Patient knowledge of risk factors 18 months after a nurse-led vascular intervention

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Background and aims: Eighteen months after the completion of a vascular risk intervention study, the authors aimed to ascertain whether participants who attended the intensive, nurse-led group had better retention of knowledge of diabetes and heart disease compared with those who had undergone standard diabetes care. *Method:* A knowledge-based questionnaire was sent to participants who completed the vascular risk intervention study, 94 from the intensive, nurse-led group and 94 from the standard care group. *Results:* A response rate of 75% was achieved. Although more participants in the intensive group achieved recommended vascular risk targets, there was no increase in retained knowledge of vascular risks. A high proportion of the total cohort could not quantify targets for blood pressure (67.2%), cholesterol (65.1%) or HbA_{1c} (68.1%). *Conclusion:* In this cohort of people with type 2 diabetes, knowledge retention regarding treatment targets was poor. Education programmes should stress awareness of vascular risk factors and diabetes.

Type 2 diabetes (T2D) is a progressive condition associated with vascular complications, requiring a multifaceted approach to risk management, rather than a glucocentric programme to reduce microvascular complications (Beckman et al, 2002; Campos, 2007). In addition, diabetes care should include management of cardiovascular (CV) risk factors that are commonly seen in people with T2D, such as hypertension, dyslipidaemia, lack of physical activity, smoking and poor diet (Gaede and Pedersen, 2005).

Well informed and motivated people with diabetes are more inclined to reach and maintain good control of their risk factors, resulting in reduced CV morbidity rates and slower progression of microvascular disease (Rachmani et al, 2002; 2005). However, little is known about the understanding of blood pressure (BP) (Stewart et al, 2005) or awareness of BP and lipid targets that people with diabetes

Article points

1. A study was undertaken to compare the retention of diabetes and heart disease knowledge between two groups (nurse-led vs standard care) 18 months after completion of a nurse-led vascular intervention.

2. Well informed people with diabetes were more inclined to reach and maintain their vascular risk targets.

3. Patient education programmes need to focus on the cardiovascular risk associated with hypertension and dyslipidaemia, as well as glycaemic control.

Key words

- Education
- Heart disease
- Nurse-led
- Vascular risk

Authors' details can be found at the end of this article.

Page points

1. The aim of the present study was to compare the retention of diabetes and heart disease knowledge between the two groups (nurse-led vs standard care) from the intervention study at 18 months after study completion.

2. A questionnaire was devised, consisting of four sections: demographics, including treatment and management of diabetes; knowledge of vascular risks; knowledge of heart disease; attitudes towards diabetes management.

3. After exclusions, 179 questionnaires were sent out: 88 to participants in the intensive, nurse-led group and 91 to those in the standard care group.

have, especially those with established vascular disease (Cheng et al, 2005a; 2005b).

Background

The authors previously conducted a vascular risk intervention study to determine whether an intensive, nurse-led clinic could achieve recommended vascular risk reduction targets in people with T2D compared with standard diabetes care (MacMahon Tone et al, 2009). The results demonstrated that the intervention was more successful in attaining BP, cholesterol and glycaemic targets than standard care.

The aim of the present study was to compare the retention of diabetes and heart disease knowledge between the two groups (nurse-led vs standard care) from the intervention study at 18 months after study completion. The authors hypothesised that participants in the intensive group, who had received more focused input, would retain greater knowledge.

Methods

Protocol for the intervention study has previously been described (MacMahon Tone et al, 2009). In brief, 200 people with T2D and at least one additional CV risk factor were randomised to standard follow-up in the outpatient clinic, or intensive, nurse-led care in a vascular intervention clinic. The intensive group received more frequent review (every 2–3 months) and were given individual education on diet, weight reduction, exercise, alcohol consumption and smoking, and on how blood tests results and BP readings related to current recommendations. Five participants dropped out from the standard group (two died, three defaulted), seven dropped out from the intensive group (one died, six defaulted).

Therefore, follow-up data were available for 94 people in each group.

Although Wagner et al (2005) developed the Heart Disease Fact Questionnaire for heart disease and its relationship with diabetes, there is currently no standardised instrument to assess attitudes, knowledge or awareness of hypertension or coronary heart disease. Thus, a questionnaire was devised, consisting of four sections: demographics, including current treatment and management of diabetes (Table 1); knowledge of vascular risks; knowledge of heart disease; attitudes towards diabetes management. The questionnaire was piloted with five of the study participants and 35 medical and nursing colleagues.

Ethical approval was sought and obtained from Beaumont Hospital Ethics Committee. Consent was assumed by completion of the questionnaire. No form of identification was incorporated in the questionnaires, therefore respondents' anonymity and confidentiality were guaranteed.

Data from 188 participants (94 in each group) who completed the vascular risk reduction study were reviewed. After exclusion of individuals who had died (*n*=4) and those who took part in the pilot study (*n*=5), 179 questionnaires were sent out: 88 to participants in the nurse-led (intensive) group and 91 to those in the standard care (control) group.

Chi-squared was used to determine associations between categorical variables and the standard and intensive groups. Statistical significance was identified by $P<0.05$. Only participants who answered all questions were included in the analysis. Analysis was performed using the Statistical Package for Social Sciences (SPSS 13.0; Chicago, USA).

Results

A total of 134 questionnaires were returned (response rate 75%). Response rates were similar between the two groups: 76% in the control group and 74% in the intensive group. The majority of the overall cohort (66.4%) were aged ≥60 years and 57% were male. There was no significant difference in age or gender between the two groups.

Table 1. Diabetes treatments being taken by study participants.			
	Group		
	Control	**Intensive**	**Total**	**P-value**
Diabetes treatment	(*n*=68)	(*n*=64)	(*n*=132)	
Diet controlled only	8 (11.8%)	4 (6.3%)	12 (9.1%)	n/s
Diet and tablets	39 (57.4%)	37 (57.8%)	76 (57.6%)	n/s
Diet, tablets and insulin	7 (10.3%)	13 (20.3%)	20 (15.2%)	n/s
Diet and insulin only	14 (20.6%)	10 (15.6%)	24 (18.2%)	n/s

Of those who answered the question regarding diabetes treatment, 57.6% were being treated with oral antidiabetes drugs (OADs), 18.2% were on insulin therapy and 15.2% were on a combination of OADs and insulin; there was no significant difference between the groups (*Table 1*).

Table 2 shows the results for all the responses to the questions pertaining to glycaemic control, BP, cholesterol and heart disease and circulation.

Discussion

The results demonstrate that participant knowledge of vascular risk factors was similar between the two groups. Most participants in both the intensive and control groups did not know what their ideal targets should be for HbA_{1c} level (59.6% vs 75%, respectively), BP (62.1% vs 71.6%, respectively) and cholesterol (58.6% vs 70.6%, respectively); the differences between the groups were all non-significant. In contrast, the majority in both groups (82.3% vs 72.5%, respectively) did know what their ideal blood glucose level target should be. Furthermore, the majority were aware that heart disease (88.7% vs 89.7%, respectively), stoke (83.3% vs 82.4%, respectively) and hardening of the arteries (71.4% vs 67.2%, respectively) are complications associated with diabetes; the differences between the groups were all non-significant.

Given the lack of difference between the groups, it is evident that only 31.9% of the pooled participants knew their ideal HbA_{1c} level (*Table 2*). This finding differs from that of a nationwide survey conducted by the Diabetes Federation of Ireland (DFI, 2005), in which 80.0% of people knew the recommended HbA_{1c} target level, 74.0% knew their current HbA_{1c} level and 71.0% had discussed their HbA_{1c} level with their doctor or nurse. The DFI (2005) suggested that ongoing education campaigns are vital for encouraging people with diabetes to manage their condition more effectively.

However, it important to note that in the current study, the majority of participants indicated that they knew how important blood glucose control is in the treatment of diabetes and what their ideal blood glucose level is.

The finding that 91% of the pooled participants group were aware that BP control is important in the treatment of diabetes contrasts with that of Stewart et al (2005). The lack of awareness of BP targets has also been demonstrated by Cheng et al (2005a) in a cohort of people with coronary artery disease (CAD), of whom only 48.9% knew both their systolic and diastolic BP targets. Cheng et al concluded that despite, the national public health campaigns being run in the USA – and the fact that the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (1997) and Chobanian et al (2003) have specifically recommended that physicians

Table 2. Participant responses to questions relating to glycaemic control, blood pressure, cholesterol, and heart disease and circulation.

No. of participants who answered the questions (n=total; n=control/n=intensive)		Group			
		Control	Intensive	Total	*P*-value
Questions pertaining to glycaemic control					
Ideal HbA$_{1c}$ level	Correct	16 (25.0%)	21 (40.4%)	37 (31.9%)	n/s
(116: 64/52)	Incorrect/don't know	48 (75.0%)	31 (59.6%)	79 (68.1%)	
Ideal blood sugar level	Correct	50 (72.5%)	51 (82.3%)	101 (77.1%)	n/s
(131: 69/62)	Don't know	19 (27.5%)	11 (17.7%)	30 (22.9%)	
How important is blood sugar	A little	2 (3.0%)	3 (4.9%)	5 (3.9%)	n/s
control in the treatment of	A lot	61 (92.4%)	58 (95.1%)	119 (93.7%)	
diabetes? (127: 66/61)	Don't know	3 (4.5%)	0 (0.0%)	3 (2.4%)	
It would be easier to control my	Agree	46 (70.8%)	49 (81.7%)	95 (76.0%)	n/s
diabetes by having a check-up every	Disagree	6 (9.2%)	4 (6.7%)	10 (8.0%)	
2–3 months (125: 65/60)	Undecided	13 (20.0%)	7 (11.7%)	20 (16.0%)	
Questions pertaining to blood pressure					
Ideal blood pressure	Correct	19 (28.4%)	22 (37.9%)	41 (32.8%)	n/s
(125: 67/58)	Incorrect/don't know	48 (71.6%)	36 (62.1%)	84 (67.2%)	
How important is blood pressure	A little	1 (1.6%)	3 (5.0%)	4 (3.3%)	n/s
control in the treatment of	A lot	55 (88.7%)	56 (93.3%)	111 (91.0%)	
diabetes? (122: 62/60)	Don't know	6 (9.7%)	1 (1.7%)	7 (5.7%)	
Weight gain affects your	True	65 (90.7%)	58 (100%)	123 (98.4%)	n/s
blood pressure (125: 67/58)	False/don't know	2 (3.0%)	0 (0.0%)	2 (1.6%)	
I have received enough information	Agree	48 (77.4%)	50 (86.2%)	98 (81.7%)	n/s
regarding blood pressure and	Disagree	4 (6.5%)	0 (0.0%)	4 (3.3%)	
diabetes (120: 62/58)	Undecided	10 (16.1%)	8 (13.8%)	18 (15.0%)	
Questions pertaining to cholesterol					
Ideal cholesterol level	Correct	20 (29.4%)	24 (41.4%)	44 (34.9%)	n/s
(126: 68/58)	Incorrect/don't know	48 (70.6%)	34 (58.6%)	82 (65.1%)	
How important is reducing	A little	2 (3.1%)	2 (3.4%)	4 (3.3%)	n/s
cholesterol in the treatment	A lot	54 (84.4%)	53 (91.4%)	107 (87.7%)	
of diabetes? (122: 64/58)	Don't know	8 (12.5%)	3 (5.2%)	11 (9%)	
High cholesterol can affect your	True	61 (92.4%)	55 (93.2%)	116 (92.8%)	n/s
blood vessels (125: 66/59)	False/don't know	5 (7.6%)	4 (6.8%)	9 (7.2%)	
I have received enough information	Agree	45 (73.8%)	48 (85.7%)	93 (79.5%)	n/s
regarding cholesterol and diabetes	Disagree	6 (9.8%)	1 (1.8%)	7 (6.0%)	
(117: 61/56)	Undecided	10 (16.4%)	7 (12.5%)	17 (14.5%)	
Questions relating to heart disease and circulation					
The following are problems associated with diabetes:					
Heart disease	True	61 (89.7%)	55 (88.7%)	116 (89.2%)	n/s
(130: 68/62)	False/don't know	7 (10.3%)	7 (11.3%)	14 (10.8%)	
Stroke	True	56 (82.4%)	50 (83.3%)	106 (82.8%)	n/s
(128: 68/60)	False/don't know	12 (17.6%)	10 (16.7%)	22 (17.2%)	
Hardening of the arteries	True	45 (67.2%)	40 (71.4%)	85 (69.1%)	n/s
(123: 67/56)	False/don't know	22 (32.8%)	16 (28.6%)	38 (30.9%)	

educate patients about their BP levels – current BP education efforts appear inadequate.

During the authors' previous intervention study (MacMahon Tone et al, 2009), BP targets were discussed with participants in the intensive group at every visit; however, the results of the follow-up questionnaire indicate that they did not retain this information. Stewart and Kendrick (2005) found that negotiating targets for BP and HbA$_{1c}$ levels with people with T2D does not routinely happen in primary care and that even when individual targets are negotiated, they are often unrecorded.

Of concern is that only 34.9% of this study cohort knew their ideal cholesterol level. Similarly, Cheng et al (2005b) found that 50% of their study cohort of people with CAD could name targets for total cholesterol levels. It is difficult to ascertain the reason for this perceived lack of knowledge regarding target cholesterol levels in the intensive group in the present study, as diet and exercise, both of which contribute to reducing cholesterol levels, were discussed with these individuals at each visit. However, 87.7% of the participants in this study indicated that they knew how important reducing cholesterol levels was in the treatment of diabetes and 92.8% appeared to be aware that high cholesterol levels can affect blood vessels.

Knowledge of heart disease and its relationship with diabetes was also explored. The results show that high proportions of the study cohort were aware that heart disease and stroke are complications associated with diabetes. This is in contrast to findings by Merz et al (2002), who found that a high proportion of people with diabetes did not consider CV disease to be a serious complication of diabetes. In addition, Diabetes UK (2002) found that <20% of people with diabetes knew about the increased risk of heart disease associated with diabetes. A more recent study concluded that only 50% of participants specified cardiac disease as a potential complication of diabetes and only 17% made the association with stroke (O'Sullivan et al, 2009).

Burden and Burden (2001) suggested that if people with diabetes are advised that they are not meeting their target BP, cholesterol and HbA$_{1c}$ levels, they should ask their doctor of the reasons for this, discuss whether lifestyle measures would be beneficial and discuss medication options. In the present study, 93.8% of the total cohort agreed that being informed of their BP and blood glucose results at each visit would be helpful in managing their diabetes.

Involving people with diabetes in decisions regarding their diabetes management is vital, but some may not wish to take an active role (Asimakopoulou, 2007); the healthcare professional must respect the wishes of the individual. Norris et al (2001) suggested that programmes which actively involve people with diabetes in the educational process appear more successful in improving glycaemic control than teaching programmes that focus only on imparting knowledge. Active participation in their care is a critical factor for individuals to improve adherence to treatment (Aminoff and Kjellgren, 2001). Therefore, assessment of patient knowledge is important for education to be tailored to meet individual needs (Wagner et al, 2005). In addition, it is key to set behavioural goals with the individual; these should be documented in their notes and they should also receive their own copy.

A study limitation is that the questionnaire design was based on self-reporting by participants, thus there is no means of verifying whether the information is accurate. In addition, participants may have received information from other sources during the 18-month period between the intervention study and this follow-up analysis. Another drawback is that the questionnaire was not validated, which could indicate a weakness of the study; however, there is currently no other questionnaire available that assesses the areas covered in this study.

Implications for clinical practice

The key issues leading to nurse-led success in CV risk management and motivating behavioural change in people with diabetes include: dedicating time to listening

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to the individual's concerns; providing encouragement and lifestyle advice; and measuring and monitoring risk factors (Wiles, 1997; McHugh et al, 2001; Wright et al, 2001). However, these approaches would have cost implications in the acute care setting (Taylor et al, 2003).

Diabetes education and treatment programmes need to provide education on not only the consequences of prolonged hyperglycaemia (Kester, 2004), but also the associated risk factors of hypertension and dyslipidaemia. Teaching programmes should be person-centred, flexible and quality assured (Kester, 2004). The literature shows that structured education improves metabolic control, wellbeing and quality of life, in addition to providing dietary freedom (Harkin, 2006; Davies et al, 2008). However, providing this form of education is costly (Kester, 2004; Hill et al, 2006). Education needs to be ongoing, reiterated and updated at appropriate intervals (Kester, 2004) to aid retention of information.

Since this study was completed, the authors have implemented a structured education programme in their diabetes unit. A vascular risk, nurse-led clinic has been introduced, and they are in the process of developing a diabetes passport to aid communication between primary and secondary care and to enable people with diabetes to be more actively involved in their diabetes management.

Conclusion

This study demonstrates that retention of knowledge regarding vascular risk factor targets was poor among people with T2D, irrespective of receiving intensive, nurse-led or standard diabetes care. However, the awareness of the importance of control of vascular risk factors was encouraging and compared well with previous studies. Patient education programmes for this high-risk population should focus on the CV risk associated with hypertension and dyslipidaemia, but this needs to be combined into an education programme that addresses all aspects of vascular risk reduction. ∎

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