Improving quality: The impact of formal impaired glucose regulation reviews in the primary care setting

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Against the backdrop of growing rates of type 2 diabetes and its associated burdens, prevention of the condition is becoming increasingly important. It is established that people with impaired glucose regulation (IGR) constitute a significant at-risk population. With HbA$_{1c}$ tests introduced within NHS health checks, IGR is now readily diagnosed. The increasingly identifiable IGR population affords an opportunity to deliver preventative lifestyle advice and intervention. The objective of the present study was to quantify the impact of formal consultations giving lifestyle advice and recommending interventions in improving outcomes for people with IGR.

Type 2 diabetes occurs in approximately 6% of the UK's population, and roughly a tenth of the NHS budget is spent on diabetes and its associated complications (Diabetes UK, 2014). Additionally, it is estimated that direct costs and non-health service costs, such as sickness and informal care, actually bring the total annual spend to £20.5 billion (Hex et al, 2012). This is a huge burden for the NHS, and it is set to increase with the escalating numbers of people developing the condition – within the UK, the number is predicted to rise by 56% by 2025 (Penn et al, 2009). Prevention of type 2 diabetes is in the best interest of not only the people at risk but also the NHS.

There are many risk factors associated with type 2 diabetes, including obesity, a family history and high blood pressure (IGR; Diabetes UK, 2015). In addition, it is well established that people with impaired glucose regulation (IGR) are at high risk of the condition. This is documented, for instance, in NICE (2012) guidelines, which recommend that people at risk receive a brief intervention regarding lifestyle changes. This has been backed up by many studies, including the randomised controlled trial by Penn et al (2009) exploring the hypothesis that type 2 diabetes

could be prevented by a lifestyle intervention. The results demonstrated a 55% reduction in incidence of progression to the condition. An application of this guidance in a GP surgery setting by Milne and Kanumilli (2012) explored the effect of provision of structured lifestyle coaching on the progression to type 2 diabetes for people with IGR. This study also showed promising results, with glucose levels and other associated risk factors for type 2 diabetes tending to improve.

Now, owing to the increased use of HbA$_{1c}$ diagnostic tests in the general practice setting, as well as its recommended inclusion in the NHS Health Check screening programme in England (see http://www.healthcheck.nhs.uk [accessed 13.05.15]), it has become easier and cheaper than ever before to identify a population with IGR.

The present study took place in a GP practice in South Manchester with a predominantly Caucasian population. The practice had actively embraced the NHS health checks to the extent of working with Public Health Manchester to operate the Manchester Health Bus, which is a service to deliver health checks to hard-to-reach populations. Point-of-care testing for HbA$_{1c}$ had a marked impact on the practice IGR register (see *Figure 1*).

Article points

1. This study presents 12-month follow-up data on people attending at a practice in Manchester for a formal impaired glucose regulation (IGR) review.

2. Only 3% of people had progressed to type 2 diabetes at 12 months; in addition, BMI was reduced in 60% of the population and total cholesterol had decreased in 72% of the population.

3. A simple and inexpensive intervention from a trained health professional appears to have a positive impact on the progression of IGR and the reduction in other risk factors for developing type 2 diabetes.

Key words
– Diabetes prevention
– Impaired glucose regulation
– Lifestyle intervention

Authors

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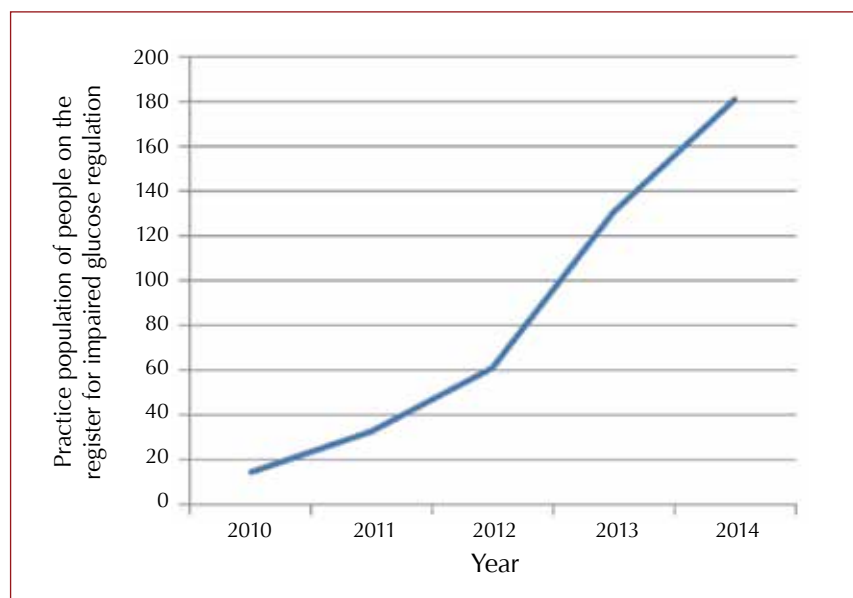
Figure 1. A graph showing the increasing population of people on the register for impaired glucose tolerance at the authors' practice. Point-of-care testing for HbA$_{1c}$ was introduced at the practice in in the spring of 2012.

It is increasingly achievable for practices to have a defined IGR population; however, many are not yet convinced by the practicality and effectiveness of the provision of intervention to this high-risk population.

The aim of this study was to quantify the impact of formal consultations providing lifestyle advice and recommending interventions to improve outcomes for people with IGR.

Methods

As suggested by NICE (2012) guidelines, brief lifestyle interventions were delivered in practice (including advice on "healthy eating" [i.e. low sugars, portion size and carbs awareness, and reduced salt], physical activity, and smoking cessation and reduced alcohol consumption where appropriate). Data were collected to determine if providing structured lifestyle advice appointments to people with IGR affected their HbA$_{1c}$ levels. We also investigated the effect on blood pressure, BMI and cholesterol levels – all of which have been linked to increased risk of progression to diabetes. Through an ongoing population search, 93 individuals were identified with an HbA$_{1c}$ value between 42 and 47 mmol/mol (6.0–6.5%), who are at moderate risk of developing type 2 diabetes (females, n=54; males, n=39). People who already had a diagnosis of diabetes were excluded.

Participants were invited for a review of their blood results in a 20-minute appointment with a practice nurse. A detailed explanation of IGR was provided, and lifestyle advice was given on how to reduce the risk of progression to diabetes via a healthy, balanced diet and exercise. Blood pressure, lipid profiles, estimated glomerular filtration rate, pulse, BMI and waist circumference were also recorded and discussed. Lifestyle advice was given for hypertension and hypercholesterolaemia, where necessary. If blood pressure was raised, 24-hour blood pressure monitoring was conducted and medicines prescribed as necessary. Raised lipids were assessed using QRISK® and treated as necessary (at the time, full risk assessment was receommended for scores over 20%; the new guidance is 10% [Kirby, 2014]). Further referrals were made, as necessary, to health trainers, dietitians, exercise programmes, well-being courses and the smoking cessation team.

Around 12 months after the initial appointment, people were recalled and given a 20-minute appointment with the same practice nurse, with the intention to repeat all of the measurements. In addition, the results were explained, with appropriate ongoing lifestyle advice and referral where necessary.

Results

Although we were able to recall all 93 participants, a full set of readings could not be obtained for each individual (BMI and lipids were not recorded, for instance, if the recall appointment came before 12 months had elapsed). The numbers of patients for whom baseline and 12-month figures were obtained were:

- HbA$_{1c}$ – 87 people.
- BMI – 67 people.
- Lipid profile – 61 people.

After the second readings were obtained, three people (3%) had progressed to diabetes, four people (4%) had become hypertensive and three people (3%) had been found to have an irregular heartbeat requiring intervention. HbA$_{1c}$ had decreased in 77 people, remained the same in five people and increased in five people. A detailed breakdown of the HbA$_{1c}$ change is shown in *Figure 2*. Overall,
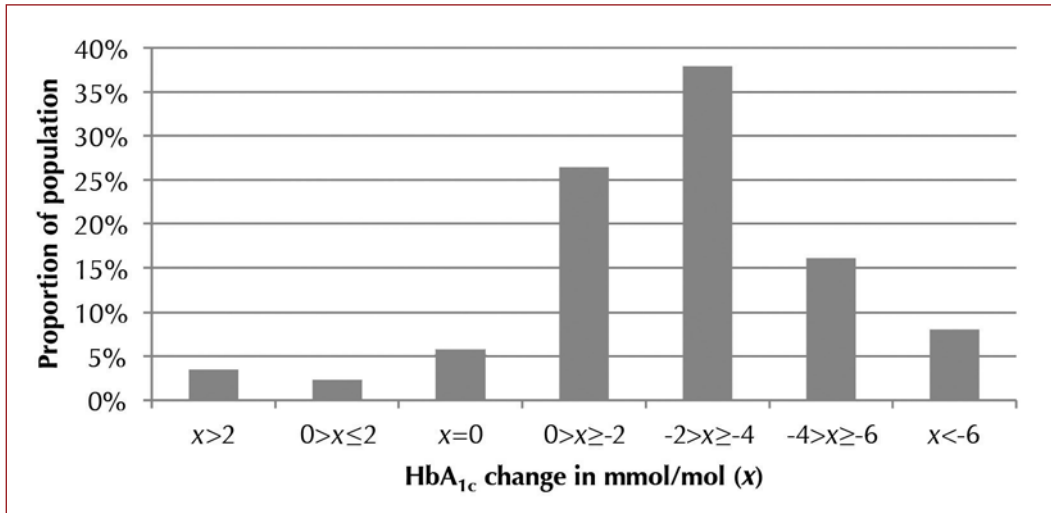
Figure 2. Breakdown of HbA$_{1c}$ change in the population.

> *"Provision of instructive lifestyle interventions to adults with impaired glucose regulation, as advised by NICE, could be very effective at reducing the risk of progression to type 2 diabetes."*
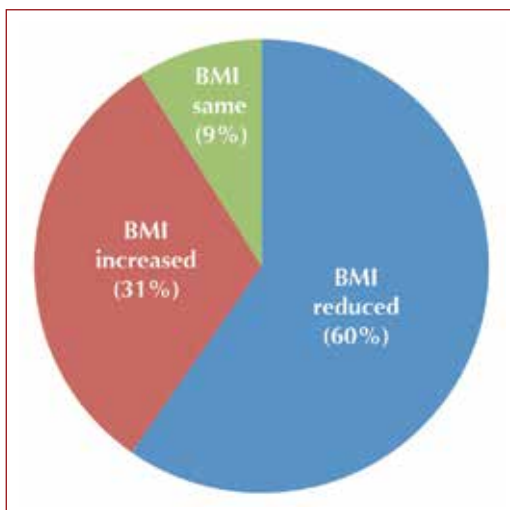
60% of the population had reverted to the normal HbA$_{1c}$ range (less than 42 mmol/mol [6.0%]).

BMI was reduced in 60% of the population, stayed the same in 9% of the population and increased in 31% of the population (*Figure 3*). Twenty-two per cent of the population had a decrease in weight of more than 5 kg.

Total cholesterol had reduced in 72% of the population and increased in 28% of the population (no participants had an unchanged level). *Figure 4* shows a breakdown of the changes in cholesterol values. In the initial appointment, 44% of the population had a cholesterol level higher than 5 mmol/L. After the second appointment, only 18% had a cholesterol value above this threshold.

Discussion

A simple and inexpensive intervention from a trained health professional seems to have a positive impact on the progression of IGR and the reduction in associated risk factors. For the majority of the people, cholesterol, BMI and HbA$_{1c}$ levels either remained similar or decreased. This would seem to suggest that empowering people with the knowledge of IGR and type 2 diabetes can be a powerful tool in preventing progression from the former to the latter. Furthermore, as the participants presented at different times throughout the year, practically it was manageable for them to be seen by the nurse at a time convenient to them, in their locality, and then be followed up 12 months later.
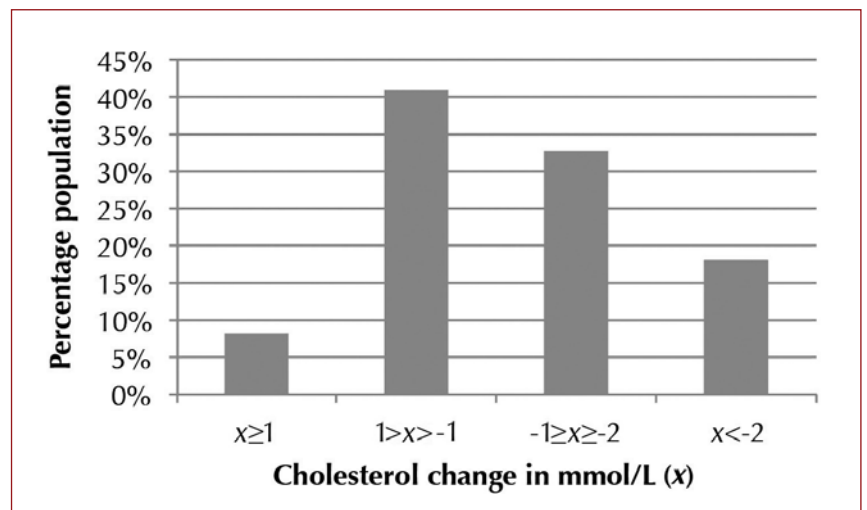

Figure 3. BMI changes in the population.

Figure 4. Breakdown of cholesterol change.

As we were carrying out this study with funding from the NHS, we had a duty of provision of best possible care, which in this case was following the NICE guidelines for all individuals. This meant it would have been ethically unjustifiable to have a control group for this study. Furthermore, having a control group would have required us to carry out the investigations on the control group, but conceal their results from them for 12 months. For these reasons, this study did not have a control group and no statistical hypothesis testing was conducted. This means that although the results seem to show a positive effect on health, we are not able to establish the causality of the intervention. However, the findings from our single-practice study do appear to be similar to those from the Diabetes Prevention Programme in the US (Knowler et al, 2002). In this study, people in the lifestyle intervention advice group had an annual rate of progression to type 2 diabetes of approximately 5%, compared with 11% in the placebo group.

Further work could be useful in exploring the psycho-social aspect of type 2 diabetes prevention. In this case, for example, we did not provide any medication. The changes in results were caused by the psychological and social changes that the patient chose to bring about in their lifestyle. Therefore, studies that focus on how patients' psychological and social behaviours change with lifestyle intervention could be useful.

In conclusion, provision of instructive lifestyle interventions to adults with IGR, as advised by NICE, could be very effective at reducing the risk of progression to type 2 diabetes. With the steady stream of patients with an HbA_{1c} in the IGR range, these interventions are practical and inexpensive for GP surgeries to carry out. However, in the long term, further work may be required to establish the precise effectiveness of these interventions. We await with interest the national roll-out of the NHS Diabetes Prevention Programme, following the pilot stage (NHS England, 2015). ■

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