

Foot care confidence in people with diabetes

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ABSTRACT

This study was a cross-sectional, descriptive investigation of seventy-three people with diabetes over fifty years of age in a regional Australian city (Greater Bendigo). The aim of the study was to determine how confident the participants were in undertaking various foot care activities, and whether an association could be found between confidence and various demographic characteristics of the sample. A modified version of the "Foot Care Confidence Scale" was used to measure confidence in the sample.

Results indicated a high level of confidence across the sample. Those who indicated that they undertook their own care of their feet were significantly more confident than those who relied on others. Those who indicated that they had seen a private podiatrist were significantly more confident than those who indicated they had seen a public podiatrist.

In general, people with diabetes aged over fifty years were very confident that they could undertake foot care activities. What is now essential is a predictive study that investigates the ability of the Foot Care Confidence Scale to predict actual behaviour with respect to foot care.

Keywords: diabetic foot, self efficacy, self care, questionnaires, foot care confidence

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INTRODUCTION

In Australia, diabetes affects over one million individuals and is associated with many chronic complications.¹ These include: cardiovascular disease; retinopathy; nephropathy; neuropathy; peripheral vascular disease; and chronic foot ulcers (and their potential sequelae including amputation) involving both micro and macro vessels.² Foot pathology as a result of diabetes is an important and costly problem, both to the affected individual and to society as a whole. Amputation of all or part of a lower limb is the most devastating result of diabetic foot disease. Over 2,500 amputations are performed each year in Australia and a study from the US has suggested that up to 80% of these amputations are preceded by a foot ulcer.^{3,4,5}

The biomedical approach to health provides an understanding of the biochemical processes of disease and ageing, however these biochemical changes are heavily influenced by behavioural and environmental factors.⁵ People suffering from diabetes and more specifically those suffering from complications to their feet because of diabetes are a good example of this. The underlying pathology of the diabetic foot is becoming increasingly clear; however, the incidence and prevalence of problems such as skin ulceration and lower limb amputation are not decreasing, despite determined efforts worldwide. There is a need to broaden the understanding of the psychosocial determinants of the diabetic foot.

This paper describes the application of a recently developed tool, the Foot Care Confidence Scale (FCCS), to examine how confident people with diabetes are in undertaking their own preventative foot care activities.⁶ The scale consists of twelve questions enquiring into the confidence people have in undertaking various foot care activities using a five-point Likert scale response to collect the data. Sloan undertook a validation study of the FCCS in 2002.⁶ The results showed a mean FCCS score of 48 (out of a total of 60) in a negatively skewed distribution, leading Sloan to state "(the) sample... viewed themselves as highly confident to care for their feet".⁶ It was also reported that the mean total score of those reporting self-care of their feet was significantly higher than those who reported that others cared for their feet.

The theoretical construct of self-efficacy underpins the FCCS. Self-efficacy was described by the Canadian psychologist, Albert Bandura, as "...beliefs in one's capabilities to organise and execute courses of action required to produce given attainments".⁵ Bandura suggested that what people are capable of doing with whatever skills they possess might not necessarily be indicative of what actions they undertake. How people behave for diverse purposes under diverse circumstances may be better predicted by the beliefs they have in the potential use of the skills they have.⁷ An essential component of self-efficacy theory is confidence. The aim of this study was to examine the

self-efficacy, or confidence of people with diabetes in undertaking various foot care activities.

METHOD

This cross-sectional, descriptive study was carried out during the months of February, March and April 2004. It was based in the City of Greater Bendigo, which is a regional Australian city with a population of approximately 90,000 people, 90% of whom are Australian born.⁸ A convenience sampling approach was used. In an attempt to capture a proportion of the population of interest that has diabetes and are over fifty years of age, questionnaires were placed in the waiting rooms of a selection of health care providers in Central Bendigo. These included a private podiatry practice, a general medical practice, the Bendigo Health Care Group (BHCG) and Community Health Bendigo. An age criterion of fifty years and over was set, as this was used by Sloan in the development the original FCCS.⁶

The questionnaires, a sealed collection box, stamped return-addressed envelopes and a poster introducing the study were placed in each waiting room. Potential participants were able to leave completed questionnaires in the sealed collection box, or were able to take a stamped return-addressed envelope and send it back to the researcher by post. Questionnaires were accepted between the dates of 1st February and the 30th April 2004 inclusive.

This study was undertaken using the FCCS with some modifications. There was a concern that the titles of the Likert scale type responses may be confusing. It was thought the terms "strongly confident", "moderately confident", "confident", "moderately not confident" and "strongly not confident" were unusual five-point Likert scale responses. The term "moderately not confident" in particular may be confusing to the respondent in the absence of somebody explaining what it means. For this reason, for the purposes of this study, the more traditional terms "strongly agree", "agree", "neither agree or disagree", "disagree" and "strongly disagree" were provided as options to a series of assertions. The final variation to the original FCCS made for the purposes of this study was to change five of the questions slightly. To reduce the risk of a response set bias, questions asked the respondent to agree or disagree with the same statements, but began with the premise "I can't..." instead of "I can".⁹ This difference was explained in the instructions for respondents before completing the questionnaire, and the word "can" or "can't" was in bold text. The total score possible for the modified FCCS used in this study was sixty, the same as the original FCCS. A graded scoring system was used whereby a score of five was given for the answer "strongly agree" to one where the answer was "strongly disagree". This system was reversed for the reverse questions (eg. a score of five was given for an answer "strongly disagree"). Please see Figure 2 for the FCCS questions used in this study.

The entire questionnaire was divided into two parts. Part 1 pertained to general information about the participant such as age, gender, chronicity of diabetes and diabetes control. It also asked some questions regarding some self-care tasks often required of people with diabetes such as whether they checked their own blood sugar levels and who was the most likely person to look after their feet. Part 2 was the modified FCCS. Approval

Demographics		n	%
Total		55	100
Gender	Males:	21	38.2
	Females:	34	61.8
Age (years)	51-60:	17	30.9
	61-70:	15	27.3
	71-80:	16	29.1
	81-90:	7	12.7
Years since diagnosis of diabetes	1-10:	34	61.8
	>10:	21	38.2
Questionnaire receipt	Private podiatrist:	18	32.7
	BHCG:	27	49.1
	GP Practice:	0	0
	Community Health Bendigo:	9	16.4
	Other:	1	1.8
Type of control	Diet:	17	32.1
	Tablets:	15	27.3
	Insulin:	23	41.8
Self control of diabetes	Yes:	43	78.1
	No:	11	20
	Missing data:	1	0.02
Admission to Hospital for diabetes related reason	Yes:	18	32.7
	No:	37	67.3
Podiatrist contact	Yes:	48	82.3
	No:	7	17.7
Where the podiatrist was seen	Public facility:	35	72.9
	Private facility:	13	27.1
Where the advice for diabetes/foot care education came from	Podiatrist alone:	16	29
	Podiatrist or other:	34	61.8
	No advice:	5	0.09
Doctor seen for diabetes	GP:	30	54.5
	GP/Specialist:	23	41.8
	No doctor:	2	0.04

was obtained from the Human Research Ethics Committee of La Trobe University, Bendigo and the Human Research Ethics Committee of the Bendigo Health Group.

RESULTS

In total, 78 questionnaires were returned. Five of these either indicated that they were under 50 years of age, or had not been diagnosed with diabetes. Seventy-three questionnaires were available for data analysis. Of these 73 respondents, 18 (25%) did not complete one or more questions on the FCCS, rendering the total confidence score incomplete. In all, 86 FCCS questions were not answered, 56% of those being questions on the last page of the questionnaire. The reverse-worded questions tended to be left unanswered more than the other questions.

Additionally, the mean individual item scores of the reverse-worded questions (questions 3, 5, 6, 10 and 11) combined yielded a lower overall mean value ($X=3.2$, $SD=1.14$) than the other questions combined ($X=4.5$, $SD=0.63$). A paired samples t-test was conducted to investigate this apparent difference in the mean scores. The reverse-worded questions achieved a significantly lower mean score than the normal questions ($t=-7.75$, $p=0.000$). The eta squared statistic (0.53) indicated a large effect size of the reverse-wording.

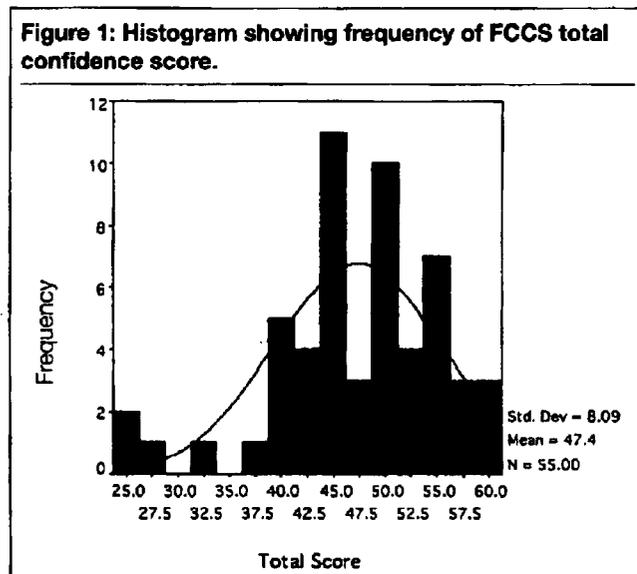


Figure 2: The FCCS questions used in this study.

1. I can protect my feet
2. I can look at my feet daily to check for cuts, scratches, blisters, redness or dryness
3. I can't dry between my toes after washing my feet
4. I can judge when my toenails need to be trimmed by a podiatrist
5. I can't trim my toenails straight across
6. I can't figure out when to use a pumice stone to smooth corns and/or calluses on my feet
7. I can test the temperature of the water before putting my feet into it
8. If I was told to do so, I can wear shoes and socks every time I walk (includes walking indoors)
9. When I go shopping for new shoes, I can choose shoes that are good for my feet
10. I can't call my doctor about problems with my feet
11. Before putting them on, I can't check the insides of my shoes for problems that could harm my feet
12. If directed to do so, I can routinely apply lotion to my feet

Table 2: Comparison of means for those that undertake their own foot care (independent samples t-test).

	n	Mean FCCS score	SD	t	p
Total	55	47.4	8.1		
Those that take part in their own foot care with help from others:	36	49.4	6.7		
Those that do not:	19	43.9	9.4	2.6	0.012*
Those that individually care for their feet:	17	51.5	5.9		
Those that do not:	38	45.6	8.3	2.6	0.011*
Those that take part in their own foot care with help from others:	19	47.5	6.9		
Those that individually care for their feet:	17	51.5	5.9	1.9	0.072

* p<0.05

Table 3: Comparison of means for diabetes-related variables and podiatric contact (independent samples t-test).

		n	Mean FCCS score	SD	t	p
Doctor seen for diabetes	GP:	30	48.0	7.2	0.317	0.752
	GP/Specialist:	23	47.4	8.5		
Check own blood glucose levels	Yes:	43	47.3	8.7	-2.84	0.778
	No:	11	48.1	5.9		
Admission to hospital for diabetes related reason	Yes:	18	45.9	7.9	-0.929	0.357
	No:	37	48.1	8.2		
Where the podiatrist was seen	Public:	35	45.8	7.6	-2.451	0.018*
	Private:	13	51.8	6.9		
Where the advice for diabetes and feet came from	Podiatrist alone:	16	48.6	5.3	0.858	0.395
	Podiatrist or other:	34	46.5	9.1		

* p<0.05

Using a Chi-squared analysis, no significant difference was found between the respondents who completed the FCCS and those who did not, in relation to gender ($\chi^2= 1.04$, $p=0.31$), age ($\chi^2= 0.62$, $p=0.89$), years since diagnosis ($\chi^2= 0.038$, $p=0.86$) or where the questionnaire was obtained ($\chi^2=0.000$, $p=1.0$). Table 1 displays the general demographic characteristics of the 55 who fully completed the FCCS. For these 55 respondents there was no significant difference in the mean scores according to gender ($t=-1.165$, $p=0.122$), age group ($F=1.525$, $p=0.22$), time since diagnosis of diabetes ($F=0.428$, $p=0.788$) or place of questionnaire receipt ($F=0.954$, $p=0.422$). As the analysis involved the comparison of means, independent samples t-tests and analysis of variance (ANOVA) tests were used.

The mean FCCS total score was 47.4 (SD=8.1) and the distribution of scores was negatively skewed (-0.836). Figure 1 displays a histogram of the FCCS total confidence score.

There was a wide variety of answers to question nine. When asked "Who is the person most likely to look after your feet?" respondents answered in a total of twenty-four different ways. Sixty-five percent of respondents who completed the FCCS indicated that they contributed to their own foot care, with half of these people being the sole person responsible for their foot care. The mean total FCCS score was significantly higher ($p=0.012$) for the respondents who indicated that they took part in their own foot care, than those that did not. Those who indicated that they were the only person caring for their feet had a higher mean total score than those who looked after their feet in combination with others; however, this difference did not reach statistical significance ($p=0.072$). A summary of these results is shown in Table 2.

Forty-eight of the 55 respondents indicated that they had seen a podiatrist at some stage. Of these, respondents who attended a podiatrist in a public setting had a significantly lower mean total score than those that attended a private podiatry clinic. There was no significant difference in the mean total scores in regard to the other variables measured. Table 3 displays these results.

DISCUSSION

Foot care confidence

Overall, the results of this study closely resembled those reported by Sloan's study in that the mean and standard deviation of the total scores of FCCS clearly demonstrated that in general, people aged over fifty with diabetes are confident they can undertake various foot care activities.

The results of this study suggest an association between high levels of confidence and self-reported behaviour. The most confident respondents in undertaking foot care activities indicated that they took part in their own foot care. Although this association is consistent with the predictions of self-efficacy theory, a causal relationship has not been established. For example, respondents may be confident that they can undertake various foot care behaviours because they actually take part in their own foot care. Alternatively, actually taking part in their own foot care may increase the confidence they have in undertaking future foot care behaviours. Furthermore, this study did not examine whether other factors may indirectly influence both confidence and behaviour, such as socioeconomic status or education level.

Of the forty-eight respondents who indicated they had seen a podiatrist at some time, those who saw the podiatrist in a private setting had a mean total score that was significantly higher than those who saw the podiatrist in the public sector. This may be explained by examining the likely patient profile in both the private and public podiatry sectors. The private nature of the clinic requires that patients themselves pay for the cost of the consultation, or partly with some sort of private insurance cover (an initial assessment at this clinic will cost over \$40, with review appointments a little less). In a social determinants of health framework, it is likely that those that can afford to attend the private clinic are in a more affluent socioeconomic position and this itself may contribute to higher levels of self-efficacy for a range of health behaviours, including their foot health needs.¹⁰ Those with a lower socio-economic status on the other hand, make less use of preventative and screening services in health.¹¹

A site used in this study was the waiting room of a publicly funded Diabetic Foot Clinic (DFC), a clinic headed by the researcher in this study. It is not known how many of the patients who attend the DFC completed the questionnaire. However, this high exposure and the fact that these patients know the researcher make it highly likely that there was a high response rate from these patients. Patients seen in the DFC require high-intensity treatment for complications to their feet due to diabetes or other neuropathy related conditions. At a minimum, patients must have peripheral neuropathy. They would have experienced any combination of peripheral neuropathy, ulceration, Charcot's Arthropathy and possibly amputation. It is possible that these respondents would be less confident in undertaking their own foot care as they suffer from diabetic foot complications and attend a clinic that is heavily involved in their care.

The modified FCCS

This study used a modified version of the original FCCS. The modifications may have had an impact on the previously established validity of the instrument. For example, the use of reverse-worded questions is likely to have had an impact on the scores on the FCCS. The mean score for the reverse-worded questions was significantly lower than that of the standard questions. The use of reverse-worded questions in the modified scale was an attempt to improve the methodological rigour of the self-administered questionnaire by decreasing the risk of a response set bias. However, as the majority of the respondents were overall very confident, it is possible response set bias was influential, in spite of the reverse-worded questions, lowering those individual mean scores and in turn the total scores. The reverse-worded questions were designed in such a way that the question was changed from an "I can" question to an "I can't" question. Despite the word "can't" being in bold text it is possible that the first two standard questions made the reader assume that all the questions were "I can" questions, and thus the reverse-worded questions may have not been considered carefully. Although the impact of these modifications on the validity of the FCCS is unknown, the overall results and distribution of FCCS scores were very similar to those found in the Sloan study. This supports the notion that the original validation was not seriously violated.

Self-efficacy – the theoretical framework

Two serious questions arise concerning the predictive ability of self-efficacy theory as applied in this study. Firstly, why were the respondents in this study so confident they could undertake foot care activities when the evidence suggests that people with diabetes do not actually do these activities? Secondly, if it is granted that a reasonable proportion of the respondents in this study actually have serious complications to their feet from diabetes and require intensive help from health professionals, then why are they confident they can look after their own feet?

Further research is required to address these issues. However, some possible reasons are worth considering. For example, the concept of self-efficacy has not been thoroughly examined in the field of diabetes management. There has been little predictive testing of the diabetes self-efficacy tools developed thus far. Self-efficacy has been shown to be a good

predictor of behaviour in a variety of health settings such as smoking cessation, weight control, pain management, cardiac rehabilitation and health preventative programs.^{5,12} When reviewing the literature in regard to self-efficacy and diabetes management, all the tools used have undergone a validation process, however their predictive value has yet to be definitively tested.^{6,13,14,15,16}

Another possible explanation is that people are confident in undertaking foot care activities and actually do them – but undertaking foot care activities does not actually reduce the likelihood of complications to their feet, such as ulceration and amputation. This is unlikely however, for two reasons. Firstly, there is evidence to suggest that people with diabetes do not look after their feet well.^{17,18,19,20} Secondly, although recently criticised in terms of methodology, there is also some evidence to suggest that education programs that aim to improve foot care behaviour can lower the incidence of ulceration and amputation, especially in the short term.^{21,22,23}

The possible ambiguities presented above make it imperative that an investigation takes place to test the value of the FCCS in predicting actual behaviour. Until this is done, the role of self-efficacy to predict how people with diabetes will actually behave towards their feet will remain uncertain.

Limitations of study

The convenience method of recruitment used in this study ensured that overwhelmingly respondents were in contact with a podiatrist, either in the private or public setting. It is possible that this does not reflect the Bendigo population of those with diabetes over fifty years of age. Self-selection into the study is also a limitation, in that leaving questionnaires in waiting rooms may attract a particular type of respondent eg. the person who notices health information in waiting rooms and is willing to take part. It is also possible that people who have increased confidence in undertaking their own foot care will be more eager to complete a questionnaire on foot care than those with less confidence.

The FCCS is a quantitative tool. It has been suggested that a qualitative approach may be more useful in determining foot care knowledge than a quantitative approach.¹⁹ Stuart and Wiles found that peoples' actual understanding of foot care practices fell short of their apparent knowledge of the foot care practices as recorded in a quantitative manner, and questioned the usefulness of using quantitative questionnaires to assess diabetic foot care knowledge. Unfortunately, most of the studies that examine foot care knowledge have used a quantitative questionnaire. The FCCS does not assess foot care knowledge or behaviour, but confidence, so it is unclear to what extent this may be a problem.

This study also has some statistical limitations. The sample size used is small. The main effect of this problem is a lowering of the power of the study, increasing the risk of a type II error (not identifying a significant difference between groups when in reality there is one). Additionally, the number of statistical analyses (comparison of means) increases the risk of a type I error (that a significant difference between groups is found when in reality a significant difference does not exist). In this study, parametric statistical testing was undertaken. This could be seen

as a violation of the normal distribution assumption for parametric testing to occur. As can be seen in Figure 1, the distribution of data was negatively skewed. Parametric testing was chosen in this study as the main dependent variable used for comparison was continuous.

Implications for future research

What is required now is longitudinal research that examines actual behaviour and its relationship with confidence. If discernable levels of self-efficacy beliefs predict certain behaviour, then health practitioners can recognise those less likely to undertake preventative foot care behaviours. Larger samples are required to attain results that are more powerful and to detect significant differences between subgroups that may have been missed in this study due to the small sample size. A qualitative examination may also be useful to investigate and understand some of the anomalies found in this study.

CONCLUSION

Overwhelmingly, people aged over fifty years with diabetes in this study were very confident that they could undertake various foot care activities. This general high level of confidence does not necessarily signify that people actually do these activities, despite the predictions of self-efficacy theory. The limited research into the behaviour of people at risk of diabetic foot complications suggests that there is poor understanding and knowledge of preventative foot care practices, and that these practices are not undertaken particularly well.

Whilst the FCCS used in this study produced clear results that the respondents were very confident they could undertake foot care activities, whether the respondents actually did these activities or whether this high confidence would help prevent future complications to their feet remains unclear. The predictive ability of self-efficacy to influence future behaviour in the area of diabetic foot health needs further investigation.

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