No consensus between HCPs on diabetic foot care education

Alistair McInnes

Diabetic foot disease is associated with high rates of morbidity and mortality, yet patient awareness about the complication is low. To determine whether podiatrists and other healthcare professionals differ in their beliefs about good foot heath behaviour, and on which specific elements they differ, an online cross-sectional survey was carried out. Significant inter-professional differences of opinion on a range of foot care behaviours were observed, including methods of toenail cutting. In the continued absence of trial evidence, multidisciplinary consensus should be reached on basic foot care behaviours to provide clear and consistent advice for people with diabetes.

Diabetic foot disease continues to cast a shadow over health care in the UK, with estimates of 5000 people with diabetes having a leg, foot or toe amputation every year (National Diabetes Support Team, 2006). Patient awareness about the complication is poor, with one-third of people with diabetes unaware that they are at increased risk of a lower-limb amputation as a result of their condition (Diabetes UK and NHS Diabetes, 2009).

It is difficult to identify a causal relationship between lack of patient awareness and amputation, however foot ulcer morbidity could be substantially reduced by the active engagement of people with diabetes in the self-care of their feet (Boulton et al, 2004). Yet, the evidence showing that educational interventions lead to a decrease in the incidence of ulceration and amputation is not compelling (Dorresteijn et al, 2010).

There are several factors that influence the effectiveness of educational intervention programmes, including the need for consistency. People with diabetes and patient groups frequently stress the need for consistency of advice about self-management of diabetes from healthcare professionals (HCPs; Day and Assal, 1992). Day and Assal (1992) and Connor (1997) also advise that HCPs be consistent in their advice on preventative foot care. However, there is evidence showing that HCPs hold differing beliefs about diabetic foot care (Radford et al, 2006). Considering that diabetic foot care is intrinsically multidisciplinary, disagreement between professionals may lead to confusion, uncertainty and even avoidance of foot care behaviours by people with diabetes (Kneepkens et al, 2006). Such a situation may result in the development of a foot ulcer.

The aims of this study were to determine differences in opinion between HCPs on what constitutes good foot health behaviour, and the extent to which HCPs differ in their opinions on the components of good foot health behaviour. Specifically, the research questions were:

Article points

1. Current evidence that educational interventions lead to a decrease in the incidence of diabetic ulceration and amputation is not compelling.
2. A survey of healthcare professionals was carried out to find levels of within and between group consensus on basic foot health behaviours for people with diabetes.
3. Significant inter-professional differences of opinion included the use of surgical spirits, methods of toenail cutting and seeking assistance from podiatrists to cut toenails.
4. In the continued absence of trial evidence, it is recommended that a multidisciplinary consensus is reached on basic foot care advice for people with diabetes.

Key words
- Education
- Foot care advice
- Professional consensus

Alistair McInnes is Senior Lecturer in Podiatry, School of Health Sciences, University of Brighton, Brighton.

Table 1. Demographics of the survey participants (*n*=689)

Gender	***n***
Women	533
Men	156
Profession	
Podiatrist	413
Nurse	194
Physician	67
Other HCP	15
Related experience†	
Podiatrist	
<6 years	70
6–15 years	178
>15 years	165
Nurse	
<6 years	66
6–15 years	92
>15 years	32
Physician	
<6 years	14
6–15 years	21
>15 years	30

†Other healthcare practitioners (HCP) had a spread of experience. Data not shown.

1. Do HCPs differ in their beliefs about good foot health behaviour?
2. What are the specific elements of good foot health behaviour that HCPs disagree about?

Methods

Participants

The survey convenience sample comprised participants invited from a diabetes journal's website, a diabetes organisation's website and an international podiatry organisation's website to complete the questionnaire. In addition, an email invitation to complete the questionnaire was sent out to subscribers of a diabetes journal. Participants were all HCPs working in diabetes care. The data were collected between January and March 2009.

Procedures

An online cross-sectional questionnaire was used. Participants were provided with an online information sheet explaining the purpose of the study and asked to respond to statements about basic foot health behaviours for people with diabetes. Submission of a completed questionnaire was considered to be consent to participate. The study was reviewed and approved by the Faculty Research Ethics and Governance Panel, University of Brighton.

The questionnaire contained statements based on foot health education and the responses were recorded on a five-point Likert scale (1, strongly agree; 2, agree; 3, neither agree nor disagree; 4, disagree; 5, strongly disagree). Face validity was determined by a review of the existing literature by an independent organisation for consumer health information, the Patient Information Forum (PIF), as part of the development of a new diabetic foot care resource document (Anders et al, in press).

The questionnaire consisted of three main sections: (i) foot care (15 items); (ii) footwear and hosiery (seven items); and (iii) accident prevention (five items). An additional three items that investigated beliefs about advice on smoking habits, glycaemic control and the supply of HCP contact details were collected into a fourth section.

The initial pool of items was based on a review of existing literature related to diabetic foot care, in collaboration with PIF. The questionnaire was piloted with colleagues and two items were altered based on the pilot.

Additional demographic information collected comprised the participant's gender, profession and years of experience. All questionnaires were anonymous.

Data analysis

The results were analysed using Excel (2007; Microsoft, Redmond, WA). To determine significant differences between the professions non-parametric Mann–Whitney *U*-test was used. In addition, to determine differences in the consistency of responses within each professional group, the Conover squared two-sample ranks test for equality of variance was utilised.

Results

A total of 689 people completed questionnaires that were suitable for analysis. The total comprised questionnaires from 413 podiatrists, 194 nurses, 67 physicians and 15 other healthcare providers. Gender, profession and experience data are summarised in *Table 1*. For the purpose of analysis, the questionnaires completed by nurses, physicians and other healthcare providers were combined into an "other HCPs" group (*n*=276).

The first section of the questionnaire comprised 15 items on foot care behaviours. Podiatrists showed a significantly higher level of within-group agreement than the other HCPs for six of the 15 items (all $P \leq 0.005$, Mann–Whitney *U*-test). These items were:

- *You should look carefully at your feet every day. If you cannot do this yourself, you should get someone else to do it for you.*
- *Apply moisturising cream to dry skin to prevent cracking.*
- *Do not apply moisturising cream between your toes.*
- *Apply surgical spirit to your feet if skin is moist (Figure 1a).*
- *Cut your toenails to the shape of your toes (Figure 1c).*
- *If you cannot cut your nails safely, try using a nail file.*

The group of other HCPs showed a significantly higher level of within-group agreement than the podiatrist group on five items in this section ($P<0.05$, Conover test for variance). These items were:

- *Cut your toenails straight across (Figure 1b).*
- *If you cannot see properly do not try to cut your nails as you may cut your skin. Get someone else to do it.*
- *If you cannot cut your own toenails safely, always see a podiatrist.*
- *Toenails should only be cut when soft after bathing (Figure 1e).*
- *Never use a callus file (Figure 1f).*

The second section of the questionnaire comprised seven items on footwear and hosiery. The podiatrist group showed a significantly higher level of within-group agreement than the other HCPs group for five of the seven items (all $P\leq0.007$, Mann–Whitney *U*-test). These items were:

- *You should always feel inside footwear before you put them on (to check for objects and torn linings).*
- *Your footwear should have laces, buckles or Velcro (Middlewich, UK) fastening to prevent movement and rubbing of feet within shoes.*
- *Never buy shoes that you feel have to be broken in.*
- *Always wear seamed socks/stockings inside out.*
- *Always wear socks/stockings with shoes and other footwear.*

On only one item in this section did the other HCPs group demonstrate a significantly higher level of within-group agreement than the podiatrists ($P=0.014$, Mann–Whitney *U*-test):

- *You should break in new shoes gradually (Figure 1g).*

The third and forth parts of the questionnaire comprised five items on accident prevention and three items on health advice not directly related to the foot, respectively. The podiatrist group showed a significantly higher level of within-group agreement than the other HCPs group for three of the accident prevention items, and one of the health advice items (all $P=0.000$, Mann–Whitney *U*-test). These items were:

- *Never use corn plasters when you get a corn (Figure 1h).*
- *Always take a hot bottle out of bed before getting in.*
- *Always put a dry dressing on a blister when you get one.*
- *People with diabetes should be provided with contact details of local foot healthcare provider in case of emergency [from section 4].*

Podiatrist responses to the following items were significantly less consistent within-group than in the other HCPs group ($P\leq0.034$, Conover test for variance):

- *Wash your feet using lukewarm water only.*
- *Always wear seamless socks/stockings.*
- *Never walk barefoot.*
- *Never go barefoot (except for children).*

Podiatrists were significantly more consistent in their responses to the following item than respondents from the other HCPs group ($P\leq0.034$, Conover test for variance):

- *Test the temperature of the bath water with your elbow.*

Discussion

Connor (1997) and Kneepkens et al (2006) reported that nurses, physicians and podiatrists hold different opinions on what constitutes good foot care advice, and the present study reveals a continued lack of consensus between these professional groups.

Connor (1997) noted significant differences of opinion between the professions on the use of alcohol or surgical spirits as a drying agent for moist feet, walking barefoot, methods of toenail cutting and seeking assistance from podiatrists to cut toenails. Kneepkens (2006) also found significant differences of opinion between the professions on the use of surgical spirits and methods of toenail cutting, and additionally on the use of seamless socks, stockings and tights.

In the present study, significant differences were observed in inter-professional opinion on the use of surgical spirits, methods of toenail cutting, seeking assistance from podiatrists to cut toenails, use of a callus file and breaking in new shoes (*Figure 1*).

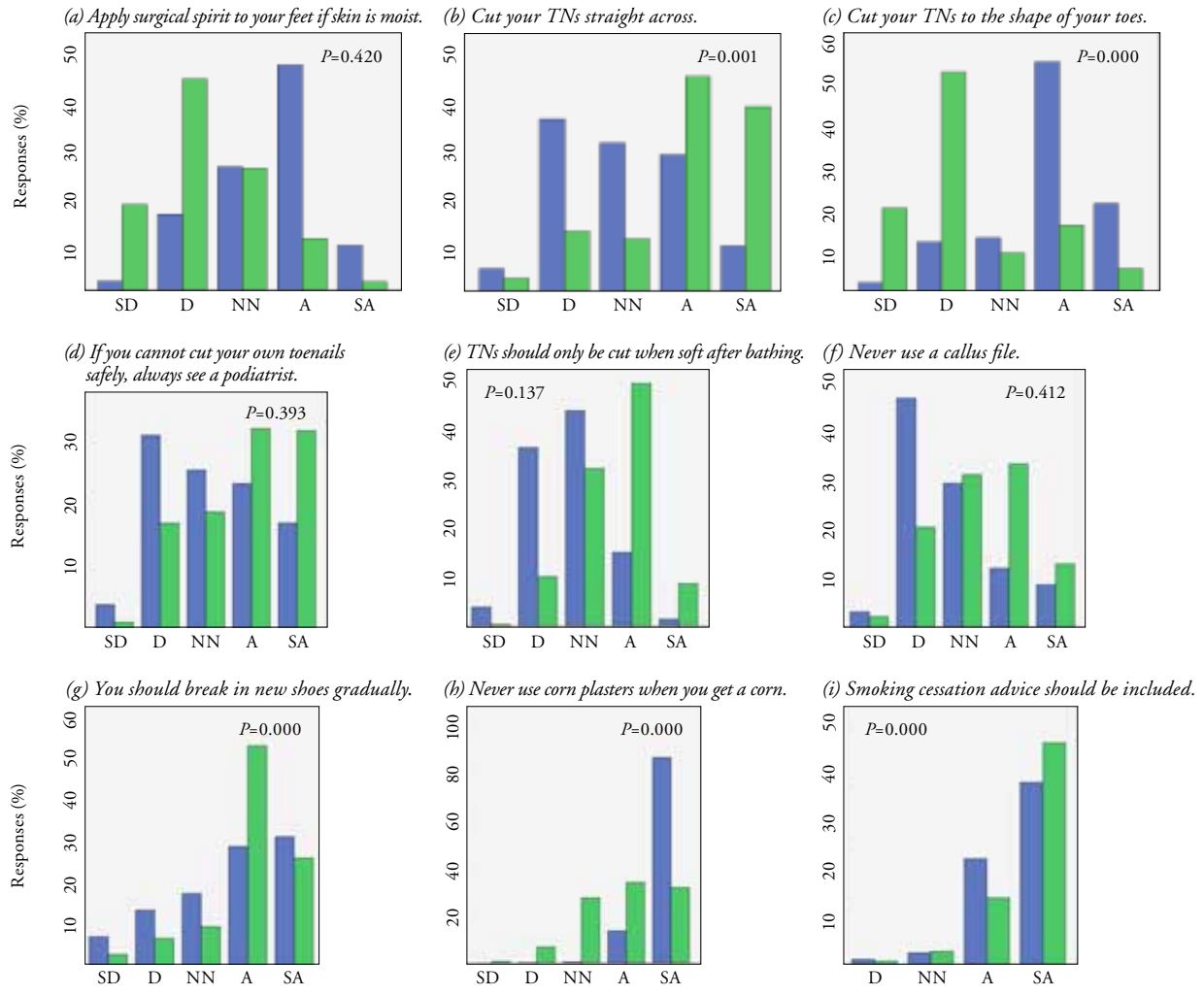
The evidence base

The lack of consensus between the surveyed HCPs may be the result of a number

Page points

1. The podiatrist group showed a significantly higher level of within-group agreement than the other healthcare professionals (HCP) group that people with diabetes should always feel inside footwear before putting them on to check for objects and torn linings.
2. Podiatrist responses were significantly less consistent within-group than in the other HCPs group for whether people with diabetes should wash their feet using lukewarm water only.
3. It has previously been reported that physicians, nurses and podiatrists hold different opinions on what constitutes good foot care advice.
4. In the present study, significant differences were observed in inter-professional opinion on the use of surgical spirits, methods of toenail cutting, seeking assistance from podiatrists to cut toenails, use of a callus file and breaking in new shoes.

Figure 1(a–i). Distribution of responses to nine of the 30 items on diabetic foot health behaviours surveyed among podiatrists (■; n=413) and other healthcare professionals (■; n=276). A, agree; D, disagree; NN, neither agree nor disagree; SA, strongly agree; SD, strongly disagree; TN, toenail. P-values are Conover test for variance throughout.



of factors, one being the lack of robust evidence on various elements of foot care behaviour or education. In light of this lack of evidence, HCPs must rely on their own clinical experience to inform them, and clinical experience varies within and between professional groups.

Systematic and non-systematic reviews have failed to demonstrate that foot care educational interventions reduce ulcer incidence (Valk et al, 2004; Radford et al, 2006; Singh et al, 2005). A randomised clinical trial by Lincoln et al (2008) demonstrated that a foot care educational intervention resulted in improved foot care behaviour, but did not bestow any measurable clinical benefit.

While validated foot care behaviour assessment programmes on specific foot health behaviours have been developed (Johnston et al, 2006; Lincoln et al, 2007), individual behaviours – both good practices to adopt and poor ones to avoid – have not been studied with regard to their effect on progression to ulceration or amputation. Kneepkens et al (2006) remind us that it is "inconceivable that every [foot care] educational point will ever be established beyond doubt by experimental evidence".

The majority of foot care educational intervention studies include individual items of advice similar to the present study (e.g. foot care, footwear and hosiery, accident prevention and additional information [e.g. smoking cessation]), but few stratify participants in terms of their risk of ulceration (Litzelman et al, 1993; Klenerman et al, 1996; McCabe et al, 1998; Hämäläinen et al, 1999; Donohoe et al, 2000).

In a recent Cochrane Collaboration Review (Valk et al, 2004) on complex interventions (i.e. more than educational intervention alone) for preventing diabetic foot ulceration, it was found that in four of the five included trials (Litzelman et al, 1993; Klenerman et al, 1996; Hämäläinen et al, 1998; Donohoe et al, 2000; McMurray et al, 2002) participants' baseline risk of ulceration was medium or low. Without risk stratification data from trials, it is difficult to obtain evidence on which risk groups will benefit from educational intervention. This lack of foot care educational interventions specific to risk groups may be one reason behind the lack of inter-professional consensus on foot care behaviours.

Results of the present study demonstrated a range of responses to items concerning water-temperature testing and washing, the use of seamless socks and barefoot walking. Differences of opinion, and the use of the option to neither agree nor disagree for these items, may be explained by the consideration that some advice may only be considered pertinent at some levels of ulceration risk. For example, if the person with diabetes is at low risk of ulceration and is not experiencing any peripheral sensory loss, testing water temperature and washing in lukewarm water may not be considered necessary. The same argument can be made for the necessity of wearing seamless socks or stockings and walking barefoot.

The spread of responses to some questionnaire items suggests that there is a requirement to tailor foot health information to the level of risk experienced by the individual. Given that some 99.6% of people at low risk of foot ulceration remain ulcer free after 2 years (Leese et al, 2006), foot health messages in this group should focus on the prevention of diabetic complications (i.e. maintaining good glycaemic control) – rather than health behaviours that ought to be adopted by people with neuropathy or peripheral vascular disease. For the high-risk group with established diabetic complications, there may be a need to focus on when and how to contact a member of the multidisciplinary diabetic foot team, given that the complicating factors may prevail over any change in foot care behaviour (Lincoln et al, 2008).

In 2008, the Scottish Foot Action Group launched a set of patient information leaflets targeted at people with diabetes and tailored to each level of risk (Stang, 2008). In the absence of trial evidence for the adoption of specific foot health behaviours, the Scottish Foot Action Group have developed leaflets based on consensus by key stakeholders.

Section 1: Foot care behaviour

There is little consensus between the professional groups surveyed in the present study about toenail cutting methods or seeking assistance with toenail cutting for people with diabetes *(Figure 1b)*. The podiatrist group clearly favours cutting toenails to the shape of the toe while the other HCPs group was divided in opinion. The inclusion of the method of toenail cutting in many diabetes foot health education programmes may be based on clinical observations of accidents occurring from sharp or irregular toenail edges. However, there is no evidence to suggest that either method (straight across or to the shape of the nail) will prevent unwanted accidents, and Connor (1997) suggests that the method of toenail cutting may not matter.

To the author's knowledge, there is no trial evidence to suggest that cutting toenails when soft after bathing is either a good or bad practice. From the results, the podiatrist group clearly do not agree with this practice, while the other HCPs do. Perhaps the podiatrists – having had more experience in toenail cutting than the other HCPs – have clinical experiences that better inform their response. It may be that other HCPs do not have access to the appropriate nail-clipping instruments and resort

Page points

1. In a recent Cochrane Collaboration Review on complex interventions for preventing diabetic foot ulceration, it was found that in four of the five trials included participants' baseline risk of ulceration was medium or low.
2. Without risk stratification data from trials, it is difficult to obtain evidence on which risk groups will benefit from educational intervention.
3. If the person with diabetes is at low risk of ulceration and is not experiencing any peripheral sensory loss, testing water temperature and washing in lukewarm water may not be considered necessary.
4. There is little consensus between the professional groups surveyed in the present study about toenail cutting methods or seeking assistance with toenail cutting for people with diabetes.

Page points

1. The other healthcare professionals (HCPs) group agreed that people with diabetes should have their toenails cut by a podiatrist, while poditrists returned a wider spread of responses perhaps reflecting a concern that many low-risk individuals will be inappropriately referred for toenail cutting.
2. The use of surgical spirits on moist diabetic feet remains a subject of disagreement.
3. There was reasonable consensus that moisturising cream should be applied to the feet to avoid cracking, but podiatrists showed a higher degree of within-group agreement than the other HCPs.
4. Corn plasters are never advocated by the podiatry profession for use by people with diabetes and the lack of consensus from the other HCPs group on their use is surprising.

to scissors, accounting for the belief that cutting toenails after bathing makes the process easier.

Responses to the item "*if you cannot cut your own toenails safely, always see a podiatrist*" may reflect between-profession differences in opinion on the role of NHS podiatry services. The other HCPs group agreed that people with diabetes should have their toenails cut by a podiatrist if they could not safely do so themselves, while podiatrists returned a wider spread of responses to this item. The responses from the podiatrist group perhaps reflects a concern that many low-risk individuals will be inappropriately referred to podiatry services. The use of the word "always" in the item may have encouraged this response.

The use of surgical spirits on moist diabetic feet remains a subject of disagreement. Podiatrist responses suggest that they approve of the use of surgical spirits as a drying agent for excessively moist skin. The majority of other HCPs did not favour this practice. There is no obvious explanation for the differences in opinion. It may be that there is concern about the use of surgical spirits in the vicinity of a wound or skin fissure, in which cases surgical spirits are contraindicated. Again, the appropriateness of advice appears dependent on risk stratification.

There was reasonable consensus that moisturising cream should be applied to the feet to avoid cracking, but podiatrists showed a higher degree of within-group agreement than the other HCPs. Yet there is little trial evidence to support this practice. Suico et al's (1998) randomised control trial did report on this question and found an increased risk of foot ulceration among participants who rarely lubricated their feet. The use of moisturising cream on the feet may be more beneficial specifically for those with dry skin resulting from peripheral neuropathy (Boulton et al, 2004).

There is disagreement about the use of a callus file. The other HCPs did not advocate callus file use, while there was a spread of responses from podiatrists (*Figure 1f*). Again, the difference may be a question of risk status. The use of a callus file under certain circumstances will be advocated by many podiatrists as part of a self-care package for people at low risk of ulceration. However, other HCPs who are more frequently exposed to moderate- and high-risk feet – where the use of a callus file would probably not be advocated by any of the professions – may be looking at this item with high-risk people in mind.

Section 2: Footwear and hosiery

Footwear and hosiery behaviour is an important aspect of diabetic foot care as studies have shown that footwear is an identified precipitating cause of toe ulceration (Apelqvist and Agardh, 1992) and that footwear has been implicated in 21% of all ulcers in a large cohort (Macfarlane and Jeffcoate, 1997). There was significantly higher within-group agreement among the podiatrists for a number of footwear and hosiery items, although the other HCPs did have a tendency to agree, albeit to a lesser extent than podiatrists.

There was one footwear item on which the other HCPs were significantly more agreed on, and that was that people with diabetes should be encouraged to break-in new shoes gradually. However, the podiatrists strongly agreed with the statement "*never buy shoes that you feel have to be broken-in*". The different responses may reflect the negative presentation of the second statement, which may have led to confusion.

Sections 3 and 4: Accident prevention and additional health information

The most significant difference between the groups was for the statement "*never use corn plasters when you get a corn*". The two groups agreed in general that corn plasters should not be used, but the other HCPs responded with almost as much frequency that they neither agreed nor disagreed with the item (*Figure 1h*). The active compound in corn plasters, salicylic acid, can destroy healthy tissues underlying and surrounding a corn. Corn plasters are never advocated by the podiatry profession for use by people with diabetes and the lack of consensus from the other HCPs group on their use is surprising.

Both the podiatrists and other HCPs agreed that smoking cessation advice should be included in foot health literature, but other HCPs agreed more strongly than the podiatrists *(Figure 1i)*. There is no obvious reason for the difference in response, although it could be argued that other HCPs are more frequently exposed to the complications of smoking among people with diabetes and thus their views on smoking cessation are more strongly held.

Limitations

The limitations of the study are that it was not a randomised sample and each profession was not represented in equal numbers. Combining the nurses, physicians and other healthcare providers responses into a single group did not allow differences between those professions to be identified.

The use of imperatives within the statements may have influenced the spread of answers and the frequency of use of the option to neither agree nor disagree. The use of a Likert scale did not permit any qualifying of responses. However, this highlighted that a "one-size-fits-all" approach to foot health information is not appropriate.

The scoring method of the survey did not completely discriminate between those who disagreed with the statements. However, the statistically significant higher scores between the groups highlighted the different responses. This can be seen in the graphs provided.

The method of validation of the survey was incomplete. However, every attempt was made to secure face and content validity by an extensive literature search on validated and non-validated foot health educational interventions and the results of a pilot study.

Conclusions

A lack of consensus exists between nurses, physicians and other healthcare providers on the one hand, and podiatrists on the other, about foot care behaviour recommendations for people with diabetes. Evidence suggesting that foot care education prevents ulceration is not compelling, and there is frequent failure to tailor educational interventions to individual levels of risk. These failures in the literature may explain some of the differences in opinion reported here.

Until there is robust evidence on which foot health behaviours prevent ulceration or reulceration of the diabetic foot, reaching consensus between professional groups involved in the care of people with diabetes will be difficult. This is bad news for people with diabetes and may reduce the effectiveness of any foot health educational intervention.

There is evidence of short-term improvement in patient knowledge and behaviour as a result of educational intervention (Valk et al, 2004). However, foot health education facilitated by HCPs requires greater scrutiny in the future, for all levels of ulcer risk. Furthermore, any new written educational information should be scrutinised by the Gunning Fog Index (Gunning, 1952) and the Flesch Reading Ease Formula (Flesch, 1948), and be reviewed by patient focus groups to provide feedback in terms of understanding, tone, attractiveness and readability.

To acknowledge the lack evidence that educational interventions reduce diabetic foot ulceration is not to say that there is no effect. From the results of this survey, and in the continued absence of trial evidence, it is recommended that a multidisciplinary consensus is reached on basic foot care advice for people with diabetes. ■

"A lack of consensus exists between physicians, nurses and other healthcare providers on the one hand, and podiatrists on the other, about foot care behaviour recommendations for people with diabetes."

Conflict of interest

Funding was received from SSL International (Manchester) to carry out this survey.

Acknowledgements

The author would like to thank Corin Atril (Senior Technician, School of Health Professions, University of Brighton) for technical assistance, Amanda Church (Research Officer, School of Health Professions, University of Brighton) and Farina Hashmi (Head of the Podiatry Research Programme, School of Health Professions, University of Brighton).

Anders J, Smith S, McInnes A. Developing an educational resource about preventing foot problems for people with diabetes: producing content, design and layout, user feedback and initial evaluation. *Journal of Healthcare Communications* [in press]
Apelqvist J, Agardh CD (1992) The association between clinical risk factors and outcome of diabetic foot ulcers. *Diabetes Res Clin Pract* **18**: 43–53
Boulton AJM, Kirsner RS, Vileikyte L (2004) Clinical practice. Neuropathic diabetic foot ulcers. *N Engl J Med* **351**: 48–55
Connor H (1997) Foot care advice: what do we tell our patients and what should we tell them? *Practical Diabetes International* **14**: 75–7
Diabetes UK, NHS Diabetes (2009) *Putting Feet First*. Diabetes UK, London. Available at: tinyurl.com/yfvf7zu (accessed 17.03.10)
Day JL, Assal J-P (1992) Education of the diabetic patient. In: Alberti KGGM et al (eds). *International Textbook of Diabetes Mellitus*. John Wiley & Sons, Chichester: 36a
Donohoe ME, Fletton JA, Hook A et al (2000) Improving foot care for people with diabetes mellitus – a randomized controlled trial of an integrated care approach. *Diabet Med* **17**: 581–7
Dorresteijn JAN, Kriegsman DMW, Valk GD (2010) Complex interventions for preventing diabetic foot ulceration. *The Cochrane Database of Systematic Reviews* **1**: 1–35
Flesch R (1948) A new readability yardstick. *J Appl Psychol* **32**: 221–33
Gunning R (1952) *The Technique of Clear Writing*. McGraw-Hill, New York, NY
Hämäläinen H, Rönnemaa T, Toikka T, Liukkonen I (1998) Long-term effects of one year of intensified podiatric activities on foot-care knowledge and self-care habits in patients with diabetes. *Diabetes Educ* **24**: 734–40
Hämäläinen H, Rönnemaa T, Toikka T, Liukkonen I (1999) Long-term effects of one-year intensified podiatric activities in the outpatient foot care of diabetic patients. *British Journal of Podiatry* **2**: 63–4
Johnston MV, Pogach L, Rajan M, et al (2006) Personal and treatment factors associated with foot self-care among veterans with diabetes. *J Rehabil Res Dev* **43**: 227–38
Klenerman L, McCabe C, Cogley D et al (1996) Screening for patients at risk of diabetic foot ulceration in a general diabetic outpatient clinic. *Diabet Med* **13**: 561–3
Kneepkens H, Lincoln N, Radford K et al (2006) Influence of differing professional opinion on foot care education. *The Diabetic Foot Journal* **9**: 14–20
Leese GP, Reid F, Green V et al (2006) Stratification of foot ulcer risk in patients with diabetes: a population-based study. *Int J Clin Pract* **60**: 541–5
Lincoln NB, Jeffcoate WJ, Ince P et al (2007) Validation of a new measure of protective foot care behaviour: the Nottingham assessment of functional foot care (NAFF). *Practical Diabetes International* **24**: 207–11
Lincoln NB, Radford KA, Game FL, Jeffcoate WJ (2008) Education for secondary prevention of foot ulcers in people with diabetes: a randomised controlled trial. *Diabetologia* **51**: 1954–61
Litzelman DK, Slemenda CW, Langefeld CD et al (1993) Reduction of lower extremity clinical abnormalities in patients with non-insulin-dependent diabetes mellitus. *Ann Intern Med* **119**: 36–41
Macfarlane RM, Jeffcoate WJ (1997) Factors contributing to the presentation of diabetic foot ulcers. *Diabet Med* **14**: 867–70
McCabe CJ, Stevenson RC, Dolan AM (1998) Evaluation of a diabetic foot screening and protection programme. *Diabet Med* **15**: 80–4
McMurray SD, Johnson G, Davis S, McDougall K (2002) Diabetes education and care management significantly improve patient outcomes in the dialysis unit. *Am J Kidney Dis* **40**: 566–75
National Diabetes Support Team (2006) *Diabetic Foot Guide*. NHS Diabetes, London
Radford K, Chipchase S, Jeffcoate W (2006) Education in the management of the foot in diabetes. In: Boulton AJM, Cavanagh PR, Rayman G (eds). *The Foot in Diabetes*. 4th edn. John Wiley & Sons, Chichester: 143–58
Singh N, Armstrong DG, Lipsky BA (2005) Preventing foot ulcers in patients with diabetes. *JAMA* **293**: 217–28
Stang D (2008) Target that risk: nationally agreed patient information and education leaflets for the diabetic foot in Scotland. *The Diabetic Foot Journal* **11**: 158–160
Suico JG, Marriott DJ, Vinicor F, Litzelman DK (1998) Behaviors predicting foot lesions in patients with non-insulin-dependent diabetes mellitus. *J Gen Intern Med* **13**: 482–4
Valk GD, Kriegsman DMW, Assendelft WJJ (2004) Patient education for preventing diabetic foot ulceration. *Cochrane Database Syst Rev* (**1**): CD001488. Available at: tinyurl.com/yjwbwco (accessed 08.03.10)