 2): S129–S31

Ribu L, Wahl A (2004) Living with diabetic foot ulcers: a life of fear, restrictions, and pain. *Ostomy Wound Manage* **50**: 57–67

Ribu L, Hanestad B, Moum T et al (2007) A comparison of the health related quality of life in patients with diabetic foot ulcers, with a diabetes group and a non-diabetes group from the general population. *Qual Life Res* **16**: 179–89

Sibbald G, Armstrong D, Orsted L (2003) Pain in diabetic foot ulcers. *Ostomy Wound Manage* **49**: 24–9

Tunceli K, Bradley C, Nerenz D et al (2005) The impact of diabetes on employment and work productivity. *Diabetes Care* **28**: 2662–7

Vileikyte L, Peyrot M, Bundy C et al (2003) The development and validation of a neuropathy- and foot ulcer-specific quality of life instrument. *Diabetes Care* **26**: 2549–55

Von Korff M, Katon W, Lin E et al (2005) Work disability among individuals with diabetes. *Diabetes Care* **28**: 1326–32

Waters N (2008) *A survey of patients' perceptions of the impact of diabetic foot ulcers on employment*. MSc dissertation. Cardiff University, Cardiff

Watson-Miller S (2006) Living with a diabetic foot ulcer: a phenomenological study. *J Clin Nurs* **15**: 1336–7

Wild S, Roglic G, Green A et al (2004) Global prevalence of diabetes: estimates for the year 2000 and projections for 2030. *Diabetes Care* **27**: 1047–53