

Young people and physical activity: a systematic review matching their views to effective interventions

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Abstract

A systematic review was conducted to examine the barriers to, and facilitators of, physical activity among young people (11–16 years). The review focused on the wider determinants of health, examining community- and society-level interventions. Four trials and 16 studies of young people's views were included. Evidence for the effectiveness of the interventions was limited, with some suggestions of improvements in knowledge and possible differences according to gender. Young women in particular identified barriers to physical activity associated with certain ways of providing physical education in schools. Young people in general identified a need for increased choice and facilities within the community and emphasized physical activity's social side. Some of the barriers and facilitators identified by young people had been addressed by 'soundly evaluated' effective interventions but significant gaps were identified where no evaluated interventions appear to have been published (e.g. initiatives explicitly addressing gender issues or the combination of sport and other leisure activities), or where there were no soundly evaluated interventions. Rigorous

evaluation is required particularly to assess initiatives that address the limited practical and material resources that young people identify as barriers to physical activity.

Introduction

Physical activity promotion is high on the health policy agenda. Low levels of physical activity in young people have been linked to increased rates of obesity, cardiovascular disease and poor mental health [1]. Guidelines recommend that all young people should participate in physical activity, of at least moderate intensity, for 1 hour day⁻¹ [2]. Yet, in the late 1990s, only 58% of young men (aged 16–24 years) and 32% of young women achieved even 30 min on ≥ 5 days week⁻¹ [3]. Recent figures also reveal alarming levels of obesity and overweight in young people. A recent government report recognized that changing health behaviour is complex. It noted 'it is critical that obesity is tackled first and foremost at a societal rather than an individual level' [4]. Effective promotion of physical activity remains a key strategy in achieving a mass shift in activity levels [5].

Policy makers and practitioners require evidence-based summaries of research on what helps and what hinders physical activity in order to plan effective interventions that are likely to bring about sustainable changes to activity levels and to identify future research needs. The objectives of the systematic review reported in this paper were:

- (i) systematically to 'locate and characterize' the existing research literature on the barriers to,

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and facilitators of, physical activity among young people, especially those from socially excluded groups (e.g. low income, ethnic minority—in accordance with government health policy);

- (ii) to prioritize a sub-set of studies to review systematically ‘in-depth’;
- (iii) to ‘synthesize’ what is known from these studies about the barriers to, and facilitators of, physical activity among young people, and how these can be addressed and
- (iv) to identify gaps in existing research evidence.

Methods

This study followed standard procedures for a systematic review, which include transparent and principled methods for identifying, describing, appraising and collating research addressing a specified research question [6, 7]. It was innovative in that it aimed to answer not only questions about effectiveness but also questions about the appropriateness of interventions in terms of whether they address the expressed needs of young people. These methods have been applied to other health areas, including the promotion of healthy eating [8–12].

The review adopted a conceptual framework of barriers to, and facilitators of, health, where interventions are thought of as aiming to modify or remove barriers and/or build upon existing facilitators. The review had two stages [13, 14]. First, systematic searches and screening identified research matching a broad review question. This research was classified so as to describe the range of existing research in a ‘systematic map’ (see Fig. 1). The second stage was an in-depth review of a sub-set of this research. The in-depth review contained three syntheses:

- (i) of effectiveness studies (trials);
- (ii) of data from surveys or interview-based studies of young people’s experiences and perspectives (views studies) and
- (iii) a ‘cross-study synthesis’, where trials data were juxtaposed with data from the views studies.

This approach aims to contextualize the findings of effectiveness studies, and to discover to what extent they address issues important to potential intervention recipients.

Literature searching and screening

Highly sensitive searches were run across a wide range of electronic databases (e.g. The Cochrane Library, PsycINFO, ERIC and the Social Science Citation Index). A range of controlled and free-text terms for physical activity was combined with those for health promotion/determinants of health and young people. The searches covered the full range of publication years available in each database up to 2001 (when the review was completed). Full details of searches and all other methods are reported elsewhere [15].

Inclusion criteria were applied to each study. For a study to be included in the map it had to: focus on physical activity of any kind; include young people aged 11–16 years; be about the promotion of physical activity, and/or the barriers to, or facilitators of, physical activity; be a relevant study type (an outcome or process evaluation, a systematic review or a UK-based study that did not involve an intervention) and be published in the English language.

Selecting studies for the in-depth review

The research topics covered in the map were discussed in a meeting with government policy makers. They identified several policy-relevant questions and agreed that trials and UK-based non-intervention studies of young people’s views should be prioritized for the in-depth review. The review team then drew up the following inclusion criteria for the in-depth review.

Trials were included in the in-depth review if they met the criteria for the map and:

- (i) reported an intervention that aimed to make a change at the level of the community or society;
- (ii) used a comparison group design;
- (iii) reported both pre- and post-test data;

- (iv) used random allocation or demonstrated equivalence between groups before intervention and
- (v) measured either the behaviour or health of young people.

UK-based non-intervention studies were included in the in-depth review, if, in addition to meeting the map criteria, they:

- (i) studied young people's definitions of and/or ideas about physical activity or factors influencing their own or other young people's physical activity;
- (ii) presented views as data and
- (iii) were published after 1990 (to maximize the relevance of the review findings to current policy issues).

Data extraction and quality assessment

All studies meeting inclusion criteria for the in-depth systematic review underwent data extraction and quality assessment, using a standardized framework [16]. Data for each study were entered independently by two researchers into a specialized computer database [17].

Trials were considered 'methodologically sound' for the purposes of this review if they reported:

- (i) a control or comparison group equivalent to the intervention group on socio-demographic characteristics and pre-intervention outcome variables;
- (ii) pre-intervention data for all individuals or groups recruited into the evaluation;
- (iii) post-intervention data for all individuals or groups recruited into the evaluation and
- (iv) data on all outcomes described in the aims of the intervention.

Only studies meeting these criteria were used to draw conclusions about effectiveness. The results of the studies that did not meet these criteria were judged unclear and their findings were not used to inform conclusions about intervention effectiveness.

Views studies were assessed according to a total of seven criteria common to those proposed by four research groups for qualitative research [18].

- (i) An explicit account of theoretical framework and/or the inclusion of a literature review.
- (ii) Clearly stated aims and objectives.
- (iii) A clear description of context which includes detail on factors important for interpreting the results.
- (iv) A clear description of the sample.
- (v) A clear description of methodology, including systematic data collection methods.
- (vi) Analysis of the data by more than one researcher.
- (vii) The inclusion of sufficient original data to mediate between data and interpretation.

Data synthesis

Three types of analyses were performed:

- (i) narrative synthesis of trials,
- (ii) narrative synthesis of views studies and
- (iii) synthesis of trials and views studies together.

In the second synthesis, each study's findings were considered in relation to developing interventions for promoting participation in physical activity, using four separate questions (presented under Results below). For the last synthesis, a matrix was constructed which laid out the barriers and facilitators identified by young people alongside descriptions of the interventions included in the in-depth systematic review of trials [19].

Results

Of the total of 7048 citations identified, 96 reports (describing 90 studies) were included in the descriptive map (Fig. 1). A sub-set of 12 trials and 16 studies of young people's views entered the in-depth review.

Trials

Twelve trials were included in the in-depth systematic review. Following quality assessment, eight were excluded from the synthesis since they did not meet the review's methodological quality criteria [20–27]. While their findings were not synthesized, we did refer to the interventions

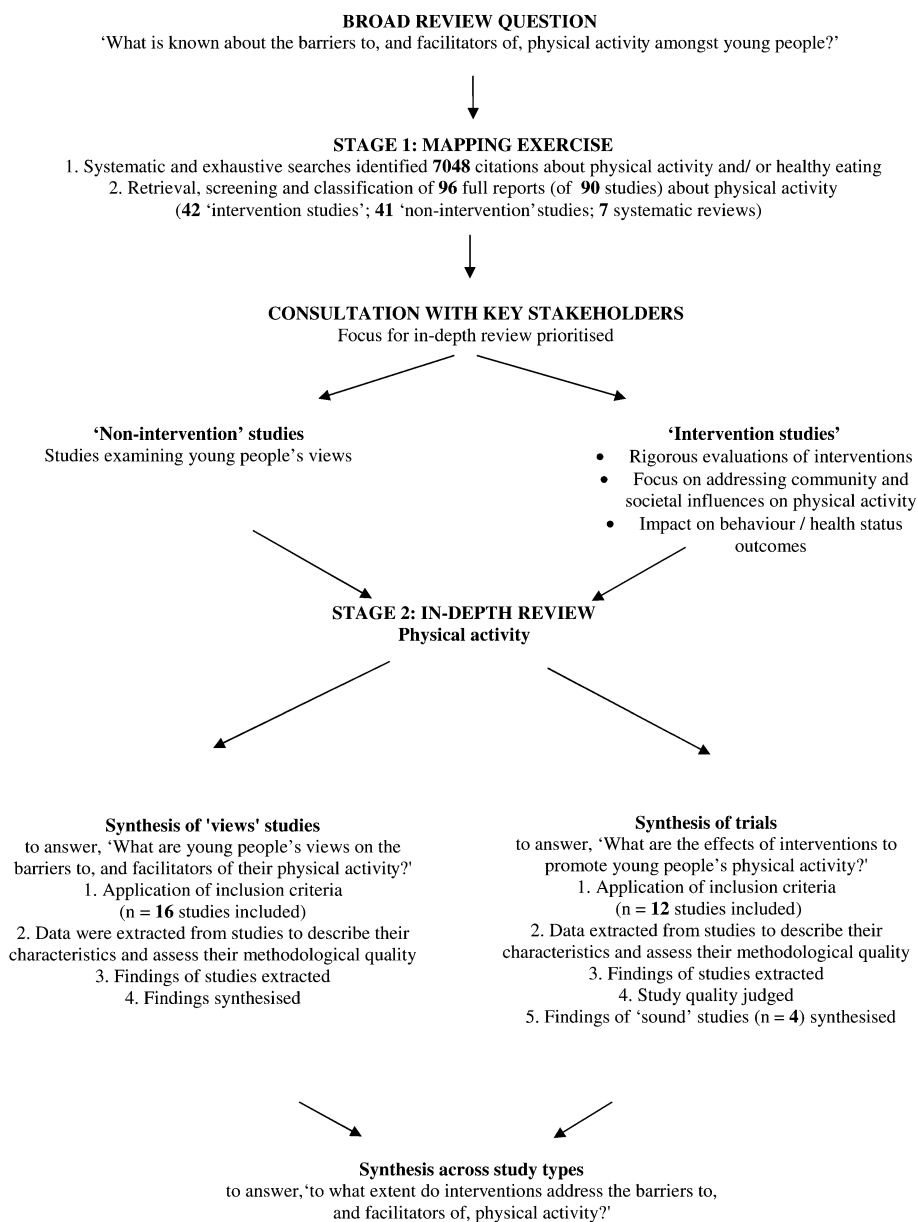


Fig. 1. The review process.

studied in these evaluations later in our cross-study synthesis (see below). For the remainder of this section, we report only the results of the four evaluations that met the review’s methodological quality criteria.

Table I reports the characteristics of the four studies. Three studies (reported in two papers) were conducted in the United States [28, 29], and one in the United Kingdom [30]. Two of the evaluations [29] studied the same intervention but in

two very different parts of New York State. All the interventions took place in schools. Three of the evaluations were judged to have limited findings because they reported effects only for some of the outcomes measured, and we judged the findings of the fourth evaluation to be unclear.

The 'Wessex Healthy Schools Award' took a whole school approach that sought to make health-promoting changes in the ethos, organization and curriculum [30]. In a cluster-controlled trial, 11 English intervention schools were compared with five control schools matched on area and socio-economic status. The intervention only appeared possibly to be effective for increasing reported physical activity levels in girls. Statistical significance is not reported.

The aim of the 'Know Your Body' programme was to promote good nutrition and physical activity and prevent smoking among children aged 9 years old (at the start of the 5-year study), with the objective of reducing future risk for cardiovascular disease and cancer [29]. The programme was evaluated in two separate randomized-controlled trials in demographically diverse areas of New York; the Bronx area and Westchester County suburb. For the intervention group in the Bronx, there was a statistically significant net increase in knowledge about preventing heart disease and cancer. Net improvements were not seen in other measurements (including exercise recovery rate, blood cholesterol and blood pressure measures). While the authors reported favourable net effects of the intervention in Westchester County for knowledge and cholesterol levels, we judged the results of the evaluation to be unclear. Here, the reviewers were concerned about a mismatch between the study's unit of assignment and unit of analysis (schools were assigned rather than pupils in this study).

A third US study, the 'Slice of Life' initiative, involved peer education and motivation for health behaviour change, with an emphasis on sociocultural and environmental influences on healthy eating and physical activity [28]. The study was undertaken in a suburban high school with ninth grade (14- to 15-year old) students. Six measures of physical activity were assessed, incorporating

knowledge, intentions and reported exercise. Significant differences between study groups at follow-up were seen only for young women on four of the six measures (knowledge of the benefits of exercising; taking regular exercise; intensity of exercise and intentions to increase the frequency, intensity and duration of exercise). No significant differences were seen for time spent on exercising or healthy exercise choices. The evaluation found no evidence of impact of the intervention on young men.

Young people's views

Table II provides details of the 16 studies included in the synthesis of young people's views [31–45] (one report [44] contained two studies).

The characteristics of the young people participating in these studies were not always easy to assess. Only age and sex were consistently reported. Most of the studies included a range of ages between 11 and 16 years. Three studies focused only on young women. Only five studies indicated participants' social class: two of these were with primarily working-class samples. Only six studies indicated that young people from ethnic minority groups were included. Most studies used school samples and collected data from young people when they were in school. The findings from these studies may therefore not be applicable to young people who are excluded from, infrequently attend, or have left, school.

The methodological quality of the studies was variable. While the majority provided a clear description of study context and clearly stated their aims, only three reported any attempt to establish the reliability or validity of their data analysis.

The findings of the studies are grouped below under the four questions applied during synthesis. A common theme was young people's desire for autonomy, choice and respect. Young women were also regularly reported to have more negative perspectives.

What are young people's perceptions of and attitudes to physical activity? What does physical activity mean to young people?

All but one of the studies addressed one or both of these questions. Gender and current physical

Table I. *Soundly evaluated outcome evaluations: study characteristics*

Author/country/design	Population	Setting	Objectives	Providers	Programme content
Moon <i>et al.</i> [30], UK, CT (+PE) sub-group analyses evaluated effects for young women and men separately.	Year 8 and Year 11 pupils (aged 11–16 years).	Secondary schools.	<ul style="list-style-type: none"> To give schools the support they need to promote good health, both in school and in the local community. Following areas covered in scheme: (i) the curriculum, (ii) links with the wider community, (iii) a smoke-free school, (iv) healthy food choices, (v) physical activity, (vi) responsibility for health, (vii) health promoting workplace, (viii) environment and (ix) equal opportunities and access to health. 	<ul style="list-style-type: none"> Teachers and key school staff. Members of the school community ('holistic' approach). 	<ul style="list-style-type: none"> The Wessex Healthy Schools Award. The award scheme provides structured frameworks, health-related targets and external support to help schools become health promoting. The scheme covers nine key areas: (i) the curriculum, (ii) links with the wider community, (iii) a smoke-free school, (iv) healthy food choices, (v) physical activity, (vi) responsibility for health, (vii) health-promoting workplace, (viii) environment and (ix) equal opportunities and access to health. Approximate 15-month gap between baseline and follow-up measurements during which intervention took place.
Perry <i>et al.</i> [28], USA, RCT (+PE) sub-group analyses evaluated effects for young women and men separately.	Ninth grade (14- to 15-year-old pupils).	Suburban high school.	<ul style="list-style-type: none"> To establish positive eating and physical activity patterns and behavioural goals. To decrease salt and saturated fat intake and increase intake of complex carbohydrates. To increase level of physical activity. 	<ul style="list-style-type: none"> Teachers administered programme in general, with 30 class elected peer leaders leading the class-based sessions. 	<ul style="list-style-type: none"> The Slice of Life programme. Ten-session high school curriculum designed to promote physical activity and healthy eating patterns among young people. Intervention lasted between Fall 1984 and Winter 1985. Intervention covered knowledge about benefits of fitness, characteristics of a heart healthy diet, social influences on eating and exercise habits and issues to do with weight control. Environmental influences (e.g. provision of health food options in school canteen) were identified and strategies for improvement were presented to school personnel.

Table I. *Continued*

Author/country/design	Population	Setting	Objectives	Providers	Programme content
Walter [29], USA, RCT (+PE) no sub-group analyses were performed (results are for young women and men combined).	Fourth grade (mean age 9 years at start) 5-year longitudinal cohort intervention.	Elementary and junior high schools NB: separate evaluations of same intervention in two populations in New York (the Bronx and Westchester County).	To favourably modify the population distributions of risk factors for coronary heart disease and cancer through in diet.	<ul style="list-style-type: none"> • Teachers delivered the classroom component. • Health and education professionals conducted risk factor examination screening. 	<ul style="list-style-type: none"> • The Know your Body programme. • Classroom component: 2 hours week⁻¹ of education on physical activity, promotion of physical activity and targeting of beliefs and attitudes around smoking, endurance exercises to build skills and strength. • Parental involvement component: parents receive newsletters about children's activities; take part in food surveys and family exercise days, as well as evening seminars. • Risk, factor examination component: students' height, weight, skinfold thickness, blood pressure, post-exercise pulse rate and cholesterol levels were measured and results fed back to them. Teachers discuss the results with the pupils in the classroom in terms of setting behavioural goals.

RCT, randomized controlled trial; CT, controlled trial (no randomization); PE, process evaluation.

Table II. *Characteristics of young people's views studies*

Study	Aims and objectives	Sample characteristics
Balding <i>et al.</i> [31]	<ul style="list-style-type: none"> To examine the travel patterns and aspirations of young people on the home to school journey. To inform ways of reducing the number of cars taking young people to school. 	Location: secondary schools and community colleges in Avon, UK Sample number: 3447 Age range: 11–15 years Gender: both Class: not stated Ethnicity: not stated Other information: none Exclusions: no details
Birtwistle and Brodie [32]	<ul style="list-style-type: none"> To investigate the perceptions of PE held by UK school children in both primary and secondary phases of education and the socio-demographic variables that might influence children's feelings about activity and the reasons for being active. 	Location: UK Sample number: 607 Age range: 7–14 years Gender: 293 females and 324 males Class: middle class/working class Ethnicity: not stated Other information: pupils from literacy sets 1–4 were included, ~25% in each set Exclusions: none
Coakely and White [33]	<ul style="list-style-type: none"> To explore how young people make decisions about participating or not participating in sport. 	Location: Industrial area of South East London, UK Sample number: 60 Age range: 13–23 years Gender: 26 females and 34 males Class: 75% from working class families Ethnicity: 85% described as 'native Britons', 15% other ethnic backgrounds Other information: included both active and inactive young people Exclusions: none stated
Gentle <i>et al.</i> [34]	<ul style="list-style-type: none"> To investigate factors associated with the motivations to exercise. To work out ways to encourage young people to participate in physical activity, especially those with lower activity levels. 	Location: young people from two secondary schools in two market towns in Devon, UK Sample number: 426 (note exclusions below) Age range: 14–15 years Gender: 197 males and 185 females Class: not stated Ethnicity: not stated

Table II. *Continued*

Study	Aims and objectives	Sample characteristics
Harris [35]	<ul style="list-style-type: none"> • To explore young people's attitudes, views and beliefs with respect to health, fitness and exercise. • To explore whether perceptions varied on the basis of age and gender. 	<p>Other information: exercise level (based on mean number of activities carried out at least twice a week): low ($n = 98$); medium low ($n = 97$); medium high ($n = 90$); high ($n = 97$)</p> <p>Exclusions: those who did not complete questionnaire correctly ($n = 44$); those who were absent from a school (reported to be only a small number)</p> <p>Location: two large comprehensive schools in Staffordshire and Wiltshire, UK</p> <p>Sample number: 61</p> <p>Age range: 11 and 13 years</p> <p>Gender: both</p> <p>Class: not stated-aim was for a mix of socio-economic backgrounds</p> <p>Ethnicity: not stated</p> <p>Other information: none</p> <p>Exclusions: no details</p>
Hopwood and Carrington [36]	<ul style="list-style-type: none"> • To investigate boys' and girls' attitudes to PE. • To investigate claims that girls' attitudes to PE might be becoming more positive, and look at girls' perceptions of their femininity in relation to sport participation. 	<p>Location: two urban high schools in north of England</p> <p>Sample number: 280</p> <p>Age range: 11, 13, 15 years</p> <p>Gender: both</p> <p>Class: not stated</p> <p>Ethnicity: sample from 'all white' schools</p> <p>Other information: authors aimed for range in educational ability</p> <p>Exclusions: none</p>
Kincey <i>et al.</i> [37]	<ul style="list-style-type: none"> • To examine the interrelationships between: self-esteem, motivation for and barriers to sports and exercise participation. 	<p>Location: schools within three health authority districts in Manchester, UK</p> <p>Sample number: 485</p> <p>Age range: 14–15 years</p> <p>Gender: both</p> <p>Class: not stated</p> <p>Ethnicity: Health Authority districts were judged to reflect a range of ethnic and cultural groups.</p> <p>Other information: none</p> <p>Exclusions: no details but response rate of 81%</p>

Table II. Continued

Study	Aims and objectives	Sample characteristics
Mason [38]	<ul style="list-style-type: none"> To complement a national survey of sports participation rates. To explore young people's views on participation in more detail. To investigate the 'school effect' and other factors which affect participation. 	<p>Location: England-wide Sample number: 23 young people (children and PE teachers also interviewed) Age range: sample of young people aged 11–15 years Gender: both Class: not stated-aim was for a mix of socio-economic backgrounds Ethnicity: not stated Other information: none Exclusions: no details</p>
Miller [39]	<ul style="list-style-type: none"> To assess the extent of conflicts or ambiguities between perceptions of femininity and a commitment to an active lifestyle. To assess differences in relation to the above according to dance and sports. 	<p>Location: Two schools in one town in Sussex, UK Sample number: between 44 and 66 Age range: not stated Gender: female Class: not stated Ethnicity: not stated Other information: all participants physically active in either sports or dance Exclusions: no details</p>
Mitchell [40]	<ul style="list-style-type: none"> To explore the role of teenage magazines in shaping attitudes to physical activity among young women. To explore the potential for using teenage magazines to promote physical activity. 	<p>Location: secondary school in South East London, UK Sample number: 21 Age range: 14–15 years Gender: female Class: school described as located in a 'relatively poor area' Ethnicity: break down according to school overall: 41% 'White'; 24% 'Black'; 25% other ethnic groups Other information: academic record of school below average Exclusions: those participating in school musical; sample restricted to those who formed the first four focus groups.</p>
Mulvihill <i>et al.</i> [41]	<p>To explore:</p> <ul style="list-style-type: none"> what constitutes physical activity/beliefs about physical activity preferred activities (physical and non-physical) relationships between physical activity and other health behaviours role of friends and gender differences in perception and participation the role of parents and the school 	<p>Location: schools, shopping malls and youth clubs in urban and rural sites in North, Midlands and south UK Sample number: 96 Age range: 11–15 years Gender: both</p>

Table II. *Continued*

Study	Aims and objectives	Sample characteristics
	<ul style="list-style-type: none"> • barriers and motivations • ways of overcoming barriers and ideas for promoting greater involvement. 	<p>Class: authors use definition of 35% free school meals = poor area. The six sites had proportions of 49, 33, 32, 16, 16 and 5%.</p> <p>Ethnicity: authors state they aimed to recruit diverse group in terms of ethnicity</p> <p>Other information: school-based sample ($n = 61$) made up of 43 inactive and 18 active young people</p> <p>Exclusions: none</p>
Orne [42]	<ul style="list-style-type: none"> • To identify the influences and constraints on participation in physical activity among 14-year-old girls. 	<p>Location: two secondary schools in Avon, UK</p> <p>Sample number: 10</p> <p>Age range: 14 years</p> <p>Gender: female</p> <p>Class: not stated</p> <p>Ethnicity: not stated</p> <p>Other information: none</p> <p>Exclusions: no details</p>
Rogers <i>et al.</i> [43]	<ul style="list-style-type: none"> • To examine in detail the effects of ethnicity on the health behaviours, knowledge and attitudes of young people from different ethnic groups. 	<p>Location: Camden and Islington, London, UK</p> <p>Sample number: 373 approached, 158 consented to participate</p> <p>Age range: 12 years</p> <p>Gender: both</p> <p>Class: included a substantial minority of low-income families</p> <p>Ethnicity: 25.8% Bangladeshi, 25.3% Black African, 17% Black Caribbean and 31.6% White (as reported by author)</p> <p>Other information: 98 were parents were interviewed</p> <p>Exclusions: those living in area for <1 year</p>
Sports Council for Wales—study one [44]	<ul style="list-style-type: none"> • To obtain information on involvement of secondary school children in curricular PE, extracurricular sport and sport in the community. • To investigate issues of availability of opportunities, access to facilities, attitudes towards sport and influences on decisions to participate. 	<p>Location: all counties in Wales</p> <p>Sample number: 2873</p> <p>Age range: 11–16 years</p> <p>Gender: both</p> <p>Class: not stated</p> <p>Ethnicity: not stated</p> <p>Other information: none</p> <p>Exclusions: no details</p>

Table II. *Continued*

Study	Aims and objectives	Sample characteristics
Sports Council for Wales—study two [44]	<ul style="list-style-type: none"> • To examine young people's feelings to and attitude about sport. • To establish some of the meanings young people give to sporting activity and how they view their own involvement and the involvement of others. 	Location: Pontypool, Haverfordwest, Wrexham, Swansea and Maesteg, Wales Sample number: 60 Age range: 11–16 years Gender: both Class: not stated Ethnicity: none of participants came from ethnic minority groups. Minority were Welsh speaking. Other information: sample over represented young women and aimed to include those less committed to sport Exclusions: no details
Warburton [45]	<ul style="list-style-type: none"> • To inform the development of an intervention to promote participation in physical activity. NB: this was not explicitly stated by the author but inferred by the reviewers.	Location: two secondary schools in Greater Manchester, UK Sample number: not stated Age range: 14–15 years Gender: both Class: not stated Ethnicity: not stated Other information: none Exclusions: none given

activity levels were key factors in understanding variation. The vast majority saw physical activity as important and had positive beliefs about its benefits. Physical activity was valued for increasing health and fitness (including mental health) and developing new skills and creating opportunities for socializing and enjoyment. Gentle *et al.* [34] found that young people with low activity levels had less positive beliefs about the social value of physical activity. Another study found no difference in reasons for exercising between different ethnic groups in north London [43]. In three studies, young women particularly valued the role of physical activity in maintaining weight and a toned figure [40, 42, 43].

Preferred sports included badminton, tennis, swimming, football and basketball, with young women expressing a preference for more recent additions to the curriculum, such as cycling and aerobics [37, 40, 42]. Other studies also reported varying views on preferences for competitive exercise, with young women and young men with low activity levels expressing a dislike for this kind of physical activity [34, 41].

Whereas young men reported physical activity to fit comfortably within their leisure time both within and outside of school [33, 41], in many studies it did not feature as part of young women's leisure time. Their descriptions of what it meant to 'become a woman' did not include physical activity, which they also saw as 'babyish'. For young men, participation confirmed their masculinity [33], and they were more likely than young women to see themselves as physically active and fit even if their activity levels were low. Physical activity and fitness were predominantly equated with sport and exercise. Both were seen as requiring hard work, as competitive and requiring considerable skill. Young men held negative stereotypes about young women's abilities in sport.

What do young people think stops them from taking part in physical activity?

Twelve studies addressed this question [31, 33, 35, 37–45]. Barriers identified by young people

included: not feeling competent enough to take part; negative reactions from peers over skill and choice of activity; feelings of inertia and conflicting interests; self-consciousness about bodies; parental constraints, sometimes related to concerns about safety or cultural restrictions; time and facilities and dislike of highly structured activities or those organized by adults. Many of these issues were particularly problematic for young women. Consistent across a number of studies was a lack of practical and material resources needed for taking part or sustaining involvement in physical activity. Several studies reported that young people held negative perceptions of physical education (PE) at school. Participation in school PE was particularly problematic for young women. While generally identifying a lack of choice of activities on offer and a lack of consultation in what activities they would like to do, many of the barriers identified by young women were to do with PE facilities and rules such as inadequate changing and showering facilities, a lack of time for changing and unacceptable gym kits such as short skirts.

What do young people think helps them to take part in physical activity?

Six studies addressed this question [33, 37–39, 41, 44]. Many of the facilitators were identified by young people who were already physically active. Young people described a range of things to do with the self that helped or motivated them. These included a chance to show off their skills; enjoyment and using exercise as a way of relieving stress. Mulvihill *et al.* [41] identified different facilitators according to whether young people were active (social benefits, competitiveness, sense of achievement and feelings of confidence) or inactive (enjoyment, well-being, avoiding boredom and help with losing weight for females). Parental support was important for creating opportunities for physical activity, encouragement and financial support; and social support from friends was important for young women, especially in terms of trying out a new activity. Liking and respecting PE teachers was described as helpful to participation at school [38].

Table III. *Synthesis matrix*

Young people's views on barriers and facilitators		Interventions which address barriers or build on facilitators identified by young people	
Barriers	Facilitators	Soundly evaluated interventions (<i>n</i> = 4)	Other evaluated interventions (<i>n</i> = 8)
Physical activity and the school			
<ul style="list-style-type: none"> • Inappropriate activities and lack of choice/consultation over activities. • 'PE environment' and 'rules and arrangements' surrounding PE (both young and women only) [33, 41, 42]. • Unsupportive attitudes of teachers [33, 38, 41, 42, 44]. • Lack of facilities for leaving bicycles at school [33, 41]. • Complex rules for 'games' [38]. 	<ul style="list-style-type: none"> • Positive experiences of PE at school [33]. • Respect for PE teachers [38] (both young men only). • Choice of 'non-traditional' activities [33, 41, 42]. • Consultation in choice of activities [41]. • Mixed sex activities and, for some young women, the chance to participate in activities traditionally seen as being for young men [33, 41, 42]. 	<ul style="list-style-type: none"> • Wessex Healthy School. Unclear what changes were implemented. Found tendency towards increases in self-reported physical activity among females [30]. • Slice of Life. Included young people lobbying for environmental changes in their schools. Intervention was effective in young women for some physical activity outcomes but not others. There was no evidence of effects for young men [28]. • Know Your Body. Included teacher-led classroom education and endurance exercises to build skills and strength. Unclear what approaches were used. Intervention effective for health-related knowledge but no evidence of effect for other physical activity measures. Effects unclear in a second evaluation in another population [29]. • No interventions looked specifically at gender and PE, changing environment or rules and arrangements, or storage facilities for bicycles at school. 	<ul style="list-style-type: none"> • Increasing the range of activities such as dancing, gymnastics, 'jazzercise', weight lifting, etc. in the PE curriculum. Unclear in their effects [20, 22, 23, 27]. • No interventions looked specifically at gender and PE, changing environment or rules and arrangements, or storage facilities for bicycles at school.
Physical activity and family and friends			
<p>Parental constraints on young women.</p> <ul style="list-style-type: none"> • Walking to school [31]. • Concerns about safety (e.g. staying late after school at activity clubs) [43]. • Monitoring leisure time to ensure that have time to do homework and domestic chores [33]. • Disapproval of exercise (Bangladeshi and Muslim young women) [39, 43]. 	<ul style="list-style-type: none"> • Parental support (e.g. encouragement and material resources) [33, 38, 44]. • Social aspects of physical activity motivates increased participation (e.g. chance to make new friends) [37, 41]. 	<ul style="list-style-type: none"> • Know Your Body. Included parental involvement. Intervention was effective for improving knowledge in young people in one population but its effect was unclear in another population [29]. • No interventions addressed parental restrictions on young women's leisure time. 	<ul style="list-style-type: none"> • Four interventions encouraged parents and young people to undertake exercise together. Often a small component in a larger intervention. Unclear in their effects [20, 23, 25, 26]. • No interventions addressed parental restrictions on young women's leisure time.

Table III. Continued

Young people's views on barriers and facilitators		Interventions which address barriers or build on facilitators identified by young people	
Barriers	Facilitators	Soundly evaluated interventions (<i>n</i> = 4)	Other evaluated interventions (<i>n</i> = 8)
<p>Peer constraints</p> <ul style="list-style-type: none"> • Boyfriends' preferences for leisure time activities are put first [33]. • Fear of negative evaluation from peers [33, 38]. • Prejudiced attitudes of boys [39]. 	<ul style="list-style-type: none"> • Social support from friends is important for young women [33, 35]. <p>Young people say to:</p> <ul style="list-style-type: none"> • Emphasize fun and social aspects [41]. • Combine sports and (non-active) leisure facilities to emphasize socializing [41, 42]. 	<ul style="list-style-type: none"> • Slice of Life. A goal was to create peer support for participation in physical activity. Not clear if achieved. Effective for some physical activity outcomes in young women only, no evidence of effect for other outcomes. There was no evidence of effects for young men [28]. • No interventions directly addressed boyfriends as a barrier but Slice of Life involved teaching skills to resist peer pressure to engage in unhealthy behaviours (see above for outcomes affected). • No interventions that aim to provide access to combined sports and leisure facilities. 	<ul style="list-style-type: none"> • 'Class of 89'. Included social support for physical activity as a component of larger intervention. Unclear how achieved. Unclear in its effect [24]. • No interventions which directly address boyfriends as a barrier. • No interventions which aim to provide access to combined sports and leisure facilities.
<p>Physical activity and the self</p> <ul style="list-style-type: none"> • Lack of confidence in skills and ability to take part [33, 37]. • Feelings of discomfort during physical activity (young women only) [42]. • Feelings of inertia/lack of motivation [40, 41]. • Preference for other activities/conflicting interests [40, 41]. • Lack of knowledge about benefits of physical activity [35]. • Self-consciousness about bodies/appearance (young women only) [41, 42]. 	<ul style="list-style-type: none"> • Personal competence is motivation to take part (e.g. chance to show off skills) [33]. • Using physical activity to increase feelings of well-being (e.g. relieve stress; forget troubles; increase confidence) [37]. • Enjoyment and fun [37]. • Motivators for inactive: feelings of well-being; enjoyment; avoiding boredom; help with losing weight (latter for young women only) [41]. • Motivators for active: social benefits; competitiveness; being part of a team; sense of achievement [41]. 	<ul style="list-style-type: none"> • Slice of Life. Emphasized cardiovascular and weight-control benefits of fitness and exercise. Effects of the intervention were found on some, but not all physical activity outcomes in young women. There was no evidence of effects for young men [28]. • Know Your Body. Provided an educational curriculum, emphasizing an endurance exercise programme and prudent diet, and screening for cardiovascular risk factors. Effective for improving knowledge in one population but effect unclear in another population [29]. • No interventions directly addressed the other barriers or built on the other facilitators listed in this area. 	<ul style="list-style-type: none"> • All of the interventions judged to be not sound included educational components that aim to increase knowledge and foster positive attitudes towards exercise. It is not clear to what extent interventions focused on the specific barriers and facilitators identified by the young people [20–27].

Table III. Continued

Young people's views on barriers and facilitators		Interventions which address barriers or build on facilitators identified by young people	
Barriers	Facilitators	Soundly evaluated interventions (<i>n</i> = 4)	Other evaluated interventions (<i>n</i> = 8)
	<ul style="list-style-type: none"> • Young women considered it to be acceptable for 'teenage' magazines to contain articles promoting physical activity [40]. • Young people felt there was enough literature on the availability of current opportunities for physical activity [41]. 		
Physical activity and practical and material resources			
<ul style="list-style-type: none"> • Lack of time [35, 37, 40, 41, 43]. • Lack of money [33, 37, 41]. • Provision of 'childish' activities, which are highly structured, or organized by adults (for young women) [33]. 	<ul style="list-style-type: none"> • Creation of more cycle lanes [31]. • Make activities more affordable [41]. • Increasing access to clubs for young people to dance [41]. • Single-sex physical activities at youth clubs with mixed sex (non-physical) activities afterwards [41]. • Provision of more acceptable forms of physical activity such as aerobics [45]. • More consensus about desirable health behaviour [35]. 	<ul style="list-style-type: none"> • None of the soundly evaluated interventions appear to have directly addressed the barriers or built on the facilitators listed in this area. 	<ul style="list-style-type: none"> • One intervention offered free baby sitting and support with transport to help families participate in exercise sessions [20]. The reviewers judged this intervention to be unclear in its effects. • No other interventions identified.

What ideas do young people have for what could or should be done to promote their participation in physical activity?

Five studies addressed ways of facilitating participation in physical activity [31, 35, 40–42]. The majority of the young people's suggestions was about increasing practical and material resources such as: creating more cycle lanes, making activities more affordable, increasing access to clubs for dancing and provision of single sex physical activities in youth clubs alongside or followed by mixed sex (non-physical) activities (combining sports and leisure facilities). Young people suggested emphasizing the fun and social aspects of physical activity. Young women's ideas reflected a desire for more equal opportunities.

Cross-study synthesis

Evaluations of interventions addressing the barriers or facilitators expressed by young people were identified in four areas: the school; physical and material resources; relationships with family and friends and the self (see Table III).

In schools, young people identified specific barriers related to PE. For young women in particular, this included a dislike of activities they saw as too routine; inappropriate or inadequate facilities (e.g. gym kit, showers); the 'rules and arrangements' surrounding PE (e.g. lack of time for changing) and unsupportive teachers. None of the soundly evaluated interventions directly addressed issues of gender and PE. One UK intervention using a 'whole school' approach was possibly effective in increasing participation in physical activity among women [30]. Young people recommended that school PE should involve consultation over choice of activities and new activities such as aerobics and cycling. None of the soundly evaluated interventions built on these facilitators.

Three interventions targeting young women whose evaluations were not judged 'sound' by our criteria addressed the suggestion from young women that they should be given more choice of activities in school [22, 23, 27]. These all provided programmes of physical activity that included

activities such as dancing, gymnastics and 'health hustles' (moving to music).

Relationships with family and friends presented both barriers and facilitators. Limiting factors included: parental constraint (due to safety concerns, monitoring of leisure time, particular cultural values); fear of negative evaluation from peers (particularly from young men) and young women prioritizing boyfriends' preferences for leisure time activities. Parents and friends could also be a source of support for physical activity. Two interventions addressed these barriers and facilitators in ways that appear effective. One involved both parents and young people through family exercise days, an approach that was effective in improving knowledge in one setting [29]. In another intervention, the aim was to increase peer support and to teach peer pressure resistance skills [28]. This was effective in young women in terms of increasing knowledge of the benefits of physical activity and intentions to exercise. Young people also recommended that physical activity could be encouraged by combining sports and (non-active) leisure facilities for socializing. However, no effective interventions were identified which built on this facilitator.

That parents could be a source of support for physical activity was addressed by five evaluations judged not to be methodologically sound [20, 21, 23, 25, 26]. These involved educational programmes that either brought young people and their parents together to engage in physical activity or educated parents separately about its benefits.

In relation to the self, young people identified as barriers: lack of confidence and competence, feelings of discomfort and self-consciousness about bodies (young women only), lack of motivation and 'inertia', preference for other activities and lack of knowledge about the benefits of physical activity. They also described the social and psychological benefits of exercise as motivators. Two effective interventions included educational components emphasizing the benefits of physical activity (both showed effects for young women only). It is not clear to what extent these also addressed other barriers such as lack of confidence. Young women endorsed magazine articles on women taking part

in physical activity as a way of promoting physical activity, but no interventions were identified which built on this.

In terms of practical and material resources, young people recommended: the creation of more cycle lanes, making activities more affordable and providing more acceptable forms of physical activity (e.g. not highly structured and organized by adults). Although young people feel that they have enough information on the facilities available, some want more consensus about desirable levels of activity. No effective interventions were identified which built on these facilitators.

Discussion

This review has systematically identified the research on the barriers to, and facilitators of, participation in activity in young people. We found a lack of good quality studies evaluating the effectiveness of interventions. In the four high quality outcome evaluations identified, the effectiveness of the interventions studied was limited.

One UK-based intervention, using a whole school approach, was possibly effective at increasing physical activity levels, but only for young women [30]. One teacher-led intervention from the United States was effective for increasing health-related knowledge in a low-income sample of mostly African American or Hispanic young people [29]. However, the effectiveness of the same intervention conducted in a more affluent neighbouring area was unclear [29]. One peer-led intervention in the United States showed no apparent effect for reported time spent on physical activity or healthy exercise choices, though females reported more regular exercise, an increase in the intensity of physical activity, more favourable intentions to undertake physical activity and an increase in knowledge [28].

The trials indicate differences in effectiveness between genders. The synthesis of young people's views also revealed gender to be an important factor in the promotion of physical activity. Young women in particular identified specific barriers

related to the way PE is provided in schools, including a dislike for activities run too many times, inappropriate or inadequate facilities, the rules and arrangements surrounding PE and un-supportive or insensitive teachers. One of the key recommendations from young people about how physical activity might be promoted was that there should be increased choice. They emphasized the need to develop the social side of physical activity and provide more opportunities for activities that are fun, with space and time for both single-sex and mixed activities.

Our findings bring together several pertinent research gaps on: community-based interventions, the promotion of active recreation or active lifestyles and the reduction of sedentary behaviour and promoting physical activity among socially excluded groups. Our systematic searches highlighted that there has been very little research on physical activity that attends to social diversity among young people.

Searches for systematic reviews and trials published since this review was conducted indicate that these research gaps are yet to be filled. We have identified one systematic review that complements this one in that it looks beyond our focus on community- or society-level changes to include interventions that work solely with young people's knowledge, attitudes or skills [46]. Further physical activity-promoting initiatives are likely to be underway, some of which may match the needs identified by studies of young people's views. It is important for all physical activity-promoting initiatives to be thoroughly evaluated using, where possible, controlled trials, preferably randomized, with comprehensive formative and process evaluation. Such evaluations should be included in a future updated systematic review.

Conclusion

On the basis of the evidence identified so far, the promotion of physical activity at the community- and society level has uncertain benefits. The essential components for success are unclear, and

may not translate to long-term participation in physical activity. A multi-faceted or whole school approach might be promising. Other promising approaches include those that aim to support teachers to foster supportive and sensitive teaching strategies that include activities other than competitive sports and team games.

Interventions which take into account young people's views and so require rigorous evaluation include those which aim to: increase the range of 'free' diverse activities through after-school clubs and community-based initiatives, provide community and school facilities for safe bicycling, improve PE facilities at school, provide young people with choices about types of physical activity and emphasize the fun and social aspects of sport and exercise. Future initiatives to promote physical activity among young people should also take their views as a starting point.

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Conflict of interest statement

None declared.

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