The role of physical activity in obesity: let’s actively manage obesity

Authors: Lewis Raiman,^A^ Raj Amarnani,^B^ Muhammad Abdur-Rahman,^C^ Anna Marshall^D^ and Sivanadian Mani-Babu^C^

Obesity, physical inactivity and sedentary behaviour are major public health concerns. A complex interaction of many factors leads to obesity, which requires an individualised multicomponent management strategy. As new interventions become available to help individuals manage obesity, it is essential that physical activity remains a core part of the approach. Here, we summarise current evidence regarding the benefits of physical activity as part of a management strategy of obesity. Additionally, we discuss current methods for increasing physical activity levels in individuals with obesity and outline the role of sport and exercise medicine physicians as part of the multidisciplinary team.

KEYWORDS: physical activity, obesity, sedentary behaviour, exercise, sport and exercise medicine

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Introduction

Obesity, physical inactivity and sedentary behaviour are all major public health concerns. Obesity is a significant contributor to ill health and is an independent risk factor for many diseases, including cancer, diabetes, cardiovascular disease, depression, anxiety and premature death. Physical inactivity is the fourth leading risk factor for mortality. The prevalence of obesity and physical inactivity varies based on socioeconomic status and ethnicity, which leads to widening health inequalities. It is also associated with adverse social impacts, such as discrimination, social exclusion and reduced earning. Sedentary behaviour is defined as any waking behaviour characterised by an energy expenditure of \( \leq 1.5 \) metabolic equivalents (METs), while in a sitting, reclining or lying position. Both reduced levels of physical activity and sedentary behaviour contribute to a lower metabolic rate and drive childhood obesity and associated health problems.

The concept that physical activity is beneficial for health is not new. Records of exercise prescriptions stretch back millennia to Susruta in India, Hippocrates in Greece and Galen in Rome. Our knowledge of the importance of physical activity for health has progressed and most physicians will recall the famous British bus conductor study, which, despite its shortcomings, reported lower rates of coronary heart disease in bus conductors compared with less occupationally active bus drivers. Now, 70 years on from the work of Morris et al, we have a more developed understanding of the benefits of physical activity, especially for individuals with obesity.

It is vital that, as new treatment modalities become available and headlines focus on these interventions, the benefits of physical activity and its role as part of a multicomponent management plan is not forgotten. This is crucial because individuals with obesity in the UK are two to three times more likely to report low levels of physical activity compared with normal-weight adults and have higher rates of sedentary behaviour. The reasons for this are complex, and individuals living with obesity face many barriers to becoming more physically active. These can include feelings of shame, associated multiple health conditions and symptoms, sedentary work and lack of access to green space. As healthcare professionals, we have an important role in helping to facilitate behaviour change. Sport and exercise medicine (SEM) consultants are experts in the use of physical activity in the prevention and treatment of illness and injury and can assist as part of the multidisciplinary team (MDT) by working to embed exercise medicine within healthcare pathways.

Definitions

- **Physical activity**: as any bodily movement produced by skeletal muscles that requires energy expenditure.
- **Obesity**: overweight and obesity are defined as abnormal or excessive fat accumulation that presents a risk to health. A body mass index (BMI) over 25 kg/m\(^2\) is considered overweight, and over 30 kg/m\(^2\) is obese. Caution is required when interpreting BMI, with consideration given to muscle mass, ethnicity, age and central adiposity.
- **Sedentary behaviour**: defined as any waking behaviour characterised by an energy expenditure of \( \leq 1.5 \) METs, while in a sitting, reclining or lying position.
The benefits of physical activity and reducing sedentary time in obesity

The benefits of increasing physical activity and reducing sedentary time for individuals are wide reaching and well established. The UK Chief Medical Officers (CMOs) provide guidelines of the recommended minimum amounts of weekly physical activity (Fig 1).8

The use of BMI as a practical tool to define obesity has resulted in a focus on weight when assessing the success of physical activity programmes. Physical activity alone has a small but favourable effect on weight loss and overall fat percentage reduction for individuals with obesity. When considering exercise alone for weight loss in individuals with obesity, aerobic exercise and high intensity-interval training (HIIT) are preferable, although it is not possible to recommend one modality over the other.11 The duration and intensity of the activity appear to be the most important factors of success.12,13 Diet together with exercise appears to be more effective in inducing body compositional changes compared with either exercise or diet alone.14,15 Ultimately, the most successful weight loss and weight maintenance programmes incorporate physical activity alongside other interventions where appropriate, as demonstrated in a summary of 48 studies, including 30 randomised control trials (RCTs).16

The role of GLP-1 analogues in assisting individuals with obesity to achieve weight loss is important. Unfortunately, much reporting

Fig 1. UK chief medical officers’ (CMOs’) physical activity guidelines for adults and older adults.
Cardiovascular disease is a specific concern for individuals with obesity and particular focus is given to risk factors in the research and clinical setting. Numerous studies have demonstrated the role of physical activity in the improvement of blood pressure, lipid profile and insulin resistance in individuals with obesity. Those with the greatest derangement in these risk factors appear to have the most dramatic improvement. In terms of exercise type, aerobic training has many well-known benefits on cardiometabolic health and was the most frequent type of exercise assessed in studies. However, broadly speaking, no one exercise type can be conclusively deemed beneficial on risk factor reduction compared with others. Obese individuals with higher physical activity levels and/or physical fitness have a lower all-cause mortality, highlighting the important role of physical activity in reducing cardiovascular disease.

Obesity can have a negative impact on the psychological health of individuals, and associations have been found between obesity and anxiety, depression, somatoform disorders and poor quality of life. Numerous meta-analyses have shown that exercise is linked to lower levels of depression and anxiety, and improved quality of life in the general population. The current literature investigating these benefits specifically for individuals with obesity shows a trend of small positive psychological effects of exercise training on psychosocial outcomes in overweight or obese individuals. A recent meta-analysis showed a non-significant effect of exercise on depression scores, with one study reporting positive effects of exercise on anxiety.

**Epidemiology**

The response between amount of physical activity and its benefits is nonlinear, with those who are inactive with the most to gain. As outlined in Fig 1, CMO guidelines recommend at least 150 min of moderate-to-vigorous physical activity (MVPA) or 75 min of vigorous physical activity (VPA) per week with muscle strengthening activities on 2 days per week. There is no minimum amount of physical activity required to achieve some health benefits (Fig 2). In addition, sedentary time in adults is associated with all-cause mortality, cancer risk and survivorship. In all groups, the relationships of sedentary behaviour and health occur independently of MVPA for some health outcomes. The curvilinear dose–response relationship between physical activity and health outcomes suggests that the proportionately greatest benefits come from progressing from being inactive to achieving moderate levels of activity.
which are still below the threshold of the guidelines. Threshold recommendations might appear as a barrier to many, particularly those starting from low levels of physical activity, and discourage them from seeking to become more active. This is particularly important to consider because individuals with obesity in the UK have higher rates of sedentary behaviour, and are two to three times more likely to report low levels of physical activity compared with normal-weight adults.\textsuperscript{8} The authors analysing UK biobank data noted that the differences were greatest in the higher obesity classes.

An association with physical activity levels and deprivation has been well documented. Physical activity levels decrease as deprivation increases, from 73\% active in the least deprived areas, to 57\% in the most deprived areas.\textsuperscript{41} Significant differences in activity levels are seen among ethnic groups, with people that identified as White British most likely to be physically active (47.7\%), and those that identified as Black (35.7\%), Other (38.0\%) or Asian (38.7\%) least likely to be active.\textsuperscript{41} These inequalities are mirrored in obesity levels. There has been a significant increase in obesity in the most deprived communities in England in recent years, leading to a widening gap between the most and least deprived areas. The latest figures demonstrate that those who live in the most deprived areas in England have a prevalence of excess weight 14 percentage points higher compared with the least deprived areas. Furthermore, an educational difference is observed among people with no formal qualifications, who have rates of excess weight 12 percentage points higher than among people with level four qualifications or higher.\textsuperscript{41} A difference is seen among people with disabilities, with 12 percentage points higher than among those without disabilities, and an ethnic variation is observed, with people in Black ethnic groups having the highest rates of excess weight.

Differences in obesity and physical inactivity rates translate to worse health outcomes for people in more deprived areas and contribute to health inequalities. The reasons for lower levels of physical activity in more deprived areas are multifactorial, cutting across economic, social, geographic and cultural factors. There is an important, yet underdeveloped, role for integrated care systems and local place-based partnerships in coordinating action.

Interventions to promote of physical activity

There has been a considerable interest in the use of digital tools to increase physical activity, with recent work showing their ease of use and effectiveness in providing short-term benefits.\textsuperscript{39–42} This approach fits within the long-term agenda for digital tools to support existing services in the NHS and more widely, and has been found to be cost effective for some services.\textsuperscript{43–46} Digital tools might also be preferable to engaging with traditional services for some, given the flexibility of accessing support at a time that suits them, reducing transport-related issues.

A recent review looking at digital tools to promote physical activity for obesity identified six studies; most delivered via
The role of physical activity

Most individuals do not need medical clearance to undertake physical activity; this includes individuals with long-term conditions (Fig 3). The Physical Activity Readiness Questionnaire for Everyone (PAR-Q+) can be used as a tool to help guide decision making. When counselling individuals regarding physical activity levels, physicians should aim to encourage patients to self-generate ideas on the types of physical activity that they will enjoy. Motivational interviewing techniques are an effective way to achieve this, and Moving Medicine provides a helpful framework with short and long consultation guides, an example of which is provided below.

Engage with the patient

> ‘Would you be happy to spend a few minutes talking about something that can make a big difference to your future health and wellbeing?’
> ‘How has struggling with your weight affected your physical activity levels and the things you enjoy?’
> The least physically active individuals stand to gain the most from a small increase in physical activity.
> Recommend starting with low-intensity activity and build up gradually.

Explore options with the patient

> ‘What do you know about the benefits of physical activity in people who are struggling with their weight?’
> ‘What would be the top two or three reasons for you personally becoming more active, if you decided to?’
> ‘Can I share some other things people find beneficial when making a plan?’
> ‘Let’s imagine that you did decide to live a more active lifestyle and were able to keep it up for 6 months or so, what differences do you think you might notice?’
> Brisk walking can be easily incorporated into everyday life for many people and is an acceptable form of physical activity.
> Share benefits of physical activity such as reductions in BMI, body fat and blood pressure; and improved lipid profiles, quality of life, walking ability and lean body mass.

Decide

> ‘Can I summarise what I think you have said?’
> ‘So what do you think you will do?’
> ‘Can I share with you some things people find helpful when making a plan?’

Box 1: Useful resources

- PACE-UP 12-week progressive walking programme: https://tinyurl.com/2anxtvcm
- NHS Couch to 5 km 9-week plan: https://tinyurl.com/ekcy75jh
- EXI iPrescribe Exercise app: www.exi.life (use code ‘moving’ for free access)
- Live Well: www.nhs.uk/live-well/exercise/
- Get Active: www.nhs.uk/better-health/get-active/
- Sport England: www.sportengland.org/jointhemovement
- Moving Medicine: https://movingmedicine.ac.uk/
- PAR-Q: https://eparmedx.com/
Interventions to help promote physical activity have an important role in the management of obesity. There are numerous additional health benefits with physical activity outside of weight loss, which include improvement in cardiovascular fitness, mental wellbeing and bone mineral density. There is a curvilinear dose–response relationship between physical activity and health, suggesting that, proportionately, the greatest health benefits are seen in those who go from being inactive to moderately active. Interventions to help promote physical activity have increased enormously over the past decade, including motivational interviewing, mobile applications and AI.

Sport and exercise medicine as a specialty can have a key role in the MDT for patients seeking to better manage their weight and improve their overall health.

“There are some great, free resources available written by people who understand what it’s like living with your condition if you’d be interested to have a look.” (See Box 1.)

Strength and balance activities should be done on at least 2 days per week.

Outcome

On further discussion with the patient, he explains that he is keen to undertake a 10-km charity walk. He is currently walking 3 km per week and his main concern is developing arthritis from the impact on his joints. After addressing his concern and sharing that resistance activity is important in addition to aerobic exercise to develop muscle strength and support joints, he will now incorporate two resistance sessions per week into his regimen. You provide encouragement for the event in 6 months’ time, and even consider organising a departmental charity walk!

References

14 Clark JE. Diet, exercise or diet with exercise: comparing the effectiveness of treatment options for weight-loss and changes in fitness for adults (18-65 years old) who are overweight, or obese; systematic review and meta-analysis. J Diabetes Metab Disord 2015;14:31.
26 Battista F, Ermolao A, van Baak MA et al. Effect of exercise on cardiometabolic health of adults with overweight or obesity: focus on...