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Centre for
Integrated Health
Care Research,
Wolfson Research
Institute, University
of Durham,
Stockton-on-Tees
TS17 6BH

Graeme Wylie
Northern and
Yorkshire Regional
Health Authority
research training
fellow

A Pali S Hungin
professor of primary
care

Joanne Neely
research officer

Correspondence to:
G Wylie
graeme.wylie@dur.ac.uk

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Impaired glucose tolerance: qualitative and quantitative study of general practitioners' knowledge and perceptions

Graeme Wylie, A Pali S Hungin, Joanne Neely

Abstract

Objective To investigate general practitioners' knowledge of and attitudes to impaired glucose tolerance.

Design Mixed methodology qualitative and quantitative study with semistructured interviews, focus groups, and questionnaires.

Setting 34 general practitioners in five primary care groups in the north east of England.

Results All the general practitioners had knowledge of impaired glucose tolerance as a clinical entity, but they had little awareness of the clinical significance of impaired glucose tolerance and were uncertain about managing and following up these patients. Attitudes to screening were mixed and were associated with reservations about increased workload, concern about lack of resources, and pessimism about the effectiveness of lifestyle interventions. Some general practitioners felt strongly that screening patients for impaired glucose tolerance and subsequent lifestyle intervention medicalised an essentially social problem and that a health educational approach, involving schools and the media, should be adopted instead. A minority expressed a positive attitude towards a pharmacological approach.

Conclusion Awareness of impaired glucose tolerance needs to be raised, and guidelines for management are needed. General practitioners remain to be convinced that they have a role in attempting to reduce the incidence of type 2 diabetes by targeting interventions at patients with impaired glucose tolerance.

Introduction

Type 2 diabetes is a serious condition, with implications for the mortality, morbidity, and social functioning of patients. The prevalence of type 2 diabetes is increasing, and the number of patients in the United Kingdom is expected to rise from just over one million in 1997 to just under three million by 2010.¹ An estimated 7-8% of the total NHS budget is spent on patients with type 2 diabetes,² and the burden of caring for these patients is falling increasingly on primary care.^{3 4}

Impaired glucose tolerance, typically characterised by hyperglycaemia and insulin resistance, is considered to be a stage in the development of type 2 diabetes. Up

to half of all people with impaired glucose tolerance will progress to type 2 diabetes within 10 years of diagnosis.⁵ In addition, people with impaired glucose tolerance are known to be at significantly increased risk of cardiovascular disease, which may present before the onset of diabetes.⁶ Studies in the United Kingdom have reported the prevalence of impaired glucose tolerance in the 35-65 year age group to be around 17%.⁷

Increasing evidence indicates that intervention can favourably influence the clinical course of impaired glucose tolerance,⁸⁻¹⁰ with some studies showing a 58% reduction in progression to diabetes.^{11 12} This study aimed to ascertain levels of awareness among general practitioners of the prevalence and clinical significance of impaired glucose tolerance and to explore their attitudes to its detection and management.

Methods

Participants and setting

Focus groups—We chose general practitioners from lists supplied by Derwentside, Sunderland West, South Tyne-side, and Gateshead West and Central Primary Care Groups. We contacted 56 general practitioners. Twenty six general practitioners (18 men, eight women) participated in four focus groups. The mean age of participants was 44 (range 30-58) years; all were principals, with a mean of 11 (1-27) years' experience in general practice (see also bmj.com). The 30 general practitioners who either declined or failed to attend were similar in terms of sex and practice characteristics.

Semistructured interviews—We chose the eight participants (six men, two women) in the semistructured interviews purposively¹³ from a list of all general practitioners in one health authority. All were principals, with a mean age of 41 (31-46) years and an average of 12 (4-24) years' experience in general practice.

Collection and analysis of data

The lead investigator (GW) carried out all the focus groups and interviews, which were audiotaped for later transcription. Before each focus group, participants completed a questionnaire designed to evaluate their knowledge of the clinical significance and prevalence of impaired glucose tolerance. Their responses were then explored in the focus group discussion. The lead investigator then gave a short presentation, based on a review of the literature, on the anticipated rise in prevalence of type 2 diabetes, together with the clinical

significance, prevalence, and management of impaired glucose tolerance.^{1 2 5-11} Further focus group discussion centred around participants' attitudes to impaired glucose tolerance in the light of what, for most of them, was new knowledge.

We took a similar approach with the semistructured interviews, administering the questionnaire verbally and following this with open ended questions concerning knowledge of the clinical significance and prevalence of impaired glucose tolerance. We then gave a short presentation, as above, and used subsequent open ended questions to explore attitudes to and perceptions of the detection and management of impaired glucose tolerance.

We used a "pragmatic variant" grounded theory approach to analyse the data by generating categories and themes.^{14 15} GW and APSH coded the data independently to increase the reliability of the study. We adopted an iterative approach to data analysis, with analysis beginning after the first focus groups and interviews, to allow emerging themes to be explored in subsequent interviews. The coders agreed that no new themes were emerging after four focus groups and eight semistructured interviews, and saturation was achieved.¹⁵

Validation

To increase confidence in the validity of the findings, we sent all 34 participants a report summarising the outcomes of the study. Twenty eight (82%) replied stating that they "strongly agreed" (10 respondents) or "agreed" (18) that the report was a true representation of their opinions.

Results

Questionnaires—All participants were aware of impaired glucose tolerance as a clinical entity. However, 16 (47%) participants were unaware of the risk of impaired glucose tolerance progressing to type 2 diabetes, and 21 (62%) were unaware of the increased risk of cardiovas-

Box 1: Main themes from data collected before participants received evidence based presentation on impaired glucose tolerance

Low awareness of the prevalence and clinical significance of impaired glucose tolerance

"I would have no idea ... I mean, as I say I think ... I doubt if we have very many that have been formally identified"

"Perhaps 2%?"

"... probably a lot of our colleagues are pretty ignorant about the implications of impaired glucose tolerance"

Uncertainty about managing patients with impaired glucose tolerance

"There's the book of guidelines; is there one [a guideline for management of patients with impaired glucose tolerance] in there?"

"I must say, we don't repeat their glucose tolerance test ... they might get a sugar level done"

"I don't honestly have a ... a ... plan for what we would do"

Support for a guideline for managing impaired glucose tolerance

"Of course, it would be excellent if we had a guideline to follow"

Box 2: Main themes from data collected after participants received evidence based presentation on impaired glucose tolerance

Fear of being overwhelmed by the workload involved in screening and managing patients with impaired glucose tolerance

"I think we all probably fight shy of diagnosing too many people with impaired glucose tolerance, I mean, I'm sure we all do it. I mean, I occasionally get people who've had a borderline high sugar and it gets passed to the nurse for dietary intervention ... they don't all have a glucose tolerance test; the reason for that is it involves a whole lot of workload"

"[So there's a resistance from the profession because of the workload implications, is that what you're saying?]" "Yes, basically"

"Who wants to find someone you've got to treat and measure their blood every so often?"

Concern that widespread screening and management of patients with impaired glucose tolerance would be impossible without extra resources

"The practices simply can't be taking all the load. I think there are huge resource implications for the practices involved. Certainly there is a huge disincentive at the moment for me to find any more patients because I can't afford to treat them"

"It would be very difficult with the present staffing ... I think it would be very difficult. We would have to have additional resources to do it"

Concern at diverting finite resources from other clinical areas

"... why should we be doing that when we haven't even ... when we're not even treating the ones that have got it [type 2 diabetes] properly yet?"

"Fine, yes, in theory [we could screen for impaired glucose tolerance], but we haven't only even got diabetes to look after ... but you've got so many things to look after and outside issues as well, so where does it stop?"

Pessimism regarding the effectiveness of lifestyle intervention

"... we have diabetics who ... who just totally ignore the advice you give them, and I think going further back than that and giving them advice when they haven't got diabetes as such is going to be very difficult"

"Around here, I just wonder how effective lifestyle advice is going to be"

Positive attitudes towards pharmacological intervention in patients with impaired glucose tolerance

"Well, even that [lifestyle intervention] is a tall order for a lot of them. I just feel as though, if you're going to do this, you've really got to put them on metformin. I mean that's what's happened with our [CHD patients] ... I mean we started off with exercise, diet and that kind of thing, stopping smoking, and now, I mean we've substituted that with statins, atenolol, and lisinopril ... I think it shouldn't be too expensive; metformin presumably is a comparatively cheap drug"

"I think if I had impaired glucose tolerance I would take the metformin to delay the diabetes"

Uncertainty regarding the role of general practitioners in detecting and treating impaired glucose tolerance

"I think we've got a role in that [detecting and lifestyle intervention for impaired glucose tolerance] to some degree, but I don't think it's educating everybody in town and sort of leading their lives for them"

"But that's not my job, you know; I'm a GP and I'm actually there probably not to do a lot of prevention but to actually do a little bit of tinkering with the people already ill"

Concern that screening and treating impaired glucose tolerance medicalises an essentially social problem

"It's a society cop out; we're always trying to medicalise things, and it's the same as, you know, I think, the current vogue for medicalising teenage pregnancy ... and under age smoking and everything else"

"I think it's on a bigger scale than us having to prevent it [type 2 diabetes] right at the end of the line. It's like us preventing suicides when there's unemployment and stress"

Positive attitudes towards a health educational approach

"If all schools had free fruit and free healthy living, free exercise ... then in 20-30 years' time I suspect the impact of that would be enormous"

"... I mean, hundreds of thousands of pounds go into health promotion. Why can't they organise themselves and, if needs be, set up opportunistic screening at supermarkets ... to prevent people coming out with the wrong things in their baskets"

cular disease. In addition, 17 (50%) participants had no idea how many patients with impaired glucose tolerance might be known to their practice, and 13 (38%) estimated prevalence at less than 1%.

What is already known on this topic

Impaired glucose tolerance is common and carries a 50% risk of progression to type 2 diabetes within 10 years of diagnosis and a doubling of the risk of developing cardiovascular disease

Lifestyle intervention can significantly reduce the progression to diabetes, although the evidence for reduction in cardiovascular disease is less compelling

What this study adds

Awareness of the clinical significance of impaired glucose tolerance among general practitioners is low

General practitioners are uncertain how best to manage and follow up patients with established impaired glucose tolerance

General practitioners are reluctant to screen patients for impaired glucose tolerance for a variety of reasons

Focus groups and interviews—Three main themes emerged from data collected before participants received a presentation detailing the anticipated rise in prevalence of type 2 diabetes, together with the clinical significance, prevalence, and management of impaired glucose tolerance (box 1). Eight main themes emerged after the presentation (box 2).

Discussion

The recently published *Diabetes National Service Framework: Standards* document recommends that the NHS and partner organisations adopt both a “population” approach (tackling obesity and sedentary lifestyles) and a “targeted” approach (identifying and intervening in high risk groups, such as patients with impaired glucose tolerance) to reducing the incidence of type 2 diabetes.¹⁶ The national service framework recognises that such interventions are also likely to have an impact on reducing cardiovascular disease. Similarly, early treatment of macrovascular risk factors may be more important than screening for and treating asymptomatic type 2 diabetes itself.¹⁷ Although studies from other countries have shown encouraging results,^{11 12} questions about the feasibility of primary prevention of type 2 diabetes in the United Kingdom remain unanswered. Our findings clearly show that general practitioners have major reservations about the appropriateness and effectiveness of giving lifestyle advice to patients in this context. Similarly, we have shown that general practitioners perceive the need for considerable extra resources if they are to be given the task of screening for impaired glucose tolerance and intervening in patients at high risk of progression to type 2 diabetes. This has important implications, both for the implementation of the diabetes national service framework and for primary care research.

General practitioners’ awareness of the existence of impaired glucose tolerance was good, but awareness of the prevalence and clinical significance

of impaired glucose tolerance was poor. In addition, general practitioners seem to be uncertain about how best to manage and follow up these patients. This has implications for the training and education of general practitioners, and not least for patient care in a field that is likely to expand exponentially in the next few years.

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- 1 Amos AF, McCarty DJ, Zimmet P. The rising global burden of diabetes and its complications: estimates and projections to the year 2010. *Diabet Med* 1997;14:S1-85.
- 2 Dixon S, Currie CJ, Peters JR. The cost of diabetes: time for a different approach? *Diabet Med* 2000;17:820-2.
- 3 Pierce M, Agarwal G, Ridout D. A survey of diabetes care in general practice in England and Wales. *Br J Gen Pract* 2000;50:542-5.
- 4 Khunti K, Ganguli S. Who looks after people with diabetes: primary or secondary care? *J Roy Soc Med* 2000;93:183-6.
- 5 Alberti KG. Impaired glucose tolerance: what are the clinical implications? *Diabetes Res Clin Pract* 1998;40(suppl):S3-8.
- 6 Tominaga M, Eguchi H, Manaka H, Igarashi K, Kato T, Sekikawa A. Impaired glucose tolerance is a risk factor for cardiovascular disease, but not impaired fasting glucose. The Funagata diabetes study. *Diabetes Care* 1999;22:920-4.
- 7 Davies M, Gray I. Impaired glucose tolerance. *BMJ* 1996;312:264-5.
- 8 Bourn DM. The potential for lifestyle change to influence the progression of impaired glucose tolerance to non-insulin-dependent diabetes mellitus. *Diabet Med* 1996;13:938-45.
- 9 Li CL, Pan CY, Lu JM, Zhu Y, Wang JH, Deng XX, et al. Effect of metformin on patients with impaired glucose tolerance. *Diabet Med* 1999;16:477-81.
- 10 Eriksson KF, Lindgarde F. No excess 12-year mortality in men with impaired glucose tolerance who participated in the Malmo preventive trial with diet and exercise. *Diabetologia* 1998;41:1010-6.
- 11 Pan XR, Li GW, Hu YH, Wang JX, Yang JX, An ZX, et al. Effects of diet and exercise in preventing NIDDM in people with impaired glucose tolerance. The Da Qing IGT and diabetes study. *Diabetes Care* 1997;20:537-44.
- 12 Tuomilehto J, Lindstrom J, Eriksson JG, Valle TT, Hamalainen H, Ilanne-Parikka P, et al. Prevention of type 2 diabetes mellitus by changes in lifestyle among subjects with impaired glucose tolerance. *N Engl J Med* 2001;344:1343-50.
- 13 Patton MQ. *Qualitative evaluation and research methods*. 2nd ed. London: Sage, 1990.
- 14 Melia K. Producing “plausible stories”: interviewing student nurses. In: Miller G, Dingwall R, eds. *Context and method in qualitative research*. London: Sage, 1997:26-36.
- 15 Glasser BG, Strauss AL. *The discovery of grounded theory: strategies for qualitative research*. Chicago: Aldine, 1967.
- 16 Department of Health. *Diabetes national service framework* [updated 12 Dec 2001] www.doh.gov.uk/nsf/diabetes/ch2/prevention.htm (accessed 11 Feb 2002).
- 17 Goyder E, Irwig L. Screening for diabetes: what are we really doing? *BMJ* 1998;317:1644-6.

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Endpiece

Aphorisms for old age

“If you don’t use it, you lose it.”
 “It is not what you have lost (of organs or functions) but what you still have that matters.” In other words, don’t bemoan your troubles but realise your remaining assets and get on with it.

Submitted by Hugh A Fleming,
 retired consultant cardiologist, Cambridge