Can structured education be used to promote physical activity in primary care?

Thomas Yates, Kamlesh Khunti, Melanie Davies

Evidence shows that successful lifestyle modification programmes are fundamental to slowing or stopping the progression to diabetes in high-risk populations and preventing or reducing the complications associated with type 2 diabetes. This article will explore the issues surrounding the promotion of physical activity by primary care. Although the main focus of the article is prevention, the issues and strategies described are equally applicable to individuals with type 2 diabetes, especially those who are newly diagnosed.

Article points

1. Physical activity reduces the risk of developing type 2 diabetes and improves glycaemic control in individuals with the condition.
2. Walking is the most appropriate form of physical activity to promote.
3. Providing individuals with a pedometer and personalised steps-per-day goals is a cheap and effective way of increasing walking activity.
4. Structured educational programmes may be an effective and acceptable way of promoting physical activity in primary care.

Key words

- Pedometer
- Physical activity
- Structured Education

Thomas Yates is a Research Student at Loughborough University, UK; Kamlesh Khunti is a Professor and Head of Division of General Practice and Primary Health Care and Melanie Davies is Professor of Diabetes Medicine – both at the University of Leicester, UK.

The prevalence of diabetes is reaching epidemic proportions and the costs associated with its treatment are set to represent a serious clinical and financial challenge to the UK's health system (Bagust et al, 2002). Individuals with pre-diabetes have a significantly increased risk of developing diabetes and cardiovascular disease compared with those with normal glucose tolerance (Unwin et al, 2002) and are therefore likely to form a significant proportion of the healthcare burden associated with diabetes in the future. Pre-diabetes is the collective term for people with impaired glucose tolerance or impaired fasting glucose (Expert Committee on the Diagnosis and Classification of Diabetes Mellitus, 2003). It is of primary importance to counter this worrying trend by identifying strategies that are appropriate to local primary healthcare services and infrastructure (Davies et al, 2002).

Although the increasing prevalence of diabetes and its co-morbidities does have a genetic component, deleterious effects are only seen in environments where energy-dense food is plentiful and the link between physical activity and food procurement has been broken. Such environments have been termed 'toxic' in both the scientific press and mainstream media. The recent technological revolution and its associated plethora of labour-saving devices, and the reduction in jobs requiring manual labour have lead to a physically inactive society far removed from the high energy expenditures on which the human phenotype evolved (Cordain et al, 1998). Consequently, physical inactivity is one of the most important factors contributing

to the 'toxicity' of modern developed environments.

The link between physical activity and diabetes risk has been well documented (Hu et al, 1999; Manson et al, 1992) and there is good evidence from randomised controlled trials that the incidence of type 2 diabetes can be reduced substantially in people with pre-diabetes through lifestyle change, including increased physical activity (Gillies et al, 2007). There is also good evidence that increased physical activity, even without weight loss, can improve glycaemic control substantially in individuals with type 2 diabetes (Thomas et al, 2006); indeed, lifestyle diabetes management programmes that focus on physical activity may be more successful than more traditional multi-component lifestyle programmes at improving glycaemic control (Conn et al, 2007). However, to date, the majority of interventions aimed at promoting physical activity have employed methods that would be difficult to deliver in usual healthcare practice (Hillsdon et al, 2005). Therefore, clinicians and researchers need to develop successful ways of promoting physical activity, not only in individuals with type 2 diabetes, but also in those at risk of diabetes. In order to achieve this, physical activity promotion strategies must take account of several important areas.

Walking – the best exercise

Physical activity interventions need to promote forms of physical activity that are appropriate and acceptable to their target populations. It is of little practical benefit to promote gym-based physical activity interventions if the majority of the individuals with the most to gain are unable or unwilling to access their local gyms. This is likely to explain the poor take up of and adherence to some exercise on prescription schemes (Thurston & Green, 2004). Data from epidemiological and intervention studies in the UK and other developed countries have consistently shown walking to be the preferred choice of physical activity in the general as well as diseased populations (Crespo et al, 1996; Booth et al, 1997; Cooper et al, 2000; Di Loreto et al, 2003). Interventions that promote walking activity have been shown to improve glycaemic control and cardiovascular risk markers in individuals with diabetes (Di Loreto et al, 2003) and epidemiological data have shown that as little as 30 minutes of walking activity per day has a significant impact on the risk of diabetes compared with being sedentary, even after adjustment for body mass and other likely confounding variables (Hu et al, 1999). Walking would therefore seem to be an appropriate mode of exercise to use when promoting physical activity in at-risk individuals. It is also likely that walking will be associated with fewer barriers than other forms of physical activity in black and minority ethnic populations (Johnson, 2000).

Pedometers to promote physical activity

A simple and cheap way of promoting walking activity is to use pedometers. Pedometer interventions have been successful at initiating physical activity behaviour change in individuals with diabetes (Tudor-Locke et al, 2004) and those at risk of diabetes (Swartz et al, 2003). When using pedometers in the promotion of physical activity, it is important to work with patients to set realistic and attainable goals. For example, promoting the popular 10 000 steps-per-day target in someone who normally takes only 3000 steps per day is inappropriate and likely to be demotivating; it is important that individual goals are based on the individual's normal activity levels.

Table 1 gives an overview of activity

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1. There is good evidence that increased physical activity, even without weight loss, can improve glycaemic control substantially in individuals with type 2 diabetes.
2. Clinicians and researchers need to develop successful ways of promoting physical activity, not only in individuals with type 2 diabetes.
3. Physical activity interventions need to promote forms of physical activity that are appropriate and acceptable to their target populations.
4. Data from epidemiological and intervention studies in the UK and other developed countries have consistently shown walking to be the preferred choice of physical activity in the general as well as diseased populations.
5. A simple and cheap way of promoting walking activity is to use pedometers.

Table 1. Physical activity categories based on steps per day (adapted from Tudor-Locke & Bassett, 2004).

Category	Steps per day
Sedentary	<5000
Low (typical of daily activity excluding volitional activity)	5000–7499
Moderate (likely to incorporate the equivalent of around 30 minutes per day of moderate intensity physical activity)	7500–9999
High (likely to incorporate the equivalent of around 45 minutes per day of moderate intensity physical activity)	10 000–12 499
Very high (likely to incorporate the equivalent of over 45 minutes per day of moderate intensity physical activity	>12 500

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categories based on the number of steps per day. The immediate goal of the clinician or healthcare professional should be to help individuals move up an activity category. For example, a sedentary individual taking 3000 steps per day should be encouraged to increase their activity levels to over 5000 steps per day. This should be achieved gradually, by increasing activity levels in small weekly increments until the target amount is reached. Along with setting realistic goals, it is important that individuals keep a daily log of their steps per day. This should be reviewed with the clinician or health professional at subsequent appointments. Clinicians should also consider using pedometers with proven reliability and validity (Schneider et al, 2004), as patients may become demotivated if the pedometer they are using does not accurately reflect their walking activity levels. This may be particularly important in elderly and overweight or obese individuals where traditional spring-levered pedometers have been shown to understate the number of steps taken (Melanson et al, 2004; Crouter et al, 2005).

Physical activity promotion – the role of structured education

Interventions to increase physical activity need to take into account the current healthcare climate and make use of existing strategies that have already been used to successfully promote self-management in people with chronic disease. Interventions that use a patient-centred approach to education are increasingly being recognised as both appropriate and successful in a UK primary healthcare setting (DoH and Diabetes UK, 2005). Structured educational programmes delivered to small groups of participants are also likely to be a cost-effective method of health promotion (NICE, 2003); this is important given that the resource-intensive methods used in the Diabetes Prevention Program and other successful diabetes prevention programmes are unlikely to be cost effective in a real-world primary healthcare setting (Icks et al, 2007).

Health behaviour theory

It is important that structured educational programmes aimed at health promotion are based on known learning techniques and health behaviour theory (DoH and Diabetes UK, 2005). Therefore, educational programmes that are designed around physical activity promotion need to be grounded in appropriate healthcare theory and delivered using patient-centred learning techniques. Physical activity research has typically failed to consider or adequately describe a theoretical justification for their chosen approach, which has made it more difficult to understand why a given approach may fail or succeed.

The PREPARE programme

In order to address some of the issues highlighted in this article and to target some of the gaps in the current evidence around physical activity and diabetes prevention (Yates et al, 2007b), we have designed a programme called the Pre-diabetes Risk Education and Physical Activity Encouragement (PREPARE) programme, which is a theory-driven, structured educational programme designed to promote increased levels of walking activity in individuals identified as having pre-diabetes using methods appropriate for a primary health care setting.

The PREPARE programme is based on the approach to patient education that was developed for the Diabetes Education and Self Management for Ongoing and Newly Diagnosed (DESMOND) programme, which is recognised by the DoH (DoH and Diabetes UK, 2005) as being the only national structured educational programme for individuals with type 2 diabetes that meets the key criteria identified by NICE for effective patient education (NICE, 2003). The DESMOND programme has been shown to be successful at targeting illness perceptions and promoting physical activity (Skinner et al, 2005; 2006).

Drawing on the knowledge and expertise of the DESMOND collaborative, the PREPARE programme aims to promote physical activity by targeting perceptions and

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1. Interventions that use a patient-centred approach to education are increasingly being recognised as both appropriate and successful in a UK primary healthcare setting.
2. It is important that structured educational programmes aimed at health promotion are based on known learning techniques and health behaviour theory.
3. The PREPARE programme is a theory-driven, structured educational programme designed to promote increased levels of walking activity in individuals identified as having pre-diabetes using methods appropriate for a primary health care setting.
4. The programme aims to promote physical activity by targeting perceptions and knowledge of pre-diabetes, self-efficacy beliefs, and perceived barriers surrounding walking activity.

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1. Pilot data suggest that the PREPARE programme is successful at increasing perceived knowledge of pre-diabetes and initiating physical activity behaviour change in individuals with pre-diabetes.
2. The PREPARE programme is currently being tested in a randomised controlled trial funded by Diabetes UK.
3. If we are to stem the rising tide of diabetes and its associated complications, it is essential that physical activity is recognised as a lifestyle variable of primary importance and promoted using strategies that are applicable and cost effective in a primary healthcare setting, and appropriate across a wide range of abilities and cultures.

knowledge of pre-diabetes, self-efficacy beliefs and perceived barriers surrounding walking activity. As self-regulation is the key to success in any structured educational programme, the PREPARE programme also helps participants to: form realistic personalised goals; develop strategies for success by planning when, where and how they will achieve their goals; and monitor their behaviour using pedometers. Total contact time for the PREPARE programme is 3 hours. Pilot data suggest that the PREPARE programme is successful at increasing perceived knowledge of pre-diabetes and initiating physical activity behaviour change in individuals with pre-diabetes (Yates et al, 2007a).

The PREPARE programme is currently being tested in a randomised controlled trial funded by Diabetes UK. The trial is powered to detect a 1 mmol/l difference, over 1 year, in 2-hour glucose levels in individuals with impaired glucose tolerance. Physical activity levels will be assessed using self-report and medical-grade piezoelectric pedometers. Additional outcomes will include blood lipids and standard anthropometric measurements. Taken together, these outcomes will help inform clinicians and health professionals as to whether or not physical activity can be promoted successfully using structured education and if any observed increase in physical activity leads to changes in traditional markers of diabetes or cardiovascular disease risk.

Conclusion

If we are to stem the rising tide of diabetes and its associated complications, it is essential that physical activity is recognised as a lifestyle variable of primary importance and promoted using strategies that are applicable and cost effective in a primary healthcare setting, and appropriate across a wide range of abilities and cultures. It is for this purpose that we have designed the PREPARE programme, which we hope will provide a successful and appropriate method of promoting increased walking activity in usual healthcare practice. ■

'If we are to stem the rising tide of diabetes and its associated complications, it is essential that physical activity is recognised as a lifestyle variable of primary importance and promoted using strategies that are applicable and cost effective in a primary healthcare setting, and appropriate across a wide range of abilities and cultures.'

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