Evaluation of the effect of nurse education on patient reported foot checks and foot care behaviour of people with diabetes receiving haemodialysis

Evaluation of foot care education for haemodialysis nurses

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Conflicts of Interest

The authors declare no conflict of interest

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Novelty Statement

- Quick and simple foot checks can be carried out by nurses on busy dialysis units.
- Educating nurses about the need for checking patients' feet increased the frequency that foot checks were carried out.
- Completing questionnaires about foot-care behaviour improved the frequency of carrying out recommended foot care behaviours.

Abstract

Aims

The aim was to assess whether a programme of nurse education increased the frequency with which nurses conducted foot checks on people with diabetes having haemodialysis and to evaluate whether this influenced self-reported foot care behaviour.

Methods

A non-randomised stepped wedge design was used to evaluate a nurse education programme implemented in four UK NHS dialysis units. People with diabetes undergoing haemodialysis were invited to complete a questionnaire on the frequency of foot examination by health professionals, on the presence of foot problems and on their own foot-care behaviour, using the Nottingham Assessment of Functional Foot-care (NAFF). An education session for nurses, including procedures for foot examination, was conducted sequentially in each of four haemodialysis units. The questionnaire was repeated at two monthly intervals.

Results

The education session resulted in a significant increase in the reported examination of feet by nurses (p=0.007). There was also a significant improvement in reported foot-care behaviour (p<0.001) but this occurred between first and second two-monthly assessments and was unrelated to the timing of the intervention.

Conclusions

A single education session can improve the routine checking of feet of people with diabetes undergoing haemodialysis. The administration of the NAFF was associated with improved self-reported foot care behaviour, reflecting greater awareness of risk in this population.

Introduction

People undergoing dialysis have a high prevalence of diabetes [1,2] The risk of developing diabetic foot disease is much higher in those with renal impairment [3] and their outcomes, including amputation and mortality, are also worse than for people without renal disease [4].

There is a need to more effectively manage diabetic foot disease in people undergoing dialysis. Renal focused health professionals view foot problems as a minor part of an already complex set of care needs [5] and the focus of medical attention is diverted to the process of dialysis [6]. There have been calls for improved foot care and education from both individuals with diabetes and renal health professionals, in order to improve outcomes [7]. Valabhji [8] suggested that foot surveillance programmes could significantly improve outcomes if they result in more rapid access to specialist care when diabetic foot disease occurs. Selfmanagement education has been shown to have positive effects on both amputation rates and quality of life in patients on dialysis units [9].

The aim of this study was to evaluate whether training of nursing staff on haemodialysis units to carry out foot examinations and to educate people with diabetes on the importance of foot care, was reflected in the frequency of foot examination and reported foot-care behaviour.

Participants and methods

No ethical approval was required as the study was a service evaluation. A non-randomised stepped wedge design was used [10, 11].

All people with diabetes attending four haemodialysis units in the Nottingham area were invited to complete a questionnaire, which comprised questions on demographic variables, the number of times health professionals (nurse, podiatrist and doctor) had examined their feet, foot self-care behaviour (using the Nottingham Assessment of Functional Footcare (NAFF) [12] and the number of active foot problems..

A single education session was delivered to six identified nurses by an experienced diabetes podiatrist, and included a protocol for monthly foot examination, clarification of referral processes to specialist services and foot care information for patients. The nurses trained were diabetes link nurses at each of the respective units. These nurses had an interest in diabetes care and the training was congruent with their link nurse role. The nurses who were trained were encouraged to pass on the information to their colleagues. The aim of the foot check was to identify active, previously unreported foot problems and to deliver foot care advice. The intervention was introduced to one of the the four participating units in sequence every two months. The order of introduction to the different units was not-randomised but was pragmatic

The questionnaire on the frequency of foot examination by health professionals and the NAFF were repeated for all patients attending each unit at two monthly intervals for 8 months..

Results

There were 95 people with diabetes attending for haemodialysis included in the evaluation. The mean age was 67.7 years (SD 12.3) and 52 (54.7%) were men.

The demographic characteristics and baseline scores for patients on each unit were compared using chi-squared for categorical data and ANOVA for ordinal data. . There were no significant differences between units at baseline (p>0.05).

Chi-squared analysis was used to examine the effect of the intervention over time. Cross tabulation of the proportion of patients examined by nurses, podiatrists and doctors are shown in Table 1.

There was an overall significant effect of time on the rate of examination by nurses. With an increase in the frequency of examination occurred following the intervention programme (p=0.007). Significant effects of time were also seen in two of the four individual units. There was no significant overall effect of time in the frequency of foot examination by podiatrists (p=0.29) or doctors (p=0.56), although there was a significant increase in foot examination by podiatrists in one unit following intervention (p=0.007). These results support the effect of the intervention on foot examination by nurses.

There was no significant overall effect on the frequency of self-reported foot problems ($Chi^2 = 7.9 p = 0.10$), with no significant effect of time in any of the units (Unit 1 $Chi^2 = 3.2 p = 0.51$; Unit 2 $Chi^2 = 5.9 p = 0.21$; Unit 3 $Chi^2 = 2.74.7 p = 0.32$; Unit 4 $Chi^2 = 6.5 p = 0.62$).

Scores on the NAFF were examined using a two way ANOVA. There was a significant effect of unit (F= 12.4 df 3, 290 p<0.001) and time (F= 83.3 df 4, 290 p<0.001) on NAFF scores and a significant unit by time interaction (F= 1.9 df 12, 290 p= 0.03). The results are also shown in Table 1. These indicate most change occurred between baseline and the second assessment, and not in response to the instigation of the intervention. There was a statistically significant difference between baseline and 8 months in the sample as a whole (p<0.001).

Discussion

The findings show that following education of nurses on haemodialysis units about the need for regular foot checks in people with diabetes on dialysis, there was a change in the frequency with which nurses examined patients' feet and in reported foot-care behaviour. There was no significant effect on the frequency of foot examination by podiatrists or doctors or on the self-reported frequency of foot problems. The patients were comparable across dialysis units on demographic characteristics, baseline frequency of foot checks, and on the NAFF. The pattern of results suggested the intervention was associated with an increase in the frequency of foot checks undertaken by nurses but not by podiatrists or doctors. The intervention was not, however, directed towards doctors even though they were aware of the education programme being offered. This supports the interpretation that the change in frequency of nurse foot checks was in response to the intervention and not part of an overall awareness being raised as a result of the study taking place.

The pattern of results on the NAFF suggested that simply administering the questionnaire led to an improvement of self-reported foot care behaviours. Scores improved in all four units between baseline and the second assessment despite the intervention only having been implemented at one unit. Administration of the NAFF may have raised awareness of foot-care amongst the patients and this alone may have caused the improvement. Despite this, nurses reported anecdotally that there was an increase in people asking for foot care advice and an improvement in communication between patients and nurses with regard to foot care. Podiatrists reported an increase in the number of relevant referrals to their service, with improved communication between the dialysis units and the podiatry service. These findings support some previous research [8] on access to specialist services,

There are limitations to the study. The order of delivery of intervention to the units was not randomised. The assessments were collected by the staff involved in the study and therefore data entry was not blind to whether patients were attending units where education of nurses had taken place. It is not known how many individuals were asked to complete the questionnaires, so the response rate is unknown. There were some missing data on questionnaires and therefore the number of patients at each stage was not consistent (see Table).

However, the overall results suggest the possibility that the request to complete the NAFF questionnaire itself resulted in an improvement in self-reported foot-care, while the education programme led to an increased frequency of nurses undertaking foot checks. The stepped wedge design proved a practical way of evaluating a clinical service. The results also indicate that a fully powered study with randomisation of units to the delivery of education and objective recording of patient outcomes is warranted.

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Table 1 Evaluation of the effect of intervention over time in foot care examination and on foot-care behaviour

Unit	Time from Baseline (months)	Examination by nurse		Examination by podiatrist		Examination by doctor		Nottingham Assessment of Functional Footcare	
		Yes	No	Yes	No	Yes	No	Mean	SD
1	0	12	17	8	20	8	21	35.4	8.0
	2	18	4	14	9	5	18	54.8	8.7
	4	22	6	17	10	9	18	56.3	10.4
	6	15	2	6	11	2	15	37.7	6.5
	8	18	7	18	7	8	17	58.4	7.0
		Chi ⁻ = 16.6 p= 0.002		Chi ⁻ = 14.1 p= 0.007		Chi ² = 3.2 p= 0.52			
2	0	8	14	8	14	7	15	36.7	6.0
	2	6	12	5	13	4	14	54.9	7.1
	4	6	8	3	11	4	9	53.2	8.7
	6	4	7	4	7	3	8	38.0	7.1
	8	6	6	3	8	3	8	55.6	7.4
		$Chi^2 = 1.0 p = 0.90$		Chi ² = 1.2 p= 0.88		Chi ² = 0.5 p= 0.97			
3	0	4	7	5	9	3	11	37.2	6.9
	2	4	8	6	9	3	12	56.3	7.6
	4	2	9	2	3	2	3	54.2	10.5
	6	0	9	6	4	4	6	35.2	8.2
	8	12	2	6	8	1	13	55.6	7.4
		Chi [∠] = 6.5 p= 0.16		Chi [∠] = 1.6 p= 0.82		$Chi^2 = 4.6 p = 0.33$			
4	0	27	49	3	8	0	11	35.0	6.8
	2	33	34	5	7	3	9	50.0	9.6
	4	32	26	3	8	3	8	37.6	9.6
	6	26	21	4	6	0	10	30.8	8.4
	8	43	22	5	9	5	9	51.9	8.9
		Chi ⁻ = 20.9 p<0.001		Chi ² = 0.9 p= 0.92		Chi ² = 8.2 p= 0.08			
Overall		Chi ² = 14.1 p= 0.007		Chi ² = 5.0 p= 0.29		Chi ² = 3.0 p= 0.56			

Shading shows data obtained after implementation of the intervention