Short exercise programmes benefit people with diabetes

Robert Andrews and Julie Holland

Introduction

Numerous trials have shown that regular exercise can benefit individuals with diabetes, but these trials have tended to be laboratory based and have included only small numbers of highly motivated individuals. This study set out to assess whether the findings from these trials could be replicated in a clinical setting. A total of 145 people with diabetes referred from a variety of sources attended a 12-week supervised exercise programme. This programme significantly improved wellbeing, long-term glycaemic control (HbA_{1c}) and body physique, indicating that trial data can be reproduced in a clinical setting.

Numerous trials have demonstrated that regular physical activity can be a useful therapeutic tool in the treatment of patients with diabetes. Patients with diabetes who exercise live longer and have reduced mortality from all diseases compared with those who do not (Blair, 1993).

In both type 1 and type 2 diabetes, regular exercise has been found to lower blood pressure, improve insulin sensitivity and reduce the risk of developing coronary heart disease (American Diabetes Association, 1993; Agurs-Collins et al, 1997). In patients with type 2 diabetes, further benefits from regular exercise include improved glycaemic control, reduced levels of triglycerides, weight reduction and improvement in the HDL/LDL cholesterol ratio (American Diabetes Association, 1993; Walker et al, 1999; Halle et al, 1999).

These trials, however, have tended to be laboratory based and have included patients who are fitter, less debilitated and more motivated than those we generally see in our clinics. In view of this, replicating their findings in a clinical setting may be more difficult. Many patients feel unsure about how to increase their level of activity and/or feel embarrassed about going to a gym or a fitness class (Wing, 1985). They may also lack the confidence to exercise without medical supervision, so that encouraging these patients to become more physically active can be very difficult (HEA, 1992).

Before changes are likely to be seen, three steps are required:

- First, these patients must be convinced that regular exercise will benefit them.
- They then require education about how to manage their diabetes so that they can exercise safely.
- Finally, they need regular encouragement to maintain these changes (Prochaska, 1984).

A busy clinic is not the ideal place to provide patients with the information and encouragement that they need.

One way of encouraging patients to increase their level of activity is to provide classes that are run by an experienced fitness instructor and supported by medically trained individuals, so-called 'supervised exercise classes'. Here the instructor oversees the activity component, and the diabetes team provides education and advice.

Aims of the study

The primary aim of this project was to establish an activity programme that would provide a graded exercise regimen and education at a level that would not preclude anyone from attending.

Our secondary aim was to look at whether this programme improved wellbeing and markers of cardiac risk factors such as body mass index (BMI), waist circumference, glycosylated haemoglobin (HbA_{1c}) and total cholesterol.

ARTICLE POINTS

1 In trials, regular exercise is beneficial to people with diabetes.

2 Whether these benefits can be replicated in clinical practice is not known.

3 Supervised exercise programmes are one way of encouraging patients to become active.

4 Patients who attend such programmes see similar benefits to those seen in trials.

5 One hour a week of exercise is enough to see significant improvements.

KEY WORDS

- **Diabetes**
- **Exercise programmes**
- **Wellbeing**
- **Glycaemic control**
- **Body physique**

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Figure 1. Disability and exercise. We feel strongly that an exercise programme should be able to cater for individuals of all disabilities. (Photo reproduced with permission of the patient.)

PAGE POINTS

1 No exclusion criteria were applied, as one of the aims of the programme was to set up an activity course that was suitable for anyone to attend.

2 No physical screening was carried out before enrolment, but if participants self-referred then their GPs were contacted to ensure suitability for inclusion.

Methods

Recruitment

Referrals for the programme were taken from a variety of sources: GPs, practice nurses, hospital clinics and direct patient self-referral. No exclusion criteria were applied, as one of the aims of the programme was to set up an activity course that was suitable for anyone to attend (*Figure 1*). No physical screening was carried out before enrolment, but if participants self-referred then their GPs were contacted to ensure suitability for inclusion. Places were offered on a first-come, first-served basis.

Personnel involved

A DSN, a specialist diabetes dietitian, a podiatrist, and a doctor ran the programmes. An EXTEND exercise therapist, employed from external sources, was responsible for organising and delivering individually tailored exercise in a group setting. (EXTEND exercise is a unique form of exercise based on the Bagot Stack principles.)

The DSN and exercise therapist were the only two team members who attended each session; the other members were involved in one or more sessions during the course as required (see below).

Structure

The structure of the programme was as previously described (Diabetes UK, 2002). In brief, each course accommodated 20 people who attended one morning a week for 12 weeks. Each session was made up of 1 hour of activity followed by half an hour of education.

The activity used in this programme was based on the EXTEND movement to music principles. At the start of the programme each individual was assessed by the exercise therapist for physical ability or limitations, and the classes were tailored as much as possible to their needs. The intensity and duration of the activity increased during the course as participants' confidence and ability improved, culminating in an activity session that lasted about 1 hour.

Diabetes-related educational topics were covered during a 30-minute education session at the end of each week's activity. Topics covered included hypoglycaemia and exercise, healthy eating, footcare, eye care and exercising safely (Diabetes UK, 2002).

Participation in the programme was voluntary, with peer group support being strongly encouraged. In order to achieve this, the team were very aware of the need to put participants at their ease as many had been inactive for a long time, were very overweight or had physical disabilities. The non-competitive nature of the programme was constantly stressed and the environment was kept informal, friendly and non-threatening. All participants were offered the opportunity of having individual consultations with the DSN and dietitian if necessary.

Measurements

HbA_{1c}, total cholesterol, waist circumference, and BMI were measured, and a wellbeing questionnaire was administered (Bradley, 1996), before and after the 12-week course.

Statistical analysis

All results are expressed as mean ± standard error. Measurements before and after were compared by Wilcoxon matched pairs test.

Results

Demographics

Between September 1999 and May 2002, 145 individuals were referred to our exercise programme. Of these, 142 accepted a place when offered. Of these 119 (84%) completed the 12-week course and 23 (16%) dropped out before completing the programme.

The characteristics of those who completed the programme are shown in *Table 1*. Forty-five (38%) were male and 74 (62%) female, mean age was 61 (range 31–75 years, *Figure 1*) and the majority of these individuals had type 2 diabetes (87%).

Wellbeing

The wellbeing score improved significantly (21±1 *vs* 26±1; P<0.000000001; *Figure 2*) with the exercise programme.

Cardiovascular risk factors

The supervised exercise programme significantly improved HbA_{1c} (9.1 ± 0.9 *vs* 7.9 ± 0.2%, P<0.05), BMI (33.5 ± 0.6 *vs* 32.7 ± 0.7, P<0.05) and waist circumference (108 ± 2 *vs* 105 ± 2 cm, P<0.00000001), but had no effect on total cholesterol (5.1 ± 0.1 *vs* 5.0 ± 0.1 mmol/l, P = 0.2; *Figure 2*).

Table 1. Baseline characteristics of the 118 people completing the 12-week exercise programme

Demographics	Age (years)	61 ± 1
	Female/male	74/45
	Type 1/type 2 diabetes	14/104
Anthropometrics	Body mass index	33.5 ± 6.8
	Waist circumference (cm)	108 ± 17
Biochemistry	HbA_{1c} (%)	9.1 ± 9.7
	Total plasma cholesterol (mmol)	5.1 ± 1.1
Treatment	Diet	14 (11%)
	Tablets	66 (56%)
	Insulin	39 (33%)
Complications	Hypertension	70 (59%)
	Ischaemic heart disease	29 (25%)
	Nephropathy	6 (5%)
	Retinopathy	16 (14%)
	Neuropathy	17 (14%)

Data are mean ± SE

Discussion

In this study we have shown that it is possible to set up and run a successful supervised exercise programme. Those individuals who completed the 12-week programme showed a significant improvement in wellbeing, long-term glycaemic control (HbA_{1c}) and body physique, with a reduction in both BMI and waist circumference. These findings demonstrate that the benefits which have previously been shown in trials can be replicated in clinical practice.

Previous studies of exercise in patients with diabetes (Schneider et al, 1984; Wing, 1985; Schneider et al, 1992) have focused on individuals who are younger, more able and less obese than those individuals the majority of us see in our clinics. These studies showed that regular exercise improves insulin sensitivity, glycaemic control and aids weight loss. Whether these benefits would be translated to a population that was more representative of patients with diabetes remains to be seen.

The mean age of patients who attended our exercise programme was 61 years (range 31–75), with average BMI 34 (range 20–53). Many of them had not exercised for many years and had numerous disabilities. These patients showed similar improvements to those seen in previous trials, indicating that exercise can be of benefit to the majority of individuals who attend diabetes clinics.

Government guidelines, based on previous trials, recommend that the minimal amount of exercise that should be taken is 30 minutes five times a week. Many individuals feel that this target is simply impossible to reach, and thus are put off from doing any exercise. The data from our exercise programme indicates that one session of exercise for 1 hour a week can have substantial benefits for the health and wellbeing of patients with diabetes. This suggests, perhaps, that these guidelines need to be altered for people with diabetes.

Many groups have suggested that patients with diabetes should be screened before undergoing exercise (Horton, 1996; Schneider and Guleria, 2000). Some have gone as far as to say that patients with retinopathy and neuropathy should not

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1 Many of those participating in the programme had not exercised for many years and had numerous disabilities.

2 These patients showed similar improvements to those seen in previous trials with younger, more able and less obese individuals.

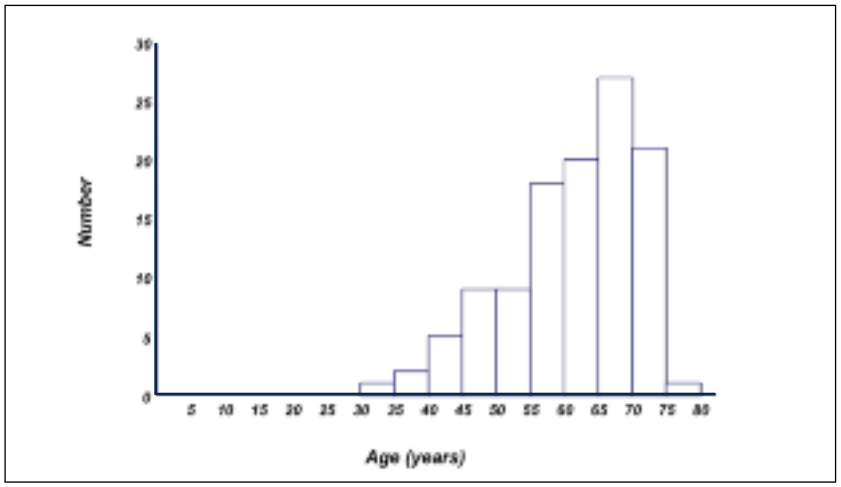

Figure 2. Age distribution of the 119 patients who have attended the 12-week exercise programme.

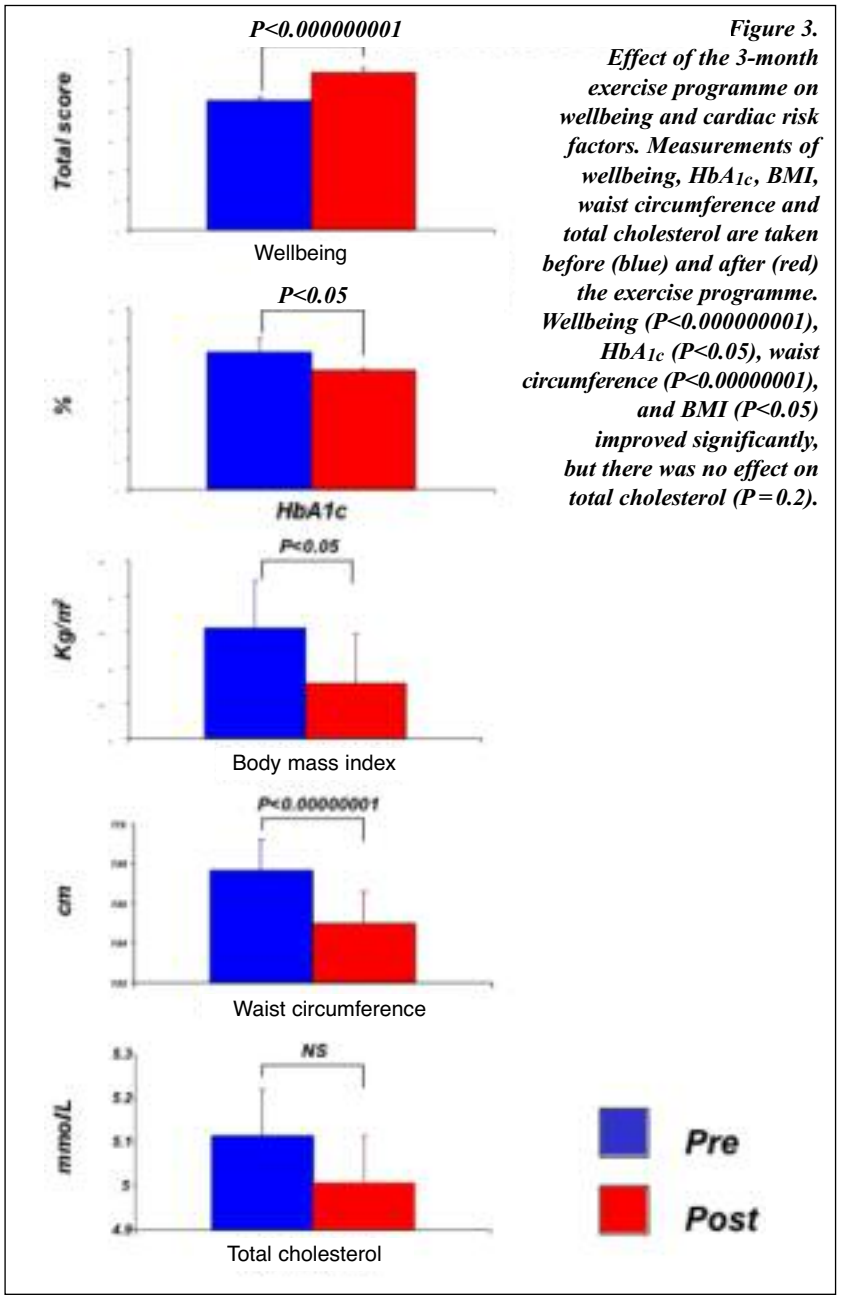

Figure 3. Effect of the 3-month exercise programme on wellbeing and cardiac risk factors. Measurements of wellbeing, HbA_{1c}, BMI, waist circumference and total cholesterol are taken before (blue) and after (red) the exercise programme. Wellbeing ($P<0.000000001$), HbA_{1c} ($P<0.05$), waist circumference ($P<0.00000001$), and BMI ($P<0.05$) improved significantly, but there was no effect on total cholesterol ($P=0.2$).

exercise (Horton, 1996). Participants in this study were not screened, in spite of the fact that many of them were known to have macrovascular and/or microvascular disease. During the 3 years of this study no injuries occurred during the exercise classes. Furthermore, at the follow-up meetings (patients were seen at 3 monthly intervals after leaving the course) no-one mentioned an escalation of any of their symptoms. This supports the theory that exercise is safe for everyone, provided that it begins at low intensity and builds up gradually.

Encouraging patients with diabetes to become active can be very difficult. Many do not realise the benefits that they will gain from regular exercise (Holland et al, 2001), perhaps because advertising campaigns have tended to focus on the benefits that regular exercise can have on the heart (Healthy Heart Awareness Campaign, 2002). Others feel unsure about how to increase their level of activity and/or embarrassed about going to a gym or a fitness class. Supervised exercise programmes are one way of addressing these problems.

Since starting our supervised exercise programme we have received more than 300 referrals and have been able to offer 145 of these patients a place. The remaining 155 are due to start the course within the next 6 months. Of those who started, 84% completed the 12-week programme. These findings seem to indicate that supervised exercise programmes are a popular and very useful way of encouraging patients with diabetes to become more active.

Further research is now needed to identify whether it is the type of activity, the education package, or a combination of the two that have made our programme so successful. Our impression is that both are needed if similar benefits are to be replicated in other areas.

Conclusion

Setting up a supervised exercise programme is one way of encouraging patients with diabetes to become more active. Individuals who attend such programmes should notice an improvement in their overall wellbeing as well as a reduction in their HbA_{1c}, BMI and

'Our findings seem to indicate that supervised exercise programmes are a popular and very useful way of encouraging patients with diabetes to become more active.'

waist circumference. Whether these individuals continue to exercise once they have completed the course remains to be determined. ■

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