

# Knowledge of foot care in people with diabetes in a tertiary care setting



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**Background.** The objective of this study was to investigate levels of foot care knowledge among patients attending the diabetes clinic at Pretoria Academic Hospital by comparing the knowledge of patients with 'at risk' feet (ARF) to those with 'normal/not at risk' feet (NARF) and so assess whether the education effort by the clinic is effective.

**Methods.** Patients attending the clinic completed an interviewer-assisted questionnaire with 11 questions concerning foot care knowledge. A knowledge score for each patient was calculated.

**Results.** Possible scores ranged from 4 to 11 (maximum 11). The mean score for the ARF group was 8.9 (standard deviation (SD) 1.4) (range 4 - 11) compared with 8.9 (SD 1.4) for the NARF group (range 5 - 11) ( $p > 0.05$ ). The most substantial difference between the two groups was that the ARF group gave 20% more correct answers than the NARF group with regard to frequency of foot inspection (daily) ( $p = 0.025$ ).

**Conclusions.** Both groups of patients had a reasonable knowledge regarding foot care. The patients at risk were more aware of the need for daily foot inspection.

The prevalence of diabetes for all age groups worldwide was estimated to be 2.8% in the year 2000 and is predicted to rise to 4.4% in 2030. The total number of people with diabetes is projected to rise from 171 million in 2000 to 366 million in 2030.<sup>1</sup> Diabetes is complicated by a number of micro- and macrovascular complications including cardiovascular disease, nephropathy, neuropathy and retinopathy.<sup>2,3</sup>

Diabetic foot complications contribute significantly to morbidity. Recent data attribute 83% of non-traumatic lower-extremity amputations in the USA to diabetes mellitus.<sup>4</sup> According to the literature 25% of all hospital admissions of patients with diabetes in the USA and UK are for the treatment of infected foot ulcers. Fewer than 14% of patients admitted for diabetic foot complications receive appropriate lower extremity evaluation, and when foot ulcers do develop 1 in 5 of these patients eventually has to undergo an amputation.<sup>5</sup> The rate of secondary amputation of the ipsi- or contralateral limb is as high as 50%.<sup>6</sup> Diabetic foot ulcers have also been recognised as a significant problem in Africa.<sup>7</sup>

It is important to recognise that these complications are preventable to a large extent with adequate blood glucose control, regular screening and foot care education. Detection of diabetes-related neuropathy is important, as this nearly always precedes foot ulceration. Patients with a previous history of amputation or foot ulceration are also considered to be at risk for subsequent ulceration.<sup>8</sup>

The tertiary care clinic at Pretoria Academic Hospital includes an annual review for diabetes complications as part of its diabetes care plan.

This study investigated whether patients with feet at risk for ulceration had better foot care knowledge than patients whose feet were not at risk.

## Methods

### Study design

This was a cross-sectional descriptive study.

## Setting

The study was conducted at the diabetes clinic at Pretoria Academic Hospital, South Africa.

## Sample size and patient selection

The aim was to interview 120 patients, 60 with 'at risk' feet (ARF) and 60 with 'normal/not at risk' feet (NARF). Patients were recruited consecutively from the clinic waiting room. Their foot risk status was identified on the basis of the result of the neuropathy foot exam conducted in the previous 2 years that classified patients as having 'at risk' feet due to the presence of neuropathy or previous or current ulcer or amputation (International Working Group on the Diabetic Foot criteria).<sup>9</sup> All participants gave informed consent and ethical clearance was obtained from the Ethics Committee of the Faculty of Health Sciences, University of Pretoria.

## Measurements

The study was conducted using a questionnaire administered by the research elective students (MV and EdK) consisting of 11 questions measuring diabetic foot care knowledge. This was the same questionnaire used by Pollock *et al.*,<sup>10</sup> but their question 10 ('What temperature of water do you think you should wash your feet in?') was replaced with the researchers' own question, 'People with diabetes may walk barefoot – true or false?'

## Data analysis

Data were entered in Microsoft Office Excel 2003 and analysed in Stata. Correct responses were compared between the two groups with chi-square tests and the total scores with an unpaired *t*-test. A *p*-value of <0.05 was regarded as statistically significant.

## Results

A total of 140 patients were approached, of whom 5 chose not to participate. Of 135 who completed interviews 60 had ARF and 65 NARF. Ten participants who completed the interview were classified as at 'unknown risk' and were excluded from data analysis. This resulted in a surplus of 5 subjects in the NARF group, so 5 subjects from this group were randomly excluded from the study.

From the participants' demographic data (Table I) it is apparent that subjects in the ARF category were mostly in the age group 50 - 70 years while those in the NARF category were between 40 and 60 years of age. The average age of participants was 56.2 years (range 19 - 84 years). The male-female ratio was close to 1:1 and most of the patients had type 2 diabetes mellitus.

Of the 60 patients in the ARF group, 49 had

**Table I.** Description of participants with feet at risk (ARF) and those whose feet were not at risk (NARF).

	ARF (% of group)	NARF (% of group)	<i>p</i> -value
Age (yrs) (mean (SD))	51.0 (15.3)	61.3 (10.6)	<0.0001
10 - 20	0 (0)	1 (1.6)	
20 - 30	1 (1.6)	6 (10)	
30 - 40	1 (1.6)	6 (10)	
40 - 50	4 (6.6)	13 (21.6)	
50 - 60	20 (33.3)	19 (31.6)	
60 - 70	23 (38.3)	7 (11.6)	
70 - 80	8 (13.3)	8 (13.3)	
80 - 90	3 (5)	0 (0)	
Gender			1.00
Male	31	30	
Female	29	30	
Type of diabetes mellitus			0.023
Unknown	1	2	
1	7	17	
2	52	41	

neuropathy and 20 a previous or current foot ulcer while 3 had had an amputation (a number of patients had combinations of these). The average score of the ARF group was 8.9 (standard deviation (SD) 1.4) out of a possible maximum of 11 (range 4 - 11) compared with 8.9 (SD 1.4) for the NARF group (range 5 - 11) (means and SDs identical when rounded) (*p*=0.85).

As can be seen in Table II and Fig. 1, the ARF group gave at least 10% fewer correct answers than the NARF group to questions 1, 10 and 11. However, the ARF group had more correct answers to question 6 (frequency of foot inspection, 20% more correct, *p*=0.025). The rest of the questions were answered similarly by both groups, with no or slight differences in the percentages of correct answers.

## Discussion

Using a very simple questionnaire this study found that patients with diabetes seen at this clinic have a reasonable knowledge regarding diabetic foot care. Most differences detected between the two groups were not statistically significant; however, the group at risk clearly had a better perception of the need for daily foot inspection. This finding is reassuring as daily foot inspection is one of the most important principles to adhere to for a person with a foot at risk. The general awareness of foot care was high in both groups, although all patients at our clinic do not routinely receive education on foot care.

The study from which we adapted our questionnaire (population based) found a mean score of 6.5 (SD 2.1), which is lower than that in our study (tertiary care clinic).<sup>10</sup> Other studies have also highlighted a lack of

**Table II. Responses to knowledge questionnaire from participants with feet at risk (ARF) compared with those whose feet were not at risk (NARF)**

Question (correct response)	ARF (% of correct responses)	NARF (% of correct responses)	p-value
1. People with diabetes should look after their feet because they are more liable to get flat feet (false)	25	35	0.32
2. People with diabetes should look after their feet because they may not feel a minor injury to their feet (true)	95	90	0.49
3. People with diabetes should look after their feet because wounds and infection may not heal quickly (true)	98.33	100	1.00
4. People with diabetes should look after their feet because they may get a foot ulcer (true)	96.67	93.33	0.68
5. People with diabetes should not smoke because smoking causes poor circulation affecting the feet (true)	95	95	1.00
6. How often do you think you should inspect your feet? (daily)	81.67	61.67	0.025
7. If you found redness/bleeding between your toes what is the first thing you would do? (visit clinic/doctor)	80	83.33	0.81
8. Even if you have never had a corn, what would you do if you had one? (visit clinic/doctor)	63.33	60	0.85
9. How often do you think your feet should be washed? (daily)	96.67	96.67	1.00
10. People with diabetes may walk barefoot (false)	78.33	88.33	0.22
11. How often do you think you should inspect the inside of your footwear for objects and torn lining? (daily)	75	86.6	0.16

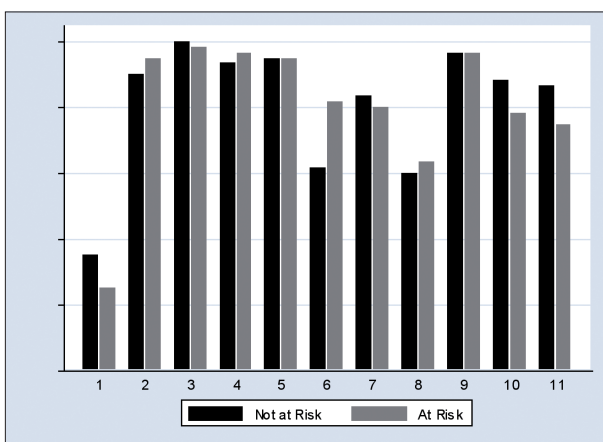


Fig. 1. Correct answers in the ARF and the NARF groups.

knowledge regarding diabetic foot care. Batista *et al.* found in 202 consecutive patients attending diabetic foot specialty clinics that in spite of an ongoing patient education programme only about 80% were able to respond appropriately to simple questions related to the care of their 'at risk' feet.<sup>11</sup> In an Iranian study of 148 patients the mean knowledge score was 6.6 (SD 3.0) out of a possible 16. Illiterate patients were the least knowledgeable ( $p=0.008$ ).<sup>12</sup>

In an interesting but small study from the Eastern Cape a qualitative evaluation was done on 5 men

aged 49 - 74 years and 10 women aged 30 - 64 years. In-depth phenomenological interviews and direct observation led to the conclusion that the participants had poor foot care knowledge and practices.<sup>13</sup>

Frequent screening in order to identify patients with feet at risk is important, as frequent screening with adequate foot care education and referral have been identified as effective measures for reducing ulceration and amputation.<sup>8</sup>

This study evaluated patient knowledge regarding foot care and not actual behaviour. We were therefore unable to ascertain whether screening ultimately leads to modified behaviour and reduced ulceration risk. The findings are encouraging as they demonstrate that knowledge on the part of these patients seen at the Pretoria Academic Hospital diabetes clinic was reasonable. However, we need to ensure that knowledge actually translates into better foot care behaviour.

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## NEWS • NEWS • NEWS • NEWS • NEWS • NEWS

### Burden of diabetes update

Diabetes mellitus was the eighth leading cause of death in high-income countries and the tenth leading cause of death in middle-income countries in 2004, and together with endocrine disorders was responsible for approximately 1.44 million (2.5%) deaths globally, according to the World Health Organization's latest Global Burden of Disease 2004 Update.

In the high- and middle-income countries diabetes and endocrine disorders were responsible respectively for 3.7% and 2.7% of deaths, while in the low-income countries these conditions were responsible for 1.9% of deaths. Within Africa they accounted for 2%, or about 0.24 million deaths.

Source: [www.who.int](http://www.who.int)

### Residual Risk Reduction initiative launched

Specialists from North America, Europe, Asia and Japan have come together to launch the Residual Risk Reduction initiative (R3i) – a global programme to evaluate and reduce the excess risk of myocardial infarction, stroke, kidney disease, loss of vision and non-traumatic limb amputation which exists in many patients with heart disease and diabetes despite optimal, currently available care.

The R3i, a worldwide, academic, multidisciplinary non-profit organisation, aims to successfully address the excessively high risk of macro- and microvascular complications in patients with atherogenic dyslipidaemia,

characterised by elevated triglycerides and low levels of high-density lipoprotein (HDL) cholesterol and unaddressed by current standards of care. This lipid abnormality is typical in patients with type 2 diabetes or metabolic syndrome and common in patients with established cardiovascular disease.

The president of the R3i, Professor Jean-Charles Fruchart of the University of Lille, France said: 'We now have unequivocal evidence from numerous studies showing that greater reductions in LDL cholesterol, blood pressure and blood sugar alone will have little, if any, additional impact on residual vascular risk. Therefore we urgently need new strategies to address other modifiable risk factors such as atherogenic dyslipidaemia, a strong contributor to residual vascular risk in millions of patients with diabetes and cardiovascular disease.'

The R3i will address this major public health problem. In its manifesto the R3i calls for:

- Original research to quantify the full extent of residual vascular risk in patients with atherogenic dyslipidaemia and to identify new targets for interventions.
- Educational programmes to create awareness of residual vascular risk and to encourage health care professionals, particularly primary care physicians, to translate available research findings into improved treatment strategies.
- Advocacy to ensure that the issue of residual vascular risk associated with atherogenic dyslipidaemia is given appropriate priority in national and international guidelines.

The R3i is led by a Board of Trustees and an International Steering Committee (ISC) of 21 officers and members from the disciplines of cardiology, diabetology, lipidology, endocrinology, epidemiology, nutrition, ophthalmology, nephrology and basic science. The legal body of the R3i will be a Foundation established in Switzerland. National organisations have been or are in the process of being established in more than 40 countries worldwide. These beneficiaries of the R3i Foundation will implement research and educational programmes in their respective countries and will also initiate their own national initiatives, according to the mission of the R3i.

The R3i Foundation will seek funding from multiple sources. Initial seed funding was provided by Solvay Pharmaceuticals.

The initial R3i research programme involves two worldwide epidemiological surveys which aim to quantify the full extent of residual macro- and microvascular risk associated with atherogenic dyslipidaemia in patients with heart disease and/or type 2 diabetes receiving current standards of care.

The R3i has also already begun to develop educational tool kits including a resource slide kit and a dedicated website including a CME-accredited programme. This will facilitate live web seminars (webinars) allowing physicians to interact and communicate with each other across the globe.

Source: [www.r3i.org](http://www.r3i.org)