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The case for community conservation in cardiovascular health promotion in the North West: Evidence from the Lancaster 'Greenfingers' initiative

Mark Christie, Paul K. Miller, Tim Barry & Susan Dewhurst

Abstract

In this paper, a case is made for the greater promotion of regular cardiovascular exercise in the North West through the potential of a (hitherto under-utilised) resource that North Lancashire and Cumbria have in abundance: rural environments. Drawing upon extant literature and indicative data from pilot research from a recent community conservation initiative in Lancaster, it is argued that the embedded activities can encourage precisely the kinds of optimal, affordable and sustainable exercise that could play an important role in the region's cardiovascular health.

Keywords

CVD; cardiovascular disease; conservation; fitness; Green Gym; exercise referral; health promotion.

1. Introduction

According to the British Heart Foundation Health Promotion Research Group:

Diseases of the heart and circulatory system...are the main cause of death in the UK and account for almost 191 000 deaths each year – one in three of all deaths. (Scarborough et al., 2010, p. 14)

Moreover, between 2006 and 2008, cardiovascular disease (henceforth CVD) accounted for 28% of all premature deaths (i.e. deaths under the age of 75 years) in men and 20% women (Ibid.). Among the nine English NHS regions, the age-standardised death rates among the under-75 age groups in the North West (25.46 per 100 000) were higher than all other regions bar the North East (26.35 per 100 000) and well above the national average of 19.69 per 100 000 (Scarborough, et al., 2010, p. 29). The specific picture in the broad North Lancashire and Cumbria area is a little more mixed;

some Local Authority districts such as Copeland (28.12) Lancaster (24.63) Carlisle (21.21) show premature CVD death rates above the national average, while others such as South Lakeland (14.52) are well below (Ibid.). There is a profusion of compelling evidence that regular aerobic exercise, i.e. that which increases breathing and heart rate, is a powerful preventative against CVD (see, for example, the seminal meta-analysis compiled by Berlin & Colditz, 1990). A corollary of this is the UK Chief Medical Officer's recommendation that adults aged 19-64 years should exercise at a moderate (or higher) intensity for thirty minutes or more at least five times per week (Department of Health, 2004), recently rephrased as:

Adults should aim to be active daily. Over a week, activity should add up to at least 150 minutes (2½ hours) of moderate intensity activity in bouts of 10 minutes or more. (Department of Health, 2011, p. 1).

Sport England's rolling *Active People Survey* measures the exercise uptake situation in the North West of England as falling far short of these recommended guidelines; between October 2009 and October 2010, only 15.2% of Cumbrian respondents, and 11.6% of Lancastrians, reported having taken part in any 'sport or physically active recreation' on 20 or more of the last 28 days while 47.2% and 49.4%, respectively, reported having taken part in none whatsoever (Sport England, 2011)ⁱ.

2. Cardiovascular Exercise and the 'Green Gym' Concept

A number of initiatives have, to date, been trialled to increase public engagement with basic cardiovascular exercise at national and local levels, including primary care 'exercise referrals'. While showing clear short-term benefits, the long-term value of these referrals remains in dispute (Riddoch, Puig-Ribera, & Cooper, 1998), largely as an output of difficulties in sustaining participant commitment to exercise post-intervention (Morgan, 2005). Among the most recent initiatives to emerge from outside the NHS itself, meanwhile, is the 'Green Gym'. First piloted in 2000 by the British Trust for Conservation Volunteers (BTCV), a green gym is a scheme through which members of the public are invited to take part in physically-active conservation activities with a view to concurrently improving their own health and the public environment. The basic principle here is not new; a range of authors (Ferris, Norman, & Sempik, 2001; Woolley, 2004) have stressed the benefits that green spaces and community gardens can offer in terms of general health and wellbeing. The provision of access to activity in natural environments, it is argued, facilitates regular exercise and communal interaction, with tangible benefits in physical and psychosocial domains (Maas & Verheij, 2007). A recently-published independent evaluation of a range of BTCV Green Gym initiatives (Yerrell, 2008) has, however, *empirically* illustrated the fitness

benefits gained from working outdoors in this manner. Reported activities in which volunteers participated were varied, but findings suggested that they were largely of sufficient duration and intensity to improve general cardiovascular fitness amongst participants and significant improvements in physical health scores after six months of regular involvement are also reported. Crucially, 72% of original participants tended to remain regularly involved after this initial six month period, significantly outstripping sustained adherence figures for more orthodox 'exercise referral' models (typically in the 25-30% range, as reported by Taylor, Doust, & Webborn, 1998), largely due to the concomitant community-building aspect endemic in Green Gym initiatives. Furthermore, levels of physical activity among participants are also reported to have increased in their lives away from the projects themselves (Yerrell, 2008).

Although, to date, the corpus of evidence in terms of the direct and sustainable cardiovascular health benefits of Green Gym initiatives is still not fully robust, there is little doubt that the range of research completed suggests very encouraging outcomes. This is reflected in the fact that, by 2008, 10% of all participants in BTCV green gym initiatives were directly referred by local health services (Yerrell, 2008).

2.1. Case: The 'Greenfingers' Initiative in Lancaster

The first run of the 'Greenfingers' initiative, which began in October 2010, was promoted in partnership with Lancaster City Council as a community-based project involving the clearance of the non-native, invasive rhododendron from a section of Lancaster's Williamson Park, and ultimately its replacement with native plant species. Tasks involved a range of physical activities, including pruning, sawing, digging, chopping, clearing and general tidying of the designated area of the park, approximately an acre and a half in size. Following an initial nine week exploratory period, during which the majority

of volunteers were recruited, the project was extended for a further total of six months.

3. Research Design

The current position of the American College of Sports Medicine for development and maintenance of physical fitness and health (Garber et al., 2011) is that exercise training above and beyond activities of daily living should include cardiovascular component working at 'moderate intensity', i.e. a heart rate of 64-76% of aged predicted maximum heart rate (HR_{max} , which is defined as 220 minus the participant age in years), for a total of $\geq 150 \text{ min.wk}^{-1}$. There is substantial evidence to suggest that working at this exercise volume is associated with lower the rates of CVD in many populations (Lee, Rexrode, Cook, Manson, & Buring, 2001; Manson et al., 2002; Sesso et al., 2000). In the present pilot study, heart rate was recorded from a sample of two populations ('young' and 'older') participating in the Greenfingers initiative to monitor whether the workload was sufficient to induce physical fitness and health benefits. 7 young males aged between 19-28 (21.9 ± 3.3) years and 5 older individuals (3 males and 2 females) aged between 42 and 68 (59.0 ± 10.0) years volunteered for the study, all were healthy and Lancaster based. Young volunteers acted also as activity leadersⁱⁱ.

The physical activity included a variety of outdoor tasks which included sawing, clearing and pruning and lifting for a period of 55 minutes. Heart rate was recorded every five minutes using Polar Heart Rate Monitors. Resting heart rate was recorded at 0 min and 5 min, passive recovery was given before the final heart rate reading at 60 min. For both the absolute heart rate response (bts.min^{-1}) and HR_{max} (%) t unpaired Students T-Test were performed on the mean of the young and older data sets (SPSS, v.15).

4. Results

Figure 1: Heart Rate response (bts.min^{-1}) in 5 older subjects and 7 younger subjects. Values are mean \pm SE. * indicates significant difference ($p < 0.05$) between the mean of the groups.

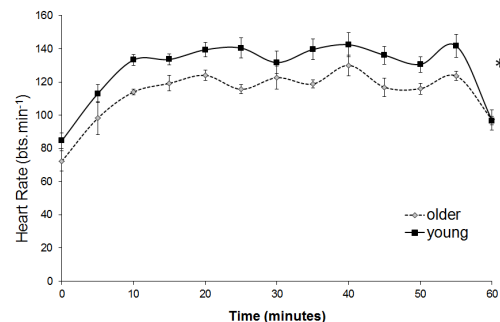
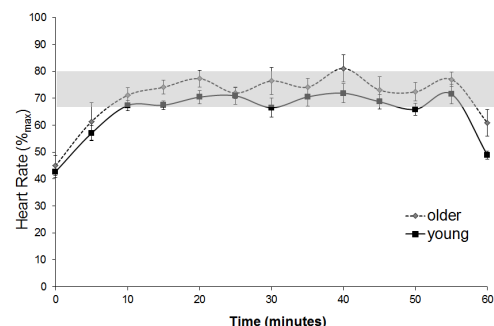


Figure 2: Percentage of HR_{max} (maximum heart rate calculated from 220-age) in 5 older subject and 7 younger subjects. Values are mean \pm SE. The grey band indicates the moderate intensity training zone suggested by Garber et al. (2011) of 64- 76% of HR_{max} .



Despite the absolute heart rate data being significantly higher in the older group, when this data is normalised using the percentage of HR_{max} , as shown in Figure 2, there is no difference between the intensity that the groups worked at (a mean of 66.4 ± 4.4 % HR_{max} compared to 71.3 ± 6.5 % HR_{max} , young and older group respectively. After 10 minutes, both groups were working at the exercise intensity defined by the ACSM (Garber, et al., 2011) as 'moderate' (between 64 and 76 % HR_{max} , shown by the grey band).

The young group, however, remained at the lower end of the banding and never increased above this moderate intensity while the older group, on occasion, were working at an intensity which would be classified as 'vigorous' (Ibid.).

5. Discussion

The main finding of the present Greenfingers pilot study was that the intensity of the work undertaken was sufficient to consistently raise heart rate into the moderate intensity zone, which has been shown to induce both physical fitness and health benefits in both the young and older groups. The ACSM (Garber, et al., 2011) suggest that physical exertion should be either of a moderate intensity, vigorous intensity or combination of moderate and vigorous intensity. The data from the Greenfingers initiative suggests that this form of community conservation activity produces the former in younger populations, and the latter in older participantsⁱⁱⁱ.

Although of small-scale, the pilot study findings clearly indicate that the activities involved in community conservation work can, providing that work schemes are appropriately tailored, produce optimal work for cardiovascular fitness. Anecdotal evidence collected from participants during the project also indicated increased motivation for engaging with regular physical activity outside of the scheme itself, while existing literature (Yerrell, 2008) suggests that these types of scheme may well produce much higher levels of sustained adherence than exercise referrals to leisure centres. Indeed, several participants in Greenfingers itself continued to be involved within Williamson Park as volunteers following the end of the scheme. As with BTCV Green Gyms, Greenfingers was inexpensive to establish and operate, run by volunteers and free to join (with, therefore, no associated cost for referrals). Locally, BTCV has now run projects in Preston and Carlisle, and a counterpart 'Fit to Grow' scheme, promoted by Carlisle City Council, is currently being

established in Currock, Cumbria. The Federation of City Farms and Community Gardens (2011) note that local authorities and health organisations often own land that is derelict and/or underused, which could well become the focus for active participation projects of this nature in the future. Health and leisure partnerships, linking with community groups, could potentially, therefore, unlock less conventional funding streams, including biodiversity, volunteering and community development grants.

In a region with substantial tracts of rural landscape, thus, community conservation projects would appear to provide an economical and effectual means of boosting public engagement with cardiovascular activity. More robust and extensive data, regarding a range of health indicators, will be collected to build a stronger evidence base when Greenfingers begins its second phase in October 2011. As part of an enhanced local body of knowledge, such research could prove vital in making the region's case for the funding of similar community projects (and related research) through new GP consortia and so forth, with substantial benefits for public health and environment alike.

Notes

ⁱ Some caution should be exercised in approaching these statistics. Given the self-reported nature of the data, it is fair to assert they may well exaggerate the levels of physical activity actually undertaken.

ⁱⁱ All subjects completed an informed consent form and ethical approval was granted by the University of Cumbria Ethics Committee.

ⁱⁱⁱ In addition to performing cardiovascular exercise, the ACSM (Garber, et al., 2011) also recommends that healthy adults should engage in physical activity that incorporates resistance exercises, and exercises to improve neuromotor control. Although not measured in the present study, the green gym activities included lifting (and in some instances heavy lifting), bending and cutting, all of which would task the neuromuscular system.

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