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The effect of physical activity advice given in routine primary care consultations: a systematic review

D. A. Lawlor and B. Hanratty

Abstract

Background Recent evidence and recommendations suggest that physical activity health promotion should be aimed at persuading the whole population to adopt an active lifestyle. Intensive medical programmes aimed at promoting physical activity amongst those at risk are not effective at achieving this aim. Brief advice from primary care professionals to quit smoking has a small but, at a population level, important effect. Brief advice in primary care to adopt a more active lifestyle may be similarly effective. The aim of this review is to determine the effect of advice given in routine primary care consultations on levels of physical activity.

Methods A systematic review was carried out of trials assessing the effectiveness of advice given in routine primary care consultations. Data sources were four electronic databases (MEDLINE, EMBASE, Sport discus, Cochrane Library), and bibliographies of retrieved papers were searched. Experts were contacted.

Results Eight trials, with a total of 4747 participants, were identified; the majority were from the United States. Outcome measures varied considerably between trials, including continuous measures (e.g. duration of exercise) and dichotomous measures (e.g. being active), therefore statistical pooling was inappropriate. Two of the trials were cluster randomized controlled trials, the remainder were quasi-experimental. None of the trials fulfilled all of the predetermined quality criteria and selection bias in the non-randomized studies may have exaggerated results. Four of the six trials that presented short-term (up to 8 weeks) results found advice to be effective; only one of the four trials with long-term follow-up (4–12 months) found a sustained effect. The two randomized controlled trials had negative short- and long-term results.

Conclusions From the available evidence it appears that advice in routine primary care consultations is not an effective means of producing sustained increases in physical activity. However, these results may not be applicable to the United Kingdom, where the structure of primary care is unique. Quality research in UK primary care would be valuable.

Keywords: physical activity, health promotion, brief intervention, primary care

Introduction

Regular, sustained physical activity is associated with increased life expectancy and reduced risk of coronary heart disease, cerebrovascular accidents, diabetes, hypertension, osteoporosis and hip fracture.[1–7] It has been suggested that promoting physical activity is 'public health's best buy'.[6] The relative risk of coronary heart disease mortality from a sedentary lifestyle is similar in magnitude to the other major risk factors – smoking, hypercholesterolaemia and hypertension.[7] However, the proportion of sedentary individuals in Western populations is greater than those with any of the other risk factors and most individuals are not regularly active.[8–14]

Recent evidence on the benefits of moderate physical activity[15,16] together with concerns about the high population levels of inactivity have led to policy recommendations aimed at promoting active lifestyles in all members of the population.[17–20] Such aims may be achieved through a number of measures, although policy statements aimed at increasing physical activity in many industrialized countries require primary care involvement.[17–20] Potential primary care interventions include opportunistic advice in routine consultations or more intensive interventions such as dedicated health promotion clinics, referral to exercise facilities, supervised training sessions, lengthy motivational interviews or a combination of these.[21,22] In the United Kingdom, both in clinical practice and in research, emphasis has been placed on the more intensive interventions.[21,22]

The results of the OXCHECK study[23] and Family Heart Study[24] found that intensive primary care nurse-led cardiovascular screening and lifestyle intervention programmes achieved small overall reductions in coronary risk. The Family Heart

Department of Social Medicine, University of Bristol, Canynge Hall, Whiteladies Road, Bristol BS8 2PR.

D. A. Lawlor, Lecturer in Epidemiology and Public Health Medicine

Department of Public Health, University of Liverpool, Liverpool L69 3GB.

B. Hanratty, Clinical Lecturer in Public Health

Address correspondence to Dr D. A. Lawlor.
E-mail: D.A.Lawlor@bristol.ac.uk

Study did not specifically report on physical activity changes but concluded that the small level of change with their intensive programme indicated that opportunistic health promotion by physicians in routine consultations was unlikely to be effective. In the OXCHECK study there was a small but significant difference between intervention and control group in the proportion reporting taking vigorous exercise at least once a month [difference 3.3 per cent (95 per cent confidence interval 0.5–6.1 per cent)]. A well-designed randomized controlled trial of an intensive primary care programme consisting of free exercise sessions, counselling and personally tailored activity programmes failed to demonstrate a sustained effect.[25] The authors concluded that as there was no effect with this intense programme less intense interventions were unlikely to be effective.

Health professionals' attempts to increase physical activity are not a homogeneous set of interventions. It does not follow that, because intensive interventions have not been shown to be effective, less intense interventions, such as advice in routine consultations, will also be unsuccessful. Advice in routine consultations may in fact be more effective than intensive interventions, both in terms of increasing the adoption of active lifestyles by individuals and in reaching more of the large proportion of the public who are inactive. Interventions to increase physical activity amongst the general population are more effective if the suggested activity fits into the individuals' daily routine rather than requires the use of exercise facilities.[26,27] Intensive interventions cannot practically be offered to the large numbers of people who are inactive. Exercise referral schemes in the United Kingdom, which involve referral to free or subsidised exercise facilities, aim to target those at most risk. In practice, they have mostly recruited middle class, middle-aged, white, healthy women[28] and less than 1 per cent of the practice population.[22] Physical activity advice provided in routine primary care consultations in the United States has been shown to be feasible and acceptable to the physicians providing the advice.[29] Primary care, in the United Kingdom, has access to most members of the population, and primary care physicians are a respected source of lifestyle advice.[30] In other areas of lifestyle change, notably smoking cessation, advice from primary care physicians in routine consultations has been shown to have an important population impact.[31–33]

Systematic reviews aim to objectively evaluate and synthesize all the available evidence in a research area.[34] A systematic review of the effectiveness of advice to increase physical activity provided in routine primary care consultations may be useful for making policy recommendations and/or identifying areas where further studies are needed and informing the most appropriate way of conducting these studies.

The aim of this systematic review is to determine the effect of advice given in routine primary care consultations on levels of physical activity.

Methods

Study identification

MEDLINE (1966–December 2000), EMBASE (1980–December 2000), Sport discus (1975–December 2000) and the Cochrane Database of Systematic Reviews and Controlled Trials Register were searched. Details of the search strategy are presented in Table 1. All abstracts were read to determine whether the study was a controlled trial. If there was any doubt about the design of the study after reading the abstract, the complete paper was retrieved. Bibliographies of retrieved papers were examined for further references. Experts in the field (UK researchers with a known interest in physical activity research) were contacted.

Inclusion criteria

Studies from any country, in any language, were included in the review if they contained the following elements. The study should include assessment of the effectiveness of advice (defined as verbal/written/other forms of advice) given within the confines of a routine consultation in a primary care setting with the aim of increasing levels of physical activity. Advice could be provided by any primary care health professional. The study had to include a control group who had not received advice to increase activity levels and have an outcome measure of physical activity. Both randomized and non-randomized studies were included. Studies that offered activity advice as part of a package of lifestyle advice were included. Studies in which the sole outcome measures were motivation to exercise or self-efficacy were excluded, as these may not necessarily translate into action.

Attempts were made to contact all authors of included studies through internet searches of university sites, letters and e-mails. The aim was to establish missing details in the methods and results of the written study reports and to determine whether authors knew of or were involved currently in any work in this area. Despite three repeated mailings (e-mail or postal) for each author no responses were obtained.

Table 1 Search strategy

1. "EXERCISE THERAPY" (explode) OR "PHYSICAL FITNESS" (explode) OR "physical activity" OR "jogging" OR "walking" OR "bicycling" OR "swimming"
2. "PHYSICIANS, FAMILY" (explode) OR "FAMILY PRACTICE" (explode) OR "PRIMARY HEALTH CARE" (explode) OR "general practitioner" OR "primary care" OR "general practice"
3. "HEALTH PROMOTION" (explode) OR "HEALTH BEHAVIOUR" (explode) OR "HEALTH EDUCATION" (explode) OR "lifestyle advice" OR "behaviour change" OR "brief intervention"
4. Combine #1 AND #2 AND #3

Terms in capitals denote Medical Subject Headings (MeSH); other terms were entered as text words.

Data extraction and quality assessment

Data (study design, numbers of participants, details of intervention, results, authors' conclusions and quality) were independently extracted by the two authors using a structured form. Study quality was assessed by noting whether the study was a randomized controlled trial, allocation to intervention groups was adequately concealed, analysis was carried out on the basis of intention to treat (defined as including participants in the groups to which they were allocated regardless of whether they received advice, in the analysis), outcome assessment was blinded, and activity levels were objectively validated. Discrepancies between the authors were agreed by referring to the original papers and discussion. A third party was available if agreement could not be reached.

Data analysis

The studies used a range of different instruments and measures to assess change in activity level including continuous measures, such as composite scores on activity questionnaires and duration of exercise, and dichotomous measures, such as being active at a specified level. It was therefore inappropriate to statistically pool the data and a narrative review is presented.

Results

Of 38 papers retrieved, nine papers (with results from eight studies), including a total of 4747 participants, met the inclusion criteria (Figure 1).[35–43] Table 2 summarizes the study characteristics, results and quality. Six studies were from the United States and two from Australia; five reported interventions aimed solely at physical activity whereas three addressed a number of lifestyle risk factors including physical activity. In all of the studies advice was provided by physicians.

Study quality

Only two of the studies were randomized controlled trials.[35,41] Both of these used cluster randomization but did not appear to take this into account in the statistical analysis.[44] This would have the effect of reducing the magnitude of the *p* value. Neither of these studies described how practices were randomly allocated or whether this process was concealed. Lack of concealment would bias results if the person responsible for the allocation had prior knowledge regarding the likelihood of the health professionals in different practices to give advice. The lack of random allocation in the remaining studies means that selection bias may have exaggerated differences between intervention and control groups.

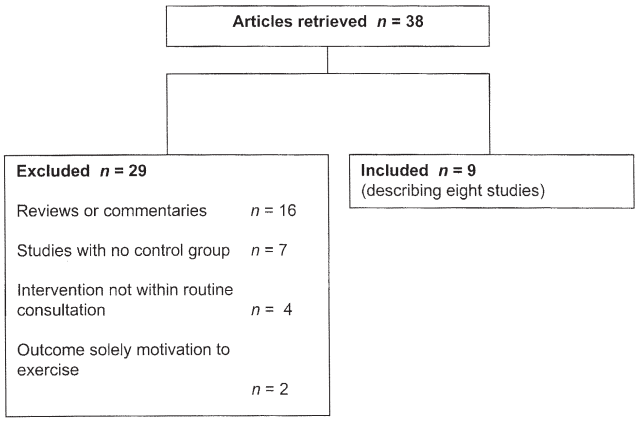

Figure 1 Summary of outcome of all retrieved papers.

Six of the eight studies undertook intention to treat analysis.[35,36,39,41–43] In three of the studies outcome was by self-completed questionnaire.[36,41,42] The remaining five used researcher-administered questionnaires and in none of these were the assessors blind to the participants allocation.[35,38–40,43] All except one of the studies used activity questionnaires that had been previously used and validated. Kelly assessed activity using a 'degree of change' score.[43] This was devised by the author and there was no evidence of it ever having been validated. It combined intention to change with actual change (Score 1 for 'don't want to change', 2 for 'want to change', 3 for 'some change', 4 for 'major change'). The mean score was significantly lower in the control group than any of the intervention groups at follow-up. However, all scores were below 3, which indicates that on average no actual change occurred.

In a small sub-sample (34 of the intervention group and 22 of the control group) of the study by Calfas *et al.* activity was assessed objectively using an accelerometer.[39] The direction and magnitude of the accelerometer change in this sub-sample was the same as the main outcome measure for the whole sample. None of the remaining studies used objective activity measures. None of the studies reported sample size calculations. However, with the exception of the study by Marcus *et al.*,[38] all sample sizes were large and likely to have had sufficient power to detect significant effects.

Interventions

Details of the interventions are provided in Table 2. Where the studies provided estimates of the time taken to undertake the intervention, these are included. In all studies health professionals delivering the intervention received training on how to do so in a standardized way. In the study by Goldstein *et al.* training involved attendance at a 1 hour session at the participating physician's surgery and provision of a 28 page manual.[35] All practices (intervention and control) were reimbursed $400 for participating, with the intervention practices receiving an additional $100. Other studies did not provide details regarding the amount of time or commitment required for training. In the study by Logsdon *et al.*[42] three out of five practices approached to participate in the study refused to do so, all giving inability to adhere to the full training and research programme as the reason. None of the studies provided details of the cost of training.

Table 2 Details of controlled trials assessing the effectiveness of advice in routine primary care consultations to increase activity

Study	Participants	Number	Intervention(s)	Main outcome	Results (values refer to main outcome)	Quality
Goldstein[35] 1999 USA Cluster randomized controlled trial	Sedentary adults aged 50 or above who were able to walk	355	Brief assessment of stage of change plus verbal and written advice to increase activity tailored to stage of change (approximate time 10 min) Offer of follow-up	Difference in mean PASE* score between intervention and control group PASE* administered by telephone interview	6 weeks: 2.75 $p = 0.95$ 8 months: 1.55 $p = 0.74$	Clustering not taken into account in analysis Randomization not concealed Outcome assessor not blind Intention to treat analysis
Bull[36,37] 1999 Australia Non-randomized	Sedentary adults aged 18 or above	763	Brief verbal advice to begin moderate activity (2–3 min) Written advice to increase activity mailed to participant within 2 days of consultation	Proportion of patients reporting at least one episode of activity in previous 2 weeks From self-completed questionnaire	1 month: intervention vs control 40% vs 31% $p < 0.05$ 12 months: 31% vs 36% $p = 0.1$	Selection bias – allocation based on day of the week but patients on intervention days when surgery was busy or who were too ill to exercise were excluded Similar exclusions not applied to control patients Self report outcome Intention to treat analysis
Marcus[38] 1997 USA Non-randomized	Sedentary adults aged 50 or above who were able to walk	44	Brief verbal and written advice to increase activity tailored to stage of change (3–5 min)	Difference in mean PASE* score between intervention and control group PASE* administered by telephone interview	6 weeks: 17.6 $p = 0.19$	Selection bias – sequential comparison groups comparing eligible patients who consulted before physicians were trained to give advice with those consulting after Outcome assessor not blind Not intention to treat analysis
Calfas[39] 1996 USA Non-randomized	Sedentary adults aged 18 or above who were without coronary heart disease or any condition that may limit mobility	255	Participants complete brief written questionnaire assessment of stage of change in waiting room; within the consultation brief verbal and written advice to increase activity tailored to results of stage of change questionnaire (3–5 min)	Proportion reporting regular activity in previous seven days via telephone interview	6 weeks: Intervention vs control 52% vs 12% $p < 0.05$	Selection bias – intervention physicians were self selected and interested in physical activity Outcome assessor not blind Intention to treat analysis Subgroup assessed with accelerometer

Lewis[40] 1993 USA Non-randomized	Adults aged 18 or above. Pregnant patients and those with severe emotional or mental problems were excluded	383	Brief verbal exercise advice (2-3 minutes) provision of an exercise educational handout in the consultation; follow-up review telephone call at 1 month	Change in duration and frequency of exercise from baseline. Obtained by researcher interview	6 weeks: change in minutes of activity per week (intervention vs control) +108.7 vs –23.7 $p < 0.05$ Change in number of episodes of activity per week 0.7 vs 0.4 $p = 0.4$	Selection bias – observational study comparing those who received advice with those who did not regardless of original random allocation of practices Outcome assessor not blind Not intention to treat analysis
Graham-Clarke[41] 1994 Australia Cluster randomized controlled trial	Adults aged 18–69. Patients were excluded if they had chronic debilitating disease, were not available for 12 months follow-up or could not speak English	758	2 intervention arms: (1) Verbal lifestyle advice within the consultation on a number of coronary heart disease risk factors including exercise; each participating physician was provided with four patient lifestyle advice videos but no clear details of how these were used provided (2) As above with addition of written advice provided within the consultation	Duration and frequency of activity, energy expenditure Obtained from self-completed activity questionnaire	4 and 12 months: no significant difference in any measures Data presented only graphically	Clustering not taken into account in analysis Randomization not concealed Self-completed outcome Intention to treat analysis
Logsdon[42] 1989 USA Non-randomized	Non-pregnant adults (age cut-off not specified)	2218	Priority areas of health education determined by age-specific prevention-orientated encounter forms completed by patients; tailored verbal and written health advice in the consultation	Odds of increasing amount of exercise Self-completed questionnaire	12 months: odds ratio 1.39 (0.99–1.96) $p = 0.1$	Selection bias – quasi-experimental, 3 intervention practices compared with 2 matched (physician characteristics) control practices No details of how practices were selected to be intervention practices Self-completed outcome Intention to treat analysis
Kelly[43] 1988 USA Non-randomized	Adults aged 18–60 years without disease that would prevent discussion of lifestyle change or increase in activity	326	3 intervention arms: (1) assessment lifestyle risk factors; (2) as (1) and brief verbal advice to modify identified risk factors; (3) as (2) and written advice	Mean 'degree of change in activity score' Administered by author/physician	4 weeks: Score in each arm (1) 2.74 (2) 2.60 (3) 2.57 control 1.60 No difference between (1), (2), (3). Significant difference between mean of these and control $p < 0.05$	Selection bias – patients randomly allocated to 3 intervention arms Controls consisted of eligible patients who attended evening surgeries or when surgeries were too busy to give advice Outcome assessor not blind Intention to treat analysis

*PASE: Physical Activity Score for the Elderly.

Main outcomes

The main outcome measures are presented as they were in the individual studies, in Table 2. Four of the six studies that reported short-term results (up to 8 weeks) found advice to be effective at increasing activity. Only one[42] of the four studies reporting long-term results (4 months or more) showed advice to be effective at increasing physical activity in the long term. One of the randomized controlled trials found null results at both short-term and long-term follow-up; the other only assessed outcome beyond 4 months and found null effects at both 4 and 12 months.

Discussion

Current evidence suggests that advice in routine primary care consultations is not effective at producing sustained increases in physical activity levels. Lack of evidence of effectiveness is clearly not the same as evidence of lack of effect, and much of the available evidence is of poor quality. In addition, no UK trials were found. Results from other countries are not necessarily relevant to the United Kingdom in this area, as UK primary care is unique in several ways. It covers over 95 per cent of the population, is free at the point of delivery and uses a list system such that families are registered with one practice, which provides comprehensive health care. Trials of advice to quit smoking and reduce alcohol consumption, given in routine UK primary care consultations, have demonstrated the effectiveness of lifestyle advice in this context.[31–33] The lack of similar trials in the area of physical activity reflects the approach in the United Kingdom towards physical activity promotion, which has been one of more intensive interventions.[21,22,45]

Other work in this area

Simons-Morton *et al.* reviewed the effect of any physical activity intervention in any healthcare setting and concluded that these could increase physical activity in the short term.[46] However, those researchers did not present the effects of primary care interventions separately, or explicitly assess the quality of the included studies. Ashenden *et al.* reviewed the effectiveness of promoting lifestyle change in primary care in four areas – smoking, alcohol, diet and exercise.[47] In the area of exercise they identified six trials, three of which were of intensive interventions conducted in non-routine consultations. They concluded that evidence of effectiveness was encouraging but more research was needed. Similarly, Eaton *et al.* reviewed the effectiveness of any primary care intervention. They concluded that there was limited evidence of primary care interventions being effective.[48] Our review adds to this previous work by focusing on advice within the routine consultation aimed at increasing population levels of activity. In addition, further studies of advice in routine consultations have been published since the Ashenden and Eaton reviews were completed.[35–37]

Implications

One of our most important findings is that no studies in the United Kingdom have evaluated the effect of advice within routine primary care consultations to promote physical activity. In addition, studies that have been conducted in other countries are generally of poor quality. The ideal study design would be a cluster randomized controlled trial with the practice as the unit of randomization. Including some assessment of whether advice was actually provided would clarify whether negative outcomes are the result of advice not being given or advice not leading to behaviour change. This could be incorporated into the research design with recording of consultations or reviewing written records, for example. Qualitative studies to explore professional and public barriers to the provision and implementation of lifestyle advice would be valuable. Economic evaluations, including the cost of motivating or training health professionals to give advice, are also needed.

The impact of environmental factors on the outcome of health professional advice or other health service interventions to promote physical activity is an important area that has been neglected by researchers. The importance of developing active lifestyles rather than isolated episodes of activity is now acknowledged in national policy.[20,49] The National Service Framework for Coronary Heart Disease recommends local multi-agency programmes to increase population levels of physical activity.[49] However, most interventions aimed at increasing physical activity, whether in primary care, local authority schemes or media campaigns, use approaches aimed at individuals. Such interventions may fail because they are trying to persuade individuals to participate in activities in environments that are (or are perceived to be) hostile to the very activities that they promote.[50] In focus group interviews with general practitioners, those from deprived areas identified lack of a supportive environment in which to walk as an important reason for not encouraging people to build activity into their lives.[51] In-depth qualitative interviews involving 30 low-income mothers with young children found that walking through depressed and neglected areas had a negative impact on the health and welfare of these families.[52] Advice in routine consultations may be most effective in areas with more supportive environments for being active.

Review limitations

Although we identified only a small number of studies that fulfilled our inclusion criteria, together the studies included more than 4000 participants. The inclusion criteria were appropriate to our aim. We included both random and non-random trials because in the area of health promotion randomization may not be feasible and to have included only randomized trials would have omitted relevant studies. Only trials in which there was a control group were included, because in the absence of a control group it is impossible to establish whether any perceived effect would have occurred even in the absence of the interven-

tion. We did not undertake hand searches of any journals but believe that the search strategy we employed will have identified all relevant studies. Assessment of study quality is essential in systematic reviews and we used criteria that are important to controlled studies of effectiveness[53] and relevant to the topic of this review, such as the use of objective measures to validate self-reported levels of activity.[54]

Contributions of authors

Both authors designed the protocol for the study, retrieved papers and extracted data. D.A.L. wrote the initial draft of the paper and both authors contributed to the final version. Both authors act as guarantors for the paper.

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