National level promotion of physical activity: results from England's *ACTIVE* for LIFE campaign

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Abstract

***Study objective*—To assess the impact of a national campaign on awareness of the campaign, change in knowledge of physical activity recommendations and self reported physical activity.**

***Design*—three year prospective longitudinal survey using a multi-stage, cluster random probability design to select participants.**

***Setting*—England.**

***Participants*—A nationally representative sample of 3189 adults aged 16–74 years.**

***Main outcome measures*—Awareness of the advertising element of the campaign, changes in knowledge of physical activity recommendations for health and self reported physical activity.**

***Results*—38% of participants were aware of the main advertising images, assessed six to eight months after the main television advertisement. The proportion of participants knowledgeable about moderate physical activity recommendations increased by 3.0% (95% CI: 1.4%, 4.5%) between waves 1 and 2 and 3.7% (95% CI: 2.1%, 5.3%) between waves 1 and 3. The change in proportion of active people between baseline and waves 1 and 2 was −0.02 (95% CI: −2.0 to +1.7) and between waves 1 and 3 was −9.8 (−7.9 to −11.7).**

***Conclusion*—The proportion of participants who were knowledgeable about the new recommendations, increased significantly after the campaign. There was however, no significant difference in knowledge by awareness of the main campaign advertisement. There is no evidence that *ACTIVE* for LIFE improved physical activity, either overall or in any subgroup.**

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It is close to 50 years since the first study linking physical inactivity and an increased risk of coronary heart disease (CHD) was published.[1] Since then numerous other studies have reported similar observations.[2] People who have a physically active lifestyle are at approximately half the risk of developing CHD compared with those who have a sedentary lifestyle.[3] Regular physical activity is also associated with reduced risk of diabetes, obesity, osteoporosis, colon cancer and with improved mental health.[2] The wealth of evidence regarding the health benefits of an active lifestyle has led to a number of national and international recommendations about the level of physical activity that would confer such benefits.[4–7] In 1996, the Department of Health issued a "Strategy Statement on Physical Activity" that outlined a new policy promoting 30 minutes of moderate intensity physical activity on at least five days of the week and for those already taking some vigorous physical activity, three periods per week of vigorous intensity physical activity of 20 minutes each.[8] Just before this statement, it was estimated that 61% of men and 76% of women were not active at these levels.[9]

In 1995 the Health Education Authority (the then national health promotion agency in England) was commissioned by the Department of Health to run a three year health promotion campaign to encourage uptake of the moderate intensity element of the new policy recommendations. The campaign was based on the concept of social marketing, defined as "the design, implementation and control of programmes aimed at increasing the acceptability of a social idea or practice in one or more groups of target adopters".[10] The *ACTIVE* for LIFE campaign aimed specifically to increase knowledge and acceptability of the new recommendation that "adults should aim to take part in at least 5 sessions of 30 minutes of moderate intensity physical activity per week", and to contribute to increased participation at this level.

The campaign used social marketing tools (including advertising, public relations, and publicity) to communicate directly to defined target groups in the population, and integrated this mass media-based public education with an extensive programme of support to health and other professionals in their work at the community and interpersonal level. The effectiveness of the professional education programme will be reported elsewhere. The campaign was also part of a broader programme of initiatives on physical activity including research, policy development and advocacy.

Mass media is often used as an element of social marketing campaigns and is particularly of value where issues are seen to be of relevance to large proportions of the population. It has been observed that with any campaign it is likely that a proportion of the target group will not be exposed to the campaign, and a further proportion will not recall, understand or act on the message.[11] Despite this, mass media remains one of the few options available for the communication of issues to large numbers of people. Mass media campaigns have been used

to promote physical activity in other countries,[12 13] but without such a substantial element of professional education and support.[14] This national physical activity campaign is the first to be evaluated using a prospective longitudinal survey method in a representative national sample.

Methods

THE CAMPAIGN

Before the main public phase of the campaign, a number of professional education seminars were run to disseminate the new physical activity message to health and other professionals. A network of 8500 professionals was encouraged to promote physical activity to the public through local projects in a "cascade" model. This network was supported with information, fact sheets, newsletters, research results, guidance, seminars, and grant aid.

Campaign resources (including posters, leaflets, postcards, two web sites and other promotional items) were developed to promote the main campaign message to specific priority groups. These were identified through existing national physical activity data and included young women aged 16–24 years; middle aged men aged 45–55 years; men and women aged over 50 years. These groups were targeted in separate phases of the campaign. The initial campaign used a 40 second TV advertisement "The thirty minute games". This was commissioned after developmental research and pretesting with the public, and was designed to appeal to a broad age range. The advertisement emphasised the importance of activities such as walking, cycling and gardening for health and emphasised the 30 minute element of the recommendation. The advertisement was aired over a six week period in the spring of 1996 across a number of commercial channels, with a total expenditure in the region of £2 million. The initial TV campaign was targeted as broadly as possible across all adults aged 16–74 years to "launch" the new message, with a media buying strategy that emphasised people from social grades C2, D and E. The second phase of the campaign began in 1997 and was aimed at men and women aged 50+. The TV advertisement was repeated in July 1997 as evaluation from the previous year had shown that the advertisement was received more favourably by older people. Other advertising included campaigns in tabloid newspapers aimed at middle aged men.

The third phase of the campaign (1998) was aimed at young women aged 16–24 and used advertisements placed in women's magazines instead of TV advertising. In each phase, the advertising was reinforced with an extensive programme of public relations and promotions including media advocacy, national press launches, national roadshows, competitions, workplace promotions and co-promotions with major retailers and manufacturers. In addition to the main campaign, two sub-campaigns communicated campaign messages to groups that were defined as having particular access or communication needs: people from black and minority ethnic communities and people with disabilities. These were highly targeted by advertising in specialised media or through joint promotions with ethnic minority and disability organisations. This paper however, reports only on the outcomes in terms of changes in knowledge attitudes and behaviour among a sample of the general public.

SAMPLING

To evaluate the campaign a cohort design was used with baseline data collected between September and November of 1995 (wave 1) and follow up data collected during the same period in 1996 (wave 2) and the same period in 1997 (wave 3). A representative sample of adults aged 16 years and over was selected for the survey using the small users Postcode Address File (PAF) for England. A multi-stage cluster random probability design[15] was used to identify a sample of addresses. If an address had more than one household, one would be selected randomly using a Kish Grid. The same method was used to randomly select one eligible respondent (aged 16–74) from the chosen household.

SURVEY

Each wave of the survey involved a 30 minute interview conducted in the home. The aim was to assess recall of the campaign messages, any changes in knowledge of the health benefits of physical activity, changes in attitude towards physical activity, changes in readiness to increase physical activity and changes in self reported physical activity. Data on attitudes are not reported as there was virtually 100% agreement with all baseline items measuring attitude.

The selection of the sample and all fieldwork were carried out by National Opinion Polls (NOP), a market research company.

MEASURES

A questionnaire was developed specifically for this study and included items on:

- physical activity
- physical health
- knowledge of current physical activity guidelines
- perceived benefits of physical activity
- perceived barriers to physical activity
- readiness to increase physical activity
- socioeconomic details

Physical activity was assessed by asking participants about the frequency, duration, intensity and type of physical activity they had performed in the previous four weeks. The types of physical activity inquired about were occupation, walking, heavy housework/DIY, gardening and sport/recreation. Each type of activity was classified as moderate or vigorous.

Four physical activity categories were defined:

Sedentary

An average of less than one period of either 30 minutes of moderate intensity physical activity or 20 minutes of vigorous intensity physical activity per week.

Table 1 Baseline characteristics (%) according to whether or not data available at all waves

	*Completers**	*Non-completers†*	*All*	*p Value*
Number of subjects	3189	3522	6711	
Age group				<0.0001‡
16–	7.5	13.7	10.7	
25–	17.8	22.4	20.2	
35–	19.6	17.0	18.2	
45–	19.4	15.4	17.3	
55–	17.1	14.7	15.8	
65–	18.6	16.8	17.6	
Gender (% male)	42.5	44.7	43.6	0.07
Children (% yes)	32.7	28.0	30.3	<0.001
Social grade				0.0001‡
AB	22.6	18.4	20.3	
C1	29.0	31.0	30.1	
C2	21.8	19.9	20.8	
DE	26.6	30.7	28.7	
Car use (% yes)	77.2	67.7	72.1	<0.001
Ethnicity (% non-white)	3.4	7.2	5.4	<0.001
Home ownership (% owned/being bought)	79.8	66.7	73.0	<0.001
Physical limitation (% yes)	26.2	25.4	25.8	0.49
Barriers (% yes)	74.8	73.2	74.0	0.16
Knowledge				0.30
5 times 30 mins	14.7	13.5	14.1	
3 times 20 mins	10.1	10.7	10.4	
Neither	75.1	75.8	75.5	
Psychological benefits (% yes)	63.9	63.2	63.5	0.57
Physical benefits (% yes)	82.6	80.4	81.5	0.02
Readiness to change				0.48‡
1 (low)	20.4	20.9	20.7	
2	19.3	20.0	19.6	
3	20.6	20.0	20.3	
4	21.9	21.8	21.9	
5 (high)	17.7	17.3	17.5	
Activity (%)				0.15‡
Vigorous	12.2	13.7	13.0	
Moderate	19.2	17.2	18.1	
Light	44.8	40.8	42.7	
Sedentary	23.9	28.3	26.2	

*Completers: subjects with data at all waves 1 to 3. †Non-completers: subjects with data at wave 1 but missing at wave 2 or wave 3 or both. ‡Test for trend. Percentages are based on subjects with non-missing data for each variable.

Light
Greater than sedentary but less than moderate or vigorous.

Moderate
An average of at least five occasions of moderate intensity physical activity per week for a minimum of 30 minutes per occasion, but not vigorous.

Vigorous
An average of at least three occasions of vigorous intensity physical activity per week for a minimum of 20 minutes per occasion.

For analysis, all categories were based on non-occupational activity, as occupational activity is not amenable to change through a mass media campaign. To assess knowledge of the moderate intensity recommendation, participants were asked open ended questions about the frequency and duration of physical activity that they believed was required to benefit health. They were also asked to select one of five statements that they felt best described the degree of effort of physical activity required to benefit health. They were said to be "knowledgeable" if responses were: 5–7 days per week; 30–60 minutes per occasion; and selected an intensity that described an effort equivalent to breathing heavier than usual and feeling slightly warm.

Awareness of the advertising element of the campaign was assessed at two levels using four questions at the wave 2 survey. Participants were asked if they had seen, heard or read any advertising about physical activity recently. Participants who responded yes and who without prompting, described any of the main advertising images were coded as unprompted awareness. They were then shown full colour photographs of five of the main scenes from the television advert and asked if they remembered seeing them. Those who did were coded as prompted awareness. Combined, the two categories were classed as "aware" of the advertising.

Social status was categorised using the social grade system.[16] Assessment procedures for other baseline measures are given in the appendix.

DATA ANALYSIS

The data from all three waves were merged using each subject's serial number. χ^2 Tests of significance were carried out to assess statistical significance for differences in proportion, with tests for trend used where appropriate. McNemar's test (for binary variables) and a paired *t* test (for ordered categorical variables) was used to assess differences in physical activity level between waves.[17] All statistical analyses were carried out using Stata6.[18]

Results

Some 12 907 eligible addresses were identified from the sampling process and 6711 baseline interviews were conducted, a 52% response rate. For wave 2, in 1996, all those interviewed at wave 1 were followed up and 4268 interviews were successfully conducted (64% of baseline). Particpants were then followed up in 1997

Table 2 Proportion (%) of subjects reporting awareness of the campaign according to baseline characteristics

	Number	Aware*	p Value
All subjects	3189	38.0	
Age group			<0.0001†
16–	238	64.7	
25–	566	49.5	
35–	625	39.2	
45–	620	35.3	
55–	545	30.8	
65–	594	24.8	
Gender			0.02
Male	1355	40.3	
Female	1834	36.4	
Children			<0.001
No	2146	35.8	
Yes	1043	42.6	
Social grade			0.01†
AB	719	32.7	
C1	923	38.4	
C2	694	42.6	
DE	847	38.5	
Car use			0.45
No	726	39.3	
Yes	2462	37.7	
Ethnicity			0.64
White	3082	38.0	
Non-white	107	40.2	
Home ownership			0.19
Owned/being bought	2496	37.5	
Rented	632	40.4	
Physical limitation			0.24
No	2355	38.6	
Yes	834	36.3	
Barriers			0.76
No	804	37.6	
Yes	2381	38.2	
Knowledge			0.23
5 times 30 mins	470	37.9	
3 times 20 mins	323	42.4	
Neither	2396	37.5	
Psychological benefits			0.17
No	1152	36.5	
Yes	2037	38.9	
Physical benefits			0.35
No	554	36.3	
Yes	2635	38.4	
Readiness to change			<0.0001†
1 (low)	549	27.0	
2	518	37.3	
3	554	37.4	
4	589	43.6	
5 (high)	476	38.9	
Activity			0.001†
Vigorous	390	45.4	
Moderate	611	37.5	
Light	1427	38.3	
Sedentary	761	34.2	

*Aware: includes unprompted and prompted awareness. See Methods section for definition of awareness. †Test for trend. Percentages are based on subjects with non-missing data for each variable.

(wave 3). Altogether 3189 participants ("completers") provided data at all three time points (48% of baseline). Table 1 shows the baseline characteristics of completers and non-completers.

Compared with completers, non-completers were younger, fewer were in social grade AB, owned their own home or car. Fewer had children or perceived that physical activity would lead to physiological benefits. More were non-white.

Overall, 38% of participants were aware of the campaign six to eight months after the main period of advertising. A total of 176 participants (5.5%) could recall key images of the television campaign unprompted with a further 1037 (32%) recognising still photographs taken from the television advertisement. The greatest awareness was in 16–24 year olds (65%) and the lowest in 65–74 year olds (25%). Men were more aware of the campaign than women as were those with children living at home and those in the lower social grades.

Participants who were more ready to adopt regular physical activity and who were already active at a vigorous level were more aware of the campaign than those who were less ready and less active (table 2).

There were no significant differences between physical activity levels at wave 1 and wave 2. However, compared with wave 1, there were 8.8% fewer people active at a vigorous level at wave 3 and a difference of 6.8% in the number of people classified as sedentary (table 3). The change in proportion of active (moderate or vigorous) people between wave 1 and wave 2 was −0.02% (95% CI: −2.0% to +1.7%). The change between wave 1 and wave 3 was −9.8% (95% CI: −7.9% to −11.7).

At baseline, 14.7% of participants were knowledgeable (see above for definition) about the moderate physical activity recommendations. By wave 2, after the main advertising campaign, this had risen to 17.7% and to 18.4% by wave 3 (table 4). The change in proportions of knowledgeable participants was 3.0% (95% CI: 1.4%, 4.5%) between waves 1 and 2 and 3.7% (95% CI: 2.1%, 5.3%) between waves 1 and 3.

Changes in the proportion of participants who knew about the moderate physical activity recommendations were higher in women, the older age group and social grades C2/DE.

The change in the proportion of participants who were ready to change was −1.8% (95% CI: −3.9%, 0.27%) between waves 1 and 2 and −1.3% (95%CI: −3.5%, 0.8%) between waves 1 and 3 (see the appendix for definition of readiness to change). At each wave women and younger participants were more ready to become regularly active than men and older participants ($p<0.05$). At each of the three waves, participants who were aware of the campaign at wave 2 were significantly more ready to take up regular activity than those who were not aware of the campaign ($p<0.05$).

Table 5 shows the proportion of participants meeting guidelines for moderate or vigorous activity at waves 1, 2 and 3 by selected baseline characteristics.

The trend observed in table 3 was generally repeated for all subgroups. Male gender, younger age, high readiness to change, knowledge, lack of barriers and lack of physical limitations were all associated with higher levels of physical activity at wave 1 ($p<0.05$ in each case.) There was no significant difference for

Table 3 Physical activity (%) at each wave for completers (n=3189)*

				Test for change in overall level	
Activity	Wave 1	Wave 2	Wave 3	Wave 2 v 1	Wave 3 v 1
				0.82	0.0009
Vigorous	12.2	13.0	3.4		
Moderate	19.2	18.6	18.2		
Light	44.8	44.2	47.7		
Sedentary	23.9	24.2	30.7		

*Completers: subjects with data at all waves 1 to 3.

Table 4 Knowledge about moderate physical activity recommendations by selected baseline characteristics

	Number of subjects	Wave 1 Yes (%)	Wave 2 Yes (%)	Wave 3 Yes (%)
All subjects	3189	14.7	17.7	18.4
Gender				
Male	1355	15.8	17.9	18.1
Female	1834	14.0	17.6	18.7
Age group (y)				
16–44	1429	10.2	11.7	12.5
45–74	1759	18.5	22.6	23.2
Social grade				
AB/C1	1642	15.7	17.7	19.6
C2/DE	1541	13.8	17.7	17.2
Aware of campaign at wave 2				
No	1976	14.8	17.6	18.8
Yes	1213	14.7	17.8	17.9

Table 5 Meeting guidelines for moderate/vigorous activity according to baseline characteristics

	Number of subjects	Wave 1 Yes (%)	Wave 2 Yes (%)	Wave 3 Yes (%)
All subjects	3189	31.4	31.6	21.6
Gender				
Male	1355	34.2	33.1	23.0
Female	1834	29.3	30.4	20.6
Age group (y)				
16–44	1429	37.0	37.1	22.8
45–74	1759	26.9	27.1	20.6
Social grade				
AB/C1	1642	31.8	30.6	21.3
C2/DE	1541	30.9	32.6	21.9
Readiness to change				
Low	1306	26.0	27.6	20.5
High	1883	35.1	34.3	22.4
Knowledge				
No	2396	29.6	30.3	21.0
Yes	793	36.8	35.6	23.5
Barriers				
No	804	46.1	43.9	29.6
Yes	2381	26.4	27.4	18.9
Physical limitations				
No	2355	33.4	33.7	23.3
Yes	834	25.7	25.7	16.9
Aware of campaign at wave 2				
No	1976	30.1	29.6	20.6
Yes	1213	33.5	34.9	23.3
Wave 1				
No	2188	0.0	21.2	15.3
Yes	1001	100.0	54.2	35.5

social grade (p=0.56) or for being aware of the campaign at wave 2 (p=0.05).

Just over half those active at baseline were still active one year later and by the second year of follow up, just 36% remained active at recommended levels. By contrast, 21% of those not active at baseline were active after the first year of follow up although this reduced to 15% by the second year of follow up (table 5).

Discussion

ACTIVE for LIFE set out to disseminate new information about physical activity to professionals and to the public, and to encourage people to turn this advice into action. The campaign was adequately resourced, and was designed using established principles of social marketing and integration with professional education and support.[14]

The emphasis on moderate intensity physical activities such as walking, cycling, swimming, dancing and heavy gardening and housework, was very different from previous campaigns that tended to promote more vigorous exercise and sport, reflecting new knowledge about the level of physical activity required to be protective against CHD and other chronic diseases.

The campaign achieved acceptable coverage when compared with other physical activity campaigns. Some 38% of people were aware of the main advertising images when unprompted and prompted awareness were combined. However, awareness was assessed six to eight months after the television advertisement and this is likely to have produced an underestimate of the true level of awareness. In Australia, prompted recall of the main mass media message was approximately 40% 18 months after the campaign. The true level of awareness may have been lower as 14% of people recalled the message before the campaign had started.[19] In Scotland, 70% of respondents were aware of a television advertisement promoting walking, when assessed within a month of the advertisement, falling to 54% after four months.[13] Only prompted awareness was assessed in Scotland, which may explain the difference between the two campaigns. The campaign reached more young adults, those with children at home and those already engaging in regular vigorous intensity activity. Unsurprisingly, the campaign was also better recalled by those already considering becoming more active. Awareness was higher in participants in social grades C2 and DE compared with those in grades AB and C1. This may reflect the media buying strategy that targeted lower social grades and the fact that all campaign materials were aimed at this group.

Overall, the proportion of participants who were knowledgeable about the moderate physical activity recommendations increased by approximately 3% during the two years of follow up. There was however, no significant difference in knowledge by awareness of the campaign advertisement, suggesting that if the campaign did produce these knowledge increases, it was through elements other than the television advertisement. Comparisons between this study and the Scottish[13] and Australian[12] studies are not possible because of the different methods of assessing knowledge. In this study, participants were only classified as knowledgeable if they could report all three elements of a complicated message.

The proportion of participants who were ready to take up regular physical activity did not change significantly from wave 1 to wave 2 or wave 1 to wave 3. Participants who were aware of the campaign at wave 2 were more ready to become active at baseline than those not aware of the campaign and this remained true during at subsequent waves. It is possible that participants ready to become more active are likely to be looking for physical activity related images and therefore more likely to recall seeing them.

Changes in physical activity during the two years of follow up were disappointing with the proportion of active participants stable from waves 1 to 2 but reducing between waves 2 and 3. The absence of barriers to physical activity, either perceived or real, would seem to be an important factor in being physically active. Exposure to the campaign seemed to make little difference to the proportion of active subjects between waves 2 and 3. Those aware

of the campaign, when asked at wave 2, were already more active at wave 1 than those not aware of the campaign, suggesting that active people are more likely to recall physical activity related advertising rather than the advertising affecting activity levels.

The 21% increase in the number of people active at recommended levels at wave 2, in those not active at wave 1, along with the 46% of people who ceased being active at this level between waves 1 and 2 suggest there was regression to the mean. Another national panel survey reported that 35% of people who had been achieving recommended levels of physical activity were not doing so a year later and 41% of those categorised as sedentary at baseline had increased their physical activity a year later.[20] This shows the importance of a control group in evaluations of interventions targeting sedentary groups, as improvements are to be expected even in the absence of an effective intervention.

The results of this campaign can be broadly compared with those carried out in other countries. A study in Australia reported positive changes in walking after a mass media campaign, although the study design did not allow these changes to be attributed to the campaign.[12] The campaign was repeated one year later but the differences in walking were not sustained.[21] The Scottish campaign only showed changes in behaviour in participants who telephoned a help line. This represented only 5% of the overall sample and they tended to be more affluent.[13]

STRENGTHS AND LIMITATIONS

The two main strengths of this study were the prospective longitudinal design, and use of a national sample, unique features compared to other mass media campaign evaluations.

The national focus of this campaign, using mass media methods, prevented the inclusion of a control group making inferences about causality difficult. The 52% response rate at wave 1 may have resulted in an unrepresentative sample, although this is unlikely given the sampling method used. In addition, the large loss to follow up at each wave and the significant differences between completers and non-completers may have led to biases. However, this analysis used people who responded at all waves so any bias attributable to non-response seems likely to affect the prevalence of physical activity at each wave equally.

The results of this study may have been confounded by secular trends. Between 1994 and 1998 the number of sedentary men increased by 5% and the number of women by 6%, while those categorised as physically active remained virtually unchanged.[22] This will have weakened the estimated effects of this campaign.

The physical activity questionnaire used in this study was based on and very similar to that used in other national surveys including the Health Survey for England.[22] As far as the authors are aware, no published validity and reliability studies exist for this questionnaire. It is possible that the panel survey itself may have affected reported levels of physical activity, a kind of Hawthorn effect. The less active groups may have been inclined to over-report their physical activity at follow up. Finally, the unexplained sharp decline in vigorous physical activity at wave 3 cannot be explained by any of the variables measured as part of this study.

KEY POINTS

- This longitudinal, prospective study suggests that an integrated campaign on physical activity can lead to small increases in knowledge about new recommendations.
- The study indicates that television advertising may not be a critical component of such a campaign.
- Future studies need to be realistic about the time required to affect ingrained social trends, and the limitations of using health promotion campaigns at a national level to directly stimulate short-term population level behaviour change.

In conclusion, there was a small but significant increase in the proportion of people who were knowledgeable about the new moderate physical activity recommendations following the main television advertisement. However, there was no significant difference between those recalling the campaign and those who did not, suggesting that the change in knowledge may not have been attributable to the television advertising element of the campaign, which was only one component of the integrated campaign.

There is no evidence that *ACTIVE* for LIFE improved physical activity, either overall or in any subgroup: indeed the confidence intervals exclude any effect larger than two percentage points. Conclusions must be cautious because of the absence of a control group, which would address the contribution of secular trends.

This study points to the need to be realistic about the time that it takes to affect ingrained social trends, and the limitations of using health promotion campaigns at a national level to directly stimulate short-term population level behaviour change. Alternative approaches that can be taken at a national level include broader policy and environmental changes to support physical activity, although there is little research to support these approaches.[23] Future physical activity campaigns may result in higher levels of behaviour change if they target people ready to adopt moderate intensity physical activity.

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Appendix

Physical limitations to physical activity were assessed by asking whether participants suffered from any illness, disability or health condition that limited their activity.

Perceived benefits of physical activity were assessed by asking participants how much they thought physical activity could help with a list of 13 outcomes such as feeling independent, controlling or losing weight, having fun, etc. They gave their answers using a Likert scale with scores from 1 (Could not help at all) to 5 (Could help a great deal) Those who gave any response of 4 or 5, for outcomes that were psychological in nature, were classed as perceiving some psychological benefits and those who gave any response of 4 or 5, for outcomes that were physiological in nature, were classed as perceiving some physiological benefits.

Barriers to physical activity were assessed by asking participants to say whether any of a list of eight barriers shown to them were relevant to them personally. Participants who said yes to any of the eight barriers were classed as having barriers to physical.

Readiness to adopt regular moderate intensity physical activity was assessed using a nine item questionnaire. Each item was a statement about taking up physical activity and participants responded using a five point Likert scale going from Strongly disagree (0) to Strongly agree (4). The scores from each item were summed to produce a continuous measure of readiness to change with values from 0–36, with 0 not being ready at all and 36 very ready. For analysis this scale was divided into quintiles. The top two quintiles were used to define a group of "ready" participants who were used to assess changes in this measure across each wave.

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