

A survey of patients' knowledge of their diabetes medication

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Article points

1. An understanding of the side effects of diabetes medications was lacking in the studied population.
2. The role of the community pharmacist could be better utilised in patient education.

Key words

- Patient education
- Oral hypoglycaemic agents

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Helping people take control of long-term medical conditions is one of the key themes in the recent white paper *Our health, our care, our say: a new direction for community services* (DoH, 2006a). The correct use of medicines has been highlighted as one of the ways in which people with diabetes can be supported in their efforts to self care (DoH, 2006b). It can also result in improved health outcomes for the individual and more effective use of resources for the healthcare provider (Rhee et al, 2005). This study set out to discover who was providing people with information about their diabetes treatment and by what means this was given, and to infer what could be done to ensure the messages surrounding diabetes medication and adherence were communicated successfully.

Despite the evidence to show that improved glycaemic control using oral hypoglycaemic agents (OHAs) reduces microvascular disease in type 2 diabetes, with its associated morbidity and mortality, adherence to OHAs remains sub-optimal (UK Prospective Diabetes Study [UKPDS] 1998a; UKPDS, 1998b; Donnan et al, 2002). The Diabetes Information Jigsaw revealed that 1 in 5 people with diabetes think it is not very important to take their diabetes medication daily as per their doctor's or nurse's instructions (Diabetes UK, the Association of the British Pharmaceutical Industry, 2002).

One of the influencing factors in adherence to treatment regimens is the content and consistency of information given to individuals (Vermiere et al, 2003). A study by Browne et al (2000) revealed that only 35% of people with diabetes recalled receiving advice about their medication, the majority of which was given verbally. Only 10% of participants in the study who were taking sulphonylureas knew that hypoglycaemia was a possible side effect. Dunning and Manias (2005) demonstrated a much higher level of information was being conveyed to people with type 2 diabetes: 93% of participants in this Australian study were

informed about how and when to take their hypoglycaemic medicines. However, only 37% were given information about side effects.

Aims

The current vision for the management of long-term conditions includes improved multidisciplinary working and a greater role for community pharmacists, together with increased participation from patients (DoH, 2006a). In order to inform this process locally, the authors set out to investigate how people with type 2 diabetes obtain information about their diabetes medication, what effect this information had on self management and whether or not knowledge of prescribed medications impacted upon glycaemic control.

Methods

A questionnaire comprising 24 short-answer questions was devised and distributed to people referred to the diabetes nursing service. The sample was based on a convenience sample of individuals who were referred to the diabetes nursing service. All participants needed to have been prescribed oral hypoglycaemic medication for a minimum of 2 years.

Where possible, participants were asked to complete the questionnaire independently while in the hospital or clinic outpatient department. A few individuals took the questionnaire home and returned it at a later stage.

The topics covered were:

- background information
- the range of tablets taken for diabetes
- the name and appearance of tablets
- when and why the tablets are taken
- known side effects
- sources of information
- glycaemic control.

Each individual's knowledge of their diabetes medication was scored in terms of name, colour, shape and reason for taking medication on a scale of 0 to 8 where a higher score equated to greater knowledge. Table 1 shows example questions and the associated scores.

Two community DSNs were involved in collecting the data. The DSNs were responsible for distribution of the questionnaire, verification

of the data relating to prescribed medication and retrieval of HbA_{1c} results. The data were analysed by a research associate using SPSS version 11 (SPSS Inc, Chicago, US) following creation of an SPSS database.

Questionnaires were not anonymous in order for the average of the previous two HbA_{1c} results from each responder's medical records to be included in the results. Approval to conduct the study was given by the Western Health and Social Services Trust. All ethical principles, such as voluntary participation and informed consent, were followed. Confidentiality was assured by using codes rather than names. Names were only known by the DSN involved and were removed from the questionnaires prior to analysis.

Results

One hundred questionnaires were distributed and 51 were returned. However, the participants did not always answer every question and therefore the total number of respondents for each variable is not constant. It is the valid percentage that is reported in each circumstance, excluding missing cases. Ages ranged from 40 to 81 years with a mean age of 64.6 (standard deviation [SD]: 9.77). See Table 2 for duration of type 2 diabetes among participants.

Medication regimens

All respondents reported taking OHAs while 37 respondents were also taking tablets for blood

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Table 1. Example questions from questionnaire. One chart required for each different tablet taken by participant.

Question	Score
What is the name of your tablet for diabetes/blood sugar?	1
What does it look like (e.g. colour, shape)?	1 (colour) 1 (shape)
How many times a day do you take this tablet?	1
When do you take this tablet?	1
Do you remember to take this tablet yourself?	
Who helps you if you do not remember?	
Why do you take this tablet?	1 (lowers blood sugar) 1 (more detail)
What side effects (if any) have you been told about this tablet?	1
Have you had any side effects with this tablet?	
How long have you been taking this tablet (roughly)?	
Do you feel you know enough about this tablet and its effects?	

Page points

1. Only nine people reported that they had been told about known side effects related to the tablets they were taking.
2. A third of the participants indicated that they would speak to their GP initially if they were concerned about their medication (n=18; 36.7%).

pressure (75.5%; n=49) and 41 respondents were on medication to control cholesterol (83.7%; n=49).

The number of tablets taken by respondents ranged from 1 to 22 tablets daily and between 1 and 11 of these were to control blood glucose levels. Two respondents did not know which tablets were taken to control blood glucose levels (n=51).

Knowledge of up to three different diabetes tablets was scored and an average score obtained. The knowledge scores obtained ranged from 0 to 8 with a mean score of 4.9 (SD: 1.47). The frequencies of different knowledge scores are shown in *Table 3*.

Only nine people (18%; n=50) reported that they had been told about known side effects related to the tablets they were taking.

Learning about tablets

When respondents were first started on OHA, the majority received information about their medication from their GP, as shown in *Table 4*.

Since initiation of OHAs, the GP provided the majority of participants with information about their medication, as shown in *Figure 1*. However,

the community DSN also provided many of the respondents with information on medication (45.1%), as did the nurse at the health centre (3.1%).

When participants were asked who gave them the greatest quantity of information about their OHAs, the most commonly cited individuals were the community DSN (52.2%) and the GP (28.3%).

A large number of participants answered the question 'who would you speak to first if you had a problem with your diabetes medication?' with 'the diabetes nurse' (53.1%), but it was not clear whether this was the community DSN

Table 2. Baseline characteristics: duration of type 2 diabetes in study participants (n=37).

Duration of diabetes	n	%
<5 years	11	29.7%
≥5 to ≤10 years	11	29.7%
>10 years	15	40.5%

Table 3. Patient knowledge score regarding diabetes medication (n=50).

Knowledge score	n	%
0–3	4	8%
3.1–5	22	44%
5.1–6	18	36%
6.1–8	6	12%

Table 4. HCP providing information about diabetes medication around the time of diagnosis.

	Did the following people provide you with information about diabetes medication around the time of diagnosis?		
	n	yes	%
GP	51	30	58.8%
Practice nurse	51	11	21.6%
Community diabetes nurse	51	8	15.7%
Hospital consultant	51	7	13.7%
Hospital diabetes nurse	51	5	9.8%
Hospital doctor	51	2	3.9%
District nurse	50	1	2%

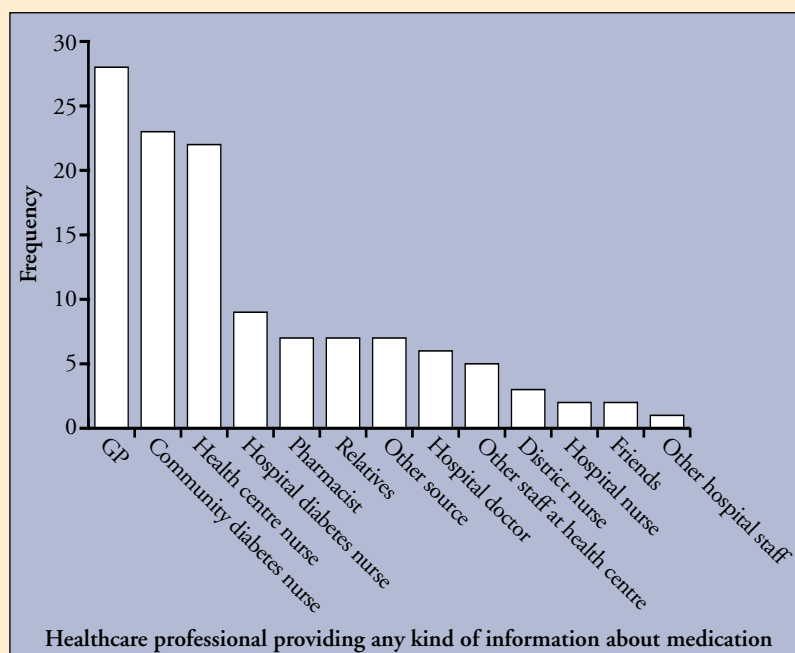


Figure 1. Healthcare professional providing participants with information regarding their medications, at a timepoint other than at diagnosis.

or the nurse at the health centre. A third of the participants indicated that they would speak to their GP initially if they were concerned about their medication (n= 18; 36.7%).

When asked if they thought they should have been given more information about their diabetes tablets, the majority (n=31; 64.6%) felt that they had been given adequate information. Seventeen respondents (35.3%) would have liked further information. Comments made by these individuals provided further insight as to why this was the case (see *Table 5*).

Some respondents reported that they had been given written information (n=17; 34.7%), tapes (n=2; 4.3%) or videos (n=2; 4.4%). The majority of respondents who had been given this information reported that they had used it (n=16; 88.9%).

Respondents were asked on a scale of 0 to 6 how often they found it inconvenient or difficult to take their tablets and how difficult it was to remember to take their tablets as recommended (0=never difficult; 6=constantly difficult). Results indicated that the majority of respondents did not find it inconvenient to take their tablets as recommended (n=39; 86.7%) or difficult to remember to take their medication (n=31; 68.9%).

Table 6 indicates how satisfied the respondents were with their current level of diabetes control.

Table 6. Level of patient satisfaction with current level of glycaemic control (n=47).

Level	Number	Percentage
Very satisfied	7	14.9%
Satisfied	21	44.7%
Not satisfied	15	31.9%
Very unsatisfied	4	8.5%

Table 7. Average of last two HbA_{1c} recordings (n=50).

HbA _{1c}	Number	Percentage
<7%	13	26%
7.1–8.0%	10	20%
8.1–9.0%	8	16%
9.1–10.0%	12	24%
>10.1%	7	14%

Table 5. Comments from individuals wanting further information about their diabetes treatment regimen.

- 'Not enough information was given for me to learn about dosage of routines, which would benefit me.'
- 'I knew why I needed to take the tablets, but they never explained any possible side effects, so how would I have known what to look for?'
- 'I was put on metformin and nobody explained it to me.'
- 'If I had a bad day and wasn't feeling well I wouldn't know what to do.'
- 'Nobody has ever spoken to me properly about each tablet I take.'
- 'I would like to know long-term side effects.'

Sixty-five per cent of participants stated that they were satisfied with the amount of information they had received regarding their medication.

The average of the last two documented HbA_{1c} levels was recorded at the end of the questionnaire. The average HbA_{1c} level of respondents ranged from 5.8% to 13.2% with a mean score of 8.5% (SD: 1.81%). *Table 7* shows the spread of the average HbA_{1c} levels. The majority of participants in this study (66%) had an HbA_{1c} above the NICE target of 7.5% recommended in order to minimise the risk of diabetes-related complications (NICE, 2002); however, 60% expressed satisfaction with their level of diabetes control.

There was no significant association between knowledge score and level of control (correlation: -0.12; *P*=0.936; n=49). Participants indicating some level of satisfaction with their diabetes control had a lower HbA_{1c} level (8.2%; SD: 1.53; n=28) than those who were dissatisfied with their diabetes control (HbA_{1c}=9.2%; SD: 2.14%; n=19), although these differences were not statistically significant.

Discussion

This study demonstrated a basic knowledge of oral hypoglycaemic medication among participants. This knowledge comprised name of medication and appearance but did not extend to the effect of the medication. The fact that the majority of participants felt they had been given adequate information regarding their medication suggests that they felt they did not need to know specific effects of the medication in order to take it as prescribed. The majority of respondents in this study did not report a problem with taking

Page points

1. A small number of respondents reported that they had been given written information (34.7%), tapes (4.3%) or videos (4.4%).
2. This study demonstrated a basic knowledge of oral hypoglycaemic medication among participants.
3. This knowledge comprised name of medication and appearance but did not extend to the effect of the medication.
4. The majority of respondents in this study did not report a problem with taking their medication as prescribed although actual data on compliance was not collected.
5. The majority of participants in this study (66%) had an HbA_{1c} above the NICE target of 7.5% recommended in order to minimise the risk of diabetes-related complications.

Page points

1. Respondents with a lower HbA_{1c} reported greater satisfaction with their level of diabetes control.
2. As the mean age of the participants was 64.6 years and given the number of tablets prescribed each day, the provision of written information would seem a more appropriate method of educating people with diabetes about their medication than relying on recall of verbal information.
3. Sixty-five per cent of the study participants expressed their satisfaction with the amount of information they had received.
4. Fifty-three per cent of respondents in this study identified a DSN as the first professional they would approach if they had problems with their medication and this is reflective of the sample.

their medication as prescribed although actual data on compliance were not collected.

In the authors' opinion, the percentage of individuals with an HbA_{1c} above NICE targets who were satisfied with their level of control (66%) would suggest that overall knowledge of diabetes was lacking, a finding partially expected in a study sample referred to a diabetes specialist nursing service.

There was no significant association between knowledge of medication and level of control. Respondents with a lower HbA_{1c} reported greater satisfaction with their level of diabetes control. Only nine participants recalled receiving any information on side effects of their medication, and as this study did not investigate healthcare professionals' knowledge of OHAs, we were unable to infer whether the information was given but not retained or not given at all. These findings are in keeping with other large surveys of patient knowledge: the Diabetes Jigsaw Report revealed that almost 60% of people with diabetes do not fully understand their diagnosis (Diabetes UK, 2006).

Given the burden of polypharmacy, with respondents reporting taking up to 22 tablets per day, it is not surprising that effects and side effects of particular medications are not within an individual's recall. However, the potentially serious side effect of hypoglycaemia for individuals taking sulphonylureas needs to be understood, including how these medications work and how to avoid, recognise and treat this possible hazard.

Just over a third of those who participated in this study reported receiving written information regarding their hypoglycaemic medication. As the mean age of the participants was 64.6 years and given the number of tablets prescribed each day, the provision of written information would seem to the authors a more appropriate method of educating people with diabetes about their medication than relying on recall of verbal information. Verbal information will vary depending on the knowledge of the healthcare professional and individuals will have differing abilities to recall information provided in this way. Patient information leaflets available from sources such as pharmaceutical companies and

Diabetes UK offer a means of providing clear and concise information for those who may have problems with recall. Furthermore, information which is consistent is more likely to result in compliance (Vermiere et al, 2003).

The person who gave the initial information about medication was identified in 58.8% of cases as the GP and in a further 21.6% as the practice nurse. This is to be expected as the majority of people with type 2 diabetes controlled by diet and OHAs are managed in primary care. However, given the constraints on consultation times within general practice it may be reasonable to consider alternative information sources as more suited to providing the depth and detail of information required. One suggested means of addressing this is the use of an information prescription directing the person with diabetes to the most appropriate source of information and support relevant to their condition (DoH, 2004). However, given that 65.0% of the study participants expressed their satisfaction with the amount of information they had received, the effectiveness of such an approach is uncertain.

Ongoing information was obtained from not only the GP and practice nurse, but also from the community DSN and pharmacist. As the regular dispenser of medication the community pharmacist is ideally placed to give and reinforce information on how medication should be taken. The Clinical Resource Efficiency Support Team (CREST) has identified the developing role of the pharmacist in diabetes care. Their 2003 study revealed the potential for greater input by pharmacists in meeting the needs of people with diabetes with regards to information about their medication (CREST, 2003).

Fifty-three per cent of respondents in this study identified a community or hospital DSN as the first professional they would approach if they had problems with their medication and this is reflective of the sample (who had all been referred to the diabetes nursing service). In addition, a major part of the role of the DSN is to provide information and support for people with diabetes. The person providing the most information about medication was identified as the DSN. This is again reflective of the role of

nursing in diabetes management. However, not everyone with type 2 diabetes has access to a DSN.

The importance of structured patient education in facilitating successful self management is recognised widely. Recent figures state that only 7% of people with diabetes in Northern Ireland have attended a structured education programme (Diabetes UK, 2005) although more recent data suggest that a greater number of individuals are aware of such programmes (Diabetes UK and the All Party Parliamentary Group for Diabetes, 2006). Locally, the authors are developing a structured education programme for people with type 2 diabetes and the findings of this study will help inform the content of the programme and how it is delivered.

Limitations

The findings of this study are limited by the small sample size. As all participants in the study were referred to the DSN service, it is not representative of the wider population of people with type 2 diabetes. The study design required people who could read and not everyone answered all the questions – a common problem in questionnaire research. In the study design, the authors did not differentiate between DSNs in primary or secondary care, nor did they investigate healthcare professionals' knowledge of medications and the actual advice that is given to people with diabetes.

Conclusion

Although this study found no significant association between patient medication knowledge and diabetes control, it highlighted that knowledge of diabetes medication within the study population was limited, in particular around their understanding of how the agents worked and what side effects were associated with them. The main sources of information were the GP, the DSN and the practice nurse. This study highlighted the under-utilisation of the community pharmacist as a resource for providing information.

The study identified the DSN as the healthcare professional who gave the most in-depth information on medication. This is in keeping

with the DSN role but it must be remembered that not all people with type 2 diabetes are referred to a DSN. In such situations, different ways of working will need to be explored to enable the diabetes team to meet the information needs of people with diabetes in an equitable manner.

This study has been an excellent learning experience for the DSNs involved, and has allowed them to pursue their role in research. The results will be shared with other professionals in primary and secondary diabetes care locally and used to positively influence interactions with patients on an individual and group basis. ■

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