A review of community engagement and community-based participatory research approaches in the development of community-based physical activity interventions

Review team members

Dr Helen Quirk: Centre for Sport and Exercise Science, Sheffield Hallam University;
h.quirk@shu.ac.uk

Dr Helen Speake: Centre for Sport and Exercise Science, Sheffield Hallam University;
h.speake@shu.ac.uk

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Executive summary

Community-based participatory research (CBPR) approaches engage the target population as co-researchers in the development, implementation and evaluation of community-based services, programmes or interventions. Emphasis has been placed on the use of CBPR approaches in health research because it is need oriented; it can identify needs, problems and assets in specific communities and help explain disparities in health. A participatory approach is appropriate for physical activity research when researchers seek to understand the lived experience of the target population. This review describes a systematic search and synthesis of the literature of CBPR approaches in the promotion of community-based physical activity for adults in developed countries. 32 studies met the inclusion criteria for review. Studies were conducted in 5 different developed countries, the majority were conducted in the United States of America (n=23). Study types and methodologies varied widely. Target populations ranged from whole communities to specific ethnic or age groups or "high risk" sub-groups. CBPR approaches included action research, feminist action research, community coalitions, community advisory boards, community sport development approaches, community partnerships, participatory research teams and other approaches consistent with CBPR principles such as photovoice, formative research and consumer research. The review findings demonstrate that CBPR approaches have been used in a range of different communities and contexts. CBPR approaches aid the development of community-based physical activity programmes and deepen understanding of the experience of physical activity for particular communities. Challenges and facilitating factors in conducting CBPR for community-based physical activity promotion are discussed.

Contents

1 Introduction

Doncaster Council has a 10 year physical activity and sport strategy driven by the Get Doncaster Moving Board to address physical inactivity in its locality. Figures suggest that only 55% of adults in Doncaster are meeting the Chief Medical Officers' recommendations of 150 minutes physical activity per week (as reported in the May 16/17 Sport England Active Lives survey results [1]). Doncaster was successful in its application to become one of Sport England's Local Delivery Pilot (LDP) sites and their vision is to involve its residents in approaches to promote widespread behaviour change.

This literature review forms part of the planning for a community-based participatory research (CBPR) approach being used by Doncaster Council to encourage community-based physical activity. Doncaster Council wants to use community engagement and CBPR approaches to better understand the needs of its residents and their perceived barriers to physical activity. This will enable physical activity interventions to be planned and implemented not only for the community, but by the community.

1.1 Community based participatory research in the promotion of physical activity

Community-based participatory research (CBPR) approaches engage the target population as co-researchers in the development, implementation and evaluation of community-based services, programmes or interventions. Emphasis has been placed on the use of CBPR approaches in health research because it is need oriented; it can identify needs, problems and assets in specific communities and help explain disparities in health [2]. A participatory approach is appropriate for physical activity research when researchers seek to understand the lived experience of the target population [3]. The key to community-based research is that community members, organisational representatives and researchers are involved in all aspects of the research process. Israel et al. (1998)[4] provided a synthesis of the key principles of CBPR in health research and this review will seek to understand how they have been used in physical activity research:

- CBPR works with existing communities through collective engagement and recognises community as a unity of entity. In the context of CBPR, 'community' can be defined as geographical location, as the place where people live, work, play or study or any group with common interests, including sexual orientation, religious, ethnic or political affiliation.
- CBPR builds upon the community's existing strengths, resources and relationships to address their communal health concerns.

- It involves collaborative partnerships in all phases of the research whereby all parties participate as equal members with "unique strengths and shared responsibilities" (Green et al., 1995; p. 12) [5].

- CBPR seeks to build a broad body of knowledge; gathering information to inform action and building knowledge as new understandings emerge as action is taken, with the intention that all involved partners will benefit.

- CBPR promotes a co-learning and empowering process that attends to social inequalities. It facilities the reciprocal transfer of knowledge, skills, capacity and power within and between members of the partnership (e.g., researchers learn from community members and vice versa) and encourages members to address inequalities.

- CBPR is an iterative process involving partnership development and maintenance, community assessment, problem definition, development of research methodology, data collection and analysis, interpretation of data, determination of action and policy implications, dissemination of results, action taking, specification of learnings, and establishment of mechanisms for sustainability.

- CBPR address health from both positive and ecological perspectives.

- Where knowledge is gained it is disseminated to all partners involved in accessible language and with ownership of the knowledge acknowledged. This dissemination principle includes researchers consulting with participants prior to submission of any materials for publication, acknowledging the contributions of participants and, as appropriate, developing co-authored publications.

Whilst there has been a wealth of research using CBPR methodology in public health interventions and some reviews undertaken of this literature [2, 4], to the authors' knowledge there has not been a synthesis of research that has used CBPR methodology for community-based physical activity interventions in developed countries. Coughlin and Smith (2016) [6] systematically reviewed the literature on CBPR approaches for promoting physical activity in African American communities and found that 13 adult-only studies met their inclusion criteria, but 12 of the studies they reviewed were interventions involving broader health behaviours for weight loss such as healthy eating. They found that particular settings, such as churches were often used to promote physical activity among African Americans, but concluded that mixed results have been obtained and modest increases in physical activity observed when CBPR was used. However, Coughlin and Smith did not explore the benefits and challenges of the CBPR approaches used in previous research. The current review

focuses on the CBPR used and only on interventions aimed at promoting community-based physical activity among adults in developed countries.

This review describes a systematic search and synthesis of the literature of CBPR approaches in the promotion of community-based physical activity. The purpose of this review is to systematically search for and synthesise the existing evidence base of community participatory research approaches used in the development of community-based physical activity among adults in developing countries.

1.2 Aims and objectives

To review existing literature around the use of community engagement and community-based participatory research approaches in the development of physical activity interventions to address physical inactivity.

Specific objectives:

- To understand what community development and engagement approaches and methods have been used for the planning, design and delivery of community-based physical activity interventions.
- To understand the barriers and enablers to using community engagement and development approaches and methods for physical activity interventions and what approaches have successfully overcome these barriers.

2 Methods

2.1 Eligibility Criteria

The review will provide a background to Doncaster's implementation and as such we will have strict eligibility criteria that ensure that the literature under review is relevant.

Types of studies - any type of study except review studies were eligible for inclusion in this review. Studies could include, but were not limited to; research studies, evaluations, or case studies. Conference abstracts were not be eligible unless they included all the data needed for inclusion.

Types of community engagement approach - any type of community engagement approach was eligible as long as the approach was described in detail and its stated purpose was to plan, design or

deliver community-based physical activity interventions or to explore the barriers to physical activity participation in communities.

Types of participant - any adult population from developed countries was eligible for inclusion in this review. We defined developed countries as per United Nations definition (see: http://www.un.org/en/development/desa/policy/wesp/wesp_current/2014wesp_country_classification.pdf)

Types of intervention - only interventions involving community-based physical activity, exercise or sport were eligible for inclusion in this review. Studies were excluded where the intervention involved more than one health behaviour, such as physical activity and healthy eating.

Studies were **included** if they met the following criteria:

a) Describe the role of community based participatory engagement in the development of a community-based physical activity intervention. The key principles by Israel et al. (1998) were used as a reference for whether a community-based participatory approach had been used.
b) Where the primary purpose was to use community engagement in the planning, design or delivery of a community-based physical activity intervention **or** to evaluate the barriers to community-based physical activity

Studies were **excluded** if they:

a) Did not clearly describe the community engagement approach used
b) Involved physical activity interventions, initiatives or services which targeted individuals (rather than communities)
c) Involved physical activity interventions, initiatives or services delivered within a wider programme of health interventions
d) Involved physical activity interventions, initiatives or services which included the planning, design, delivery and/or governance of treatment in healthcare settings or of clinical populations

Studies were also excluded if they were:

a) Set in developing countries
b) Target clinical populations of people with a health condition, disability or illness

c) In language other than English

d) Published pre 1990

2.2 Literature Search

The following databases were searched in August 2018 for relevant data from January 1990 onwards using search terms defined in Appendix 1:

- MEDLINE (via EBSCO)
- SPORTDiscus (via EBSCO)
- CINAHL (via EBSCO)
- PsycINFO
- Web of Science
- PUBMED

2.2.1 *Grey literature*

A variety of searching strategies were used to search for grey literature, including: a) Google search engine, b) targeted websites, and c) hand search of reference lists by the research team.

2.3 Data collection and analysis

2.3.1 *Screening and selection of studies*

Following de-duplication, titles and abstracts of identified records were screened by two authors. The full-text of all potentially eligible records were retrieved and screened independently by one author and 10% were selected and screened by the second author. Reasons for exclusion were recorded at the full-text screening stage. Multiple records of the same study were linked together in the process. Any disagreements between the authors were resolved by discussion or by consulting a third independent party. The study selection process is described using a PRISMA flow diagram (see Figure 1).

2.3.2 *Data extraction and management*

Two review authors independently extracted outcome data from the full texts of those studies meeting the eligibility criteria. Any disagreements were resolved by discussion. A standardised data extraction form was used. Data extracted included: author(s), publication date (year), title of the document, country, study design, aims of the study, target population, community engagement approach used, physical activity type, data collected (outcomes reported), study participants, sample

size, inputs (activities that took place), outputs and/or outcomes, enablers or perceived strengths of the approach, barriers or perceived limitations of the approach and lessons learned.

2.4 Data synthesis

As this review covers differing methodologies, several community engagement approaches, numerous intervention strategies and outcome measures it was inappropriate to synthesise the data using meta-analysis. This review is therefore restricted to a narrative overview of all studies that meet the inclusion criteria.

3 Findings

32 studies met the inclusion criteria for review (see FIGURE 1). The studies represented 29 individual research programmes. Studies were conducted in 5 different countries (United States of America, Canada, United Kingdom, Germany and Australia. The majority of studies (n=23) were conducted in the United States of America (USA). Publication dates ranged from 1997 to 2017. Study types varied and included case study research [3, 7-17]), qualitative research [18-26], quantitative surveys [27, 28], randomised controlled trials with CBPR planning phases [29-31], quasi-experimental studies [32-34], and mixed methods studies [35, 36].

3.1 Target populations

Target populations for physical activity programmes varied considerably across studies included in this review. Some studies targeted whole communities and others targeted specific sub-groups. In the studies targeting whole communities, these ranged from general community residents [9, 13, 18, 24, 32] to more specific communities such as post-industrial communities in south Wales (UK) [8] and community park users and members of the surrounding area [30, 31]. Other studies targeted specific sub-groups such as specific ethnicities. Studies targeted racial/ethnic minority communities in the USA [7], south Asian communities in the USA [19], African-American men in the USA [21], African-American women in the USA [33] and Latino / Mexican origin women in Texas and South Carolina, USA [26]. Two studies targeted specific age group communities, such as community-dwelling older adults in the USA [29] and older adults in North America, USA [22].

Other specific sub-groups targeted included high risk sub groups e.g., low income in south-eastern Missouri counties, USA [32], irregularly active women aged 35-54 in Sumter County, South Carolina, USA [18], women in difficult life situations in Germany [10], adult female Chinese newcomers/recent immigrants to Canada [20], women living below the poverty line in Canada (single mothers, elderly women and recent immigrant women) [11, 12], low income women in Canada [3], tenants of council

housing estates in Rochdale, UK [23] and disadvantaged population groups in South Australia, including people with mental impairments, low socioeconomic status communities, indigenous people, newly arrived migrants and refugee groups [14].
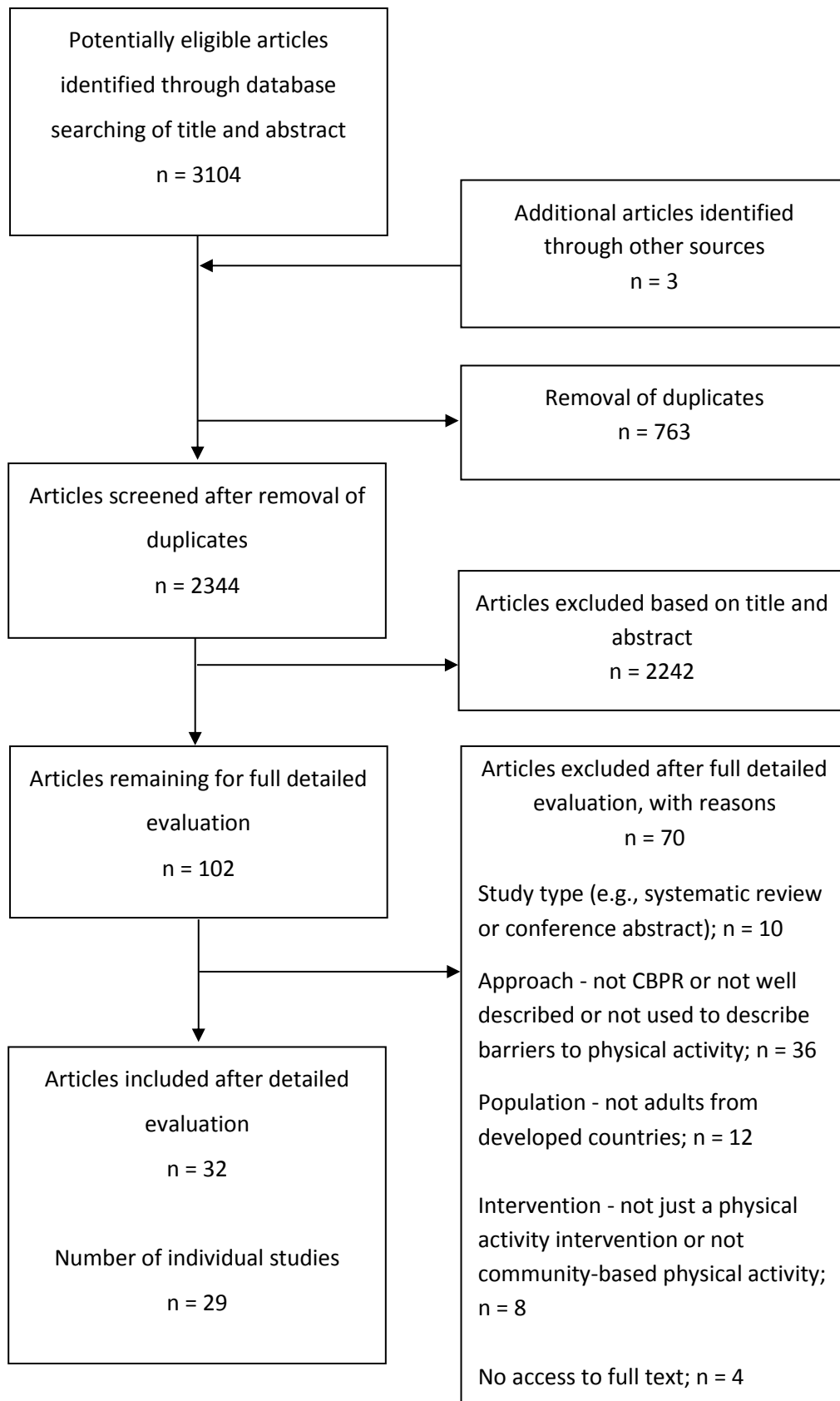
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┌─────────────────────────────┐
│ Potentially eligible articles│
│ identified through database  │
│ searching of title and       │
│ abstract                     │
│        n = 3104              │
└─────────────────────────────┘
                              ┌──────────────────────────────┐
                              │ Additional articles identified│
                              │ through other sources         │
                              │         n = 3                 │
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                              │ Removal of duplicates         │
                              │         n = 763               │
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│ Articles screened after      │
│ removal of duplicates        │
│        n = 2344             │
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                              │ Articles excluded based on    │
                              │ title and abstract            │
                              │         n = 2242              │
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│ Articles remaining for full  │
│ detailed evaluation          │
│        n = 102              │
└─────────────────────────────┘
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                              │ Articles excluded after full  │
                              │ detailed evaluation, with     │
                              │ reasons    n = 70             │
                              │ Study type (e.g., systematic  │
                              │ review or conference abstract);│
                              │ n = 10                        │
                              │ Approach - not CBPR or not     │
                              │ well described or not used to  │
                              │ describe barriers to physical  │
                              │ activity; n = 36              │
                              │ Population - not adults from   │
                              │ developed countries; n = 12   │
                              │ Intervention - not just a      │
                              │ physical activity intervention │
                              │ or not community-based physical│
                              │ activity; n = 8               │
┌─────────────────────────────┐│ No access to full text; n = 4 │
│ Articles included after      │└──────────────────────────────┘
│ detailed evaluation          │
│        n = 32               │
│                             │
│ Number of individual studies │
│        n = 29               │
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Figure 1 Flow diagram to show identification and screening of studies

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The studies varied in respect to when the target population was identified. For some, the target population had been defined at the outset. In other studies, the target population arose as after being identified by the community members. For example, Davies et al. (2008) described how a community consultation identified the need for a low intensity exercise class for older women.

3.2   Target behaviour/intervention type

The majority of the studies referred to community based physical activity as the target behaviour [3, 7, 10, 11, 13, 15, 16, 21, 22, 25, 36] whilst others were more specific. The behaviour or intervention type included; physical activity and community sport [12, 20], group exercise programme [29], walking [9, 17, 24, 28, 32, 34], walking and other moderate-intensity physical activities [18], physical activity in parks [30, 31], leisure time physical activity [19, 26], low intensity exercise class [8], dance intervention [33], sport [14, 23], cycling [27] and tennis [35].

3.3   Rationale for CBPR in community-based physical activity promotion

22 studies used the CBPR approach for planning, design, delivery and/or testing of a physical activity programme [3, 7-13, 15, 17, 18, 21, 24, 28-35]. 7 used the approach for exploring the barriers to physical activity within a specific community [19, 22, 23, 26, 27, 36]. 2 studies used CBPR for both planning and delivering an intervention and exploring the barriers to physical activity [16, 20]. One study used CBPR for evaluation and dissemination only [25].

3.4   Types of CBPR used in community-based physical activity promotion

The CBPR approach used varied across studies. Approaches included; action research and feminist action research [3, 8, 10-12, 20, 22, 23], photovoice [22], community coalitions [17, 24, 27, 32, 36], community advisory boards [15, 19, 28-31, 34], community sport development approaches [14, 35], community partnerships [7, 13, 26, 33], consumer research/social marketing [18], participatory research teams [9] and others that were consistent with CBPR principles [21].

Methodologies varied across studies and included; focus groups [11, 13, 15, 18, 25, 29, 32, 36] [34], semi-structured interviews [10, 12, 19, 21, 23, 35], focus groups and interviews [21, 25, 26], photovoice and interviews [22], nominal group technique sessions [16], brainstorm sessions and concept mapping [7], meetings [17, 27], workshops and interviews [3, 20], observation and field notes [10, 23, 35] and surveys [27, 28, 36].

3.5   Parties involved in the CBPR partnerships

Partnership dynamics varied across all studies. Most studies provided information on the parties involved in the CBPR partnerships. These parties tended to include researchers or academic staff, target community members, service providers, policy makers, professionals, funders and other

relevant stakeholders. It was less common for studies to report specific characteristics of the individuals involved in the CBPR. Instead, there was a tendency for studies to report the characteristics of the sample involved in the actual physical activity intervention. In studies that did report characteristics of the community members involved in the CBPR, it was useful for the primary authors to report demographics of the community members such as sex, age and ethnicity in order to understand whether the community members involved in the CBPR were representative of the target community (e.g., Zoellner et al., 2011). In addition, it was not always clear which party member or group initiated the CBPR approach which is important when considering the influence of power relations. Often it was the research/academic staff who secured funding, developed and managed the research (e.g., Rosso et al., 2017). In some cases, authors described how the project has been initiated by the community itself, who had identified a need and target population and approached researchers for guidance [11] and in other cases, community organisations led the CBPR [24].

3.6   What did the CBPR partnerships achieve?

The primary achievement of all studies involved in this review was the formation of a partnership between representatives of a target community and relevant stakeholders in order to learn more about the health of the community. Specifically, studies focused on understanding factors related to physical activity participation (e.g., barriers to engagement) and/or to design and deliver a physical activity programme. However, there was little in the way of exploring the impact or effectiveness of the CBPR approaches used. The majority of the included studies did not contain any outcome or impact data specific to the CBPR component of study, but instead presented results demonstrating the impact or effectiveness of the physical activity intervention itself. In the absence of knowing how effective the CBPR approaches are, this section will describe the CBPR activities that took place, and wherever possible the primary authors' accounts of what the approach achieved. Studies will be grouped by the type of approach taken.

3.6.1   *Action research approaches*

Four studies described taking an action research approach [8, 10, 22, 23]. The Frisby et al. studies described used a feminist action research approach [3, 11, 12, 20].

Davies et al. (2008) used an action research partnership approach to reduce health inequalities among post-industrial communities in south Wales (UK). Consultation and reflection between researchers, community groups and the community shaped future action and there was a continuous cycle of evaluation and revision of the low intensity exercise programme, emphasising the democratic and participative aspects of the action research process. The authors discuss the

importance of ownership and believed that the community set their own agenda and eventually carried it out without an external facilitator. The authors believed that the action research method used in this project ensured that, via continuous feedback, reflection and adjustment, members' opinions strongly influenced how the project was managed and delivered.

Frahsa et al. (2014) described an action research project aimed at promoting physical activity among women in difficult life situations in Germany. Central to the project was the approach of cooperative planning, in which women in difficult life situations, local policymakers, professionals and researchers equally participated in project planning, implementation, evaluation and sustainability activities. Cooperative planning groups decided on the type, content, time, location, costs, recruitment and marketing of physical activities. The authors discuss examples of 'enabling' among policy makers and professionals related to the cooperative planning process and believe that cooperative planning might be a pathway to negotiated agreement that foster systematic enabling and policy change.

Mahmood et al. (2012) used 'photovoice' as a participatory action research approach to identify neighbourhood physical environmental features and social aspects that influence physical activity in older adults in North America. Photovoice involved members of the community taking photographs of the physical and social aspects of their respective neighbourhoods that they perceived as facilitators or barriers to their physical activity behaviours. The authors described photovoice as a potential tool for collecting and disseminating knowledge in a way that enables local people to identify and assess the strengths and concerns in their community, create dialog, share knowledge and develop a presentation of their lived experiences and priorities. The authors reported that group discussions with community members who had taken photographs encouraged conversation and reflection regarding issues identified in the photographs, emerging issues and to generate planning and design recommendations on how to overcome the barriers and enhance facilitators of physical activity in the study neighbourhoods.

Partington et al. (2012) examined what contribution community sports development makes to community involvement and subsequently community empowerment (enabling communities to influence the decisions and services that affect them). The study used a case study approach to explore the power relations that underpin provision of community sport for social housing estates tenants in Rochdale, UK. The community sports project acted as a medium for community empowerment to develop community involvement in activities, build capacity within tenants and residents associations and develop social capital in communities. Authors described how the project

was agile and responsive to local needs and succeeded in achieving a very local degree of ownership and control when detached from mainstream providers.

Frisby et al. (1997) described how a community project (Women's Action Project) for low-income women identified a lack of access to physical activity services in their community in Canada. Using focus groups and questionnaires, a needs assessment was carried out to identify the issues and concerns of the community. After the needs assessment, 'community mobilisation' took place whereby the low-income women and service providers (e.g., recreation professionals, healthcare providers, representatives from social service agencies, and community groups) were brought together to form an advisory committee, whose purpose was to develop strategies for increasing access to local physical activity services and to oversee the implementation and evaluation of these strategies. As a result, three physical activity programmes were developed, implemented and monitored/evaluated. The authors provide a detailed account of how the CBPR approach used incorporates key features of Green et al.'s (1995) framework for evaluating participatory action projects. The authors believed that because low-income women initiated the project themselves they assumed a sense of ownership from the outset of the project.

Frisby et al. (2002) and *Frisby et al. (2005)* used participatory and action research methods to work with a community group called 'Women Organizing Activities for Women (WOAW)' in Canada. WOAW members included women living below the poverty line (e.g., single mothers, elderly women, and recent immigrant women), a number of public sector employees (e.g., staff from two local sport and recreation departments, family service agencies, community schools, and a women's center, n=11), and a university-based research team. The WOAW group met regularly over three years to collaboratively plan and implement free or low cost social and physical activities for themselves and other women on low income in the community. The authors believed that the participatory and action research methods used provided a unique opportunity for examining the key dimensions of community development from the perspectives of those actually engaged in the work.

Frisby et al. (2011) brought immigrant Chinese women, local government staff, provincial and federal sport policy makers, and community partners together with researchers for a two-day 'Multiculturalism, Sport, and Physical Activity Workshop' to share and discuss results from interviews that had been previously carried out with 50 Chinese immigrant women, 11 staff from the City of Vancouver, and 5 staff from an immigration service agency. The authors believed the workshop was an effective way of promoting cross-cultural communication and identifying action strategies, including a discussion of promising inclusion practices.

3.6.2 *Community coalitions*

Five studies described community coalitions [17, 24, 27, 32, 36]. ***Brownson et al. (2004)*** described how an academic team worked with community coalitions and local governments to develop walking trails for promoting physical activity among rural communities in the Missouri "bootheel" region. Focus groups were conducted to explore the perceived benefits of walking and trail use, social factors that encourage or discourage walking and trail use, and other facilitating and inhibiting factors. Meetings with the coalition members provided input on topics related to the interventions, including their perceptions of priorities of various communities, creative ideas for specific interventions, and input into which incentives might best encourage participation. Community and academic partners also recognised the need to understand the unique characteristics of each community and so held community meetings to determine the protective social factors that facilitate coalition activities and factors that hinder coalition effectiveness. Findings from each meeting were reviewed with community members and discussions were held to determine how findings could be used to enhance coalition activities designed to increase physical activities. The authors believed that community member empowerment was a key beneficial outcome.

Sharpe et al. (2011) described how a community coalition committee used survey findings as a needs assessment tool to develop an educational video about cycling safety in South Carolina, USA. Surveys were created by academic researchers and then community members were invited to comment on them. The coalition's Bike/Walk committee collaborated to conceptualise, draft, review, and distribute a Bicycle Plan for the county. The partners involved in the development and production of the video were researchers, coalition staff and members, and the coalition's community partners. An 8-minute video was produced that aired on the local community cable TV channel. The authors believed that the leadership from community members in making the video set the foundation for local ownership and additional endeavours, such as policy advocacy.

Whaley et al. (2008) identified a key person in the community who was respected and aware of the community needs and meetings with the key person identified the common goal improving health through increasing physical activity. A community coalition was built to work on the project and the research team designed the project. One important member source was an existing group of community service providers who met regularly to discuss community issues and make sure services were not being duplicated. Key community members in the coalition were the director of Recreational Services, a local health care provider, and a county official. Coalition group meetings identified the need to know about the community, residents' perceived physical activity barriers, and previous experiences with trying to initiate health-related programmes for community members. A survey of perceived activity levels, barriers and facilitators to physical activity, and

available physical activity opportunities was conducted as well as a series of focus groups with targeted community groups (e.g., community centres, county staff, service providers, residents). The authors believed that the surveys and focus groups identified perceived benefits and barriers to physical activity needed for planning a community intervention.

Williams et al. (1999) described how a community coalition was formed to plan appropriate physical activity interventions for African Americans in Southeast Stockton, California, USA. The coalition consisted of community members, local board members and ministers and was chaired by a lifelong resident and nurse from the target area. The coalition identified and prioritised the health needs of the target area and identified appropriate interventions. The coalition recruited and trained 'captains' for walking clubs, walking routes and organised walking clubs. Among a series of physical activity initiatives, specialised groups were initiated to meet specific community interests. For instance, senior support groups developed as a result of the walking club experience. The authors believed that the coalition members could not have realised the project alone. Pooling resources, experiences and influence enabled them to successfully deliver the project and mobilising the community worked best when emphasis was on community betterment rather than increasing physical activity.

Matsuoka et al. (2012) described a community-based planning process and intervention to revitalise an old airport in Hawaii into a walking/jogging trail. Through the leadership of a grassroots community coalition, a community advisory committee planned and designed the development, inviting a local kupuna (elder) to share with the group the oral history of her ancestral land. Through community engagement, support from local media and businesses, and volunteers, the community advisory committee created the walking paths and increased physical activity among residents. The authors believed that mobilisation of a grassroots community coalition enabled the community to take responsibility for the revitalisation of the walking trails.

3.6.3 *Community advisory boards*
Community advisory boards (CABs) were described in 7 studies [15, 19, 28-31, 34]. **Brach et al. (2016)** describe stakeholder involvement in the design of a clinical trial of a group-based exercise program that incorporated timing and coordination of movement into the exercises for community dwelling older adults in the USA. Stakeholders participated in the pilot studies and focus groups to help develop the intervention. They were also involved in the delivery and dissemination as members of a CAB. Attempts were made to ensure the CAB involved a diverse representation of a variety of genders, races, types of facilities and both participants and providers. The CABs met twice a year throughout the study and involved two-way engagement between investigators and

stakeholders. The authors described how the CAB played a critical role in the preparation and conduct the study with significant input into the study aims, design, sample, intervention and outcomes as well as operational decisions.

Cohen et al. (2013) aimed to determine whether using a community-based participatory approach with park directors and park advisory boards (PABs) could increase physical activity in local parks. The researchers also tested whether involving PABs would be more effective than working with park directors alone. The researchers worked with the park directors and PABs in all phases of the research; in design, implementation, and interpretation of data collection results and in using the baseline results to design park-specific interventions aimed at increasing park use and physical activity. The authors described how working with park directors and PABs in a participatory fashion had a positive impact on levels of park-based physical activity.

Dave et al. (2015) conducted focus groups with South Asian women in the USA to explore barriers to leisure time physical activity. The aim was to explore perspectives on physical activity during different life stages, to identify sociocultural and contextual barriers and facilitators related to physical activity and to identify potential avenues for future physical activity interventions. The study partners formed a CAB consisting of community members and the community-based organisation. CAB members were asked to help recruit women from different religions into the study focus groups. The CAB members were also involved in study design, review of study materials, and a semi structured interview guide to ensure cultural equivalence, and they also provided input on future interventions. They also helped to interpret and disseminate study results to the local community. The authors concluding that the CBPR approach provided important contextual information and formative data for refining and developing community-engaged strategies and interventions to promote physical activity in South Asian women living in USA.

Derose et al. (2014) described how they involved community stakeholders to explore whether public parks can influence population-level physical activity. This study targeted community park users and residents of the surrounding areas in Los Angeles, USA. The researchers worked with community partners, park directors and park advisory boards of interested community members to develop surveys, plan data collection, deliver the intervention and interpret results. Community members were employed as data collectors. Each park developed their own plans for how to increase park use and physical activity and how they would spend the $4000 outreach and marketing funds. The authors believed that working with established community structures that are consistent across diverse communities enabled them to carry out a randomised controlled trial across 50 diverse parks.

Sharpe et al. (2010) described how a CAB was established to guide the development of a physical activity intervention for middle aged women in the south-eastern USA. The CAB members helped to identify the target subgroup for the intervention. Researchers and the CAB members reviewed focus group results using social marketing principles to organise and discuss the findings, developed the intervention materials and recruited participants. The marketing agency designed three potential logos and concepts based on the consumer research. After CAB input, the designs were modified and pretested regarding the logos' appeal and message to target audiences. The marketing and intervention were then tested in a non-randomised trial. The authors believed that the approach enabled the development of an intervention that addressed women's preferences and perceptions.

Zoellner et al. (2011; 2012) described the reach, adoption, implementation and effectiveness of a walking intervention to reduce blood pressure among African Americans in the USA. A research team collaborated with the steering group associated with a community-wide wellness initiative to design the intervention and apply for funding. Once funding was awarded, other partners were invited to a CAB including delivery agents and individuals who were members of community networking/advocacy services and health services. The CAB helped develop and execute the culturally-appropriate intervention components which included social support walking groups led by peer coaches, pedometer diary self-monitoring, monthly diet and physical activity education sessions, and individualised motivational interviewing sessions. For the purpose of intervention adaptation and tailoring, community gatekeepers were invited to attend one of three community conversation workshops. The community conversations elicited input on a variety of aspects of intervention planning, including recruitment of walking coaches and participants, retention of participants, intervention design, scheduling and format of education sessions, and data collection procedures. In the 2012 study, the CAB provided feedback on the cultural sensitivity of a survey instrument and nominated community members to serve as data collectors. The authors believed that utilising CBPR enabled community voices to be represented and using community coaches to recruit participants resulted in an adequate sample size.

3.6.4 *Community sport development approach*

Rosso et al. (2017) described a community development approach to increase opportunities of inclusion in sport and physical activity in disadvantaged population groups in rural South Australia (including people with mental impairments, low socioeconomic status communities, indigenous people, newly arrived immigrants and refugee groups). The article reports the development of co-designed community projects run in collaboration between a tertiary education provider and sport, education, community, government and charity organisations. The authors strongly advocated the capacity-building and partnership strategies as the core ingredient of success.

Vail (2007) reported an action research study that used a community development approach to build tennis communities in 18 local communities in Canada. The approach involved identifying a community champion, developing collaborative partnerships, and delivering quality sport programming. Communities were able to identify a community champion and deliver quality programmes that aimed to increase and sustain tennis participation. The author described how the community champions could develop partnerships that had not previously existed (e.g., with tennis clubs with parks/recreation services).

3.6.5 *Community partnership approach*
Four studies described the CBPR as a community partnership approaches [7, 13, 26, 33]. *Baker et al. (2013)* used a community-based participatory research approach to identify issues to consider when adapting evidence-based physical activity interventions with and within racial/ethnic minority communities in the USA. A national community-academic partnership worked with local community members who were engaged in prevention research (from white and racial/ethnic minority communities) to create a set of "issues to consider" when adapting physical activity interventions with and within racial/ethnic minority communities. Brainstorm sessions produced qualitative data and concept mapping resulted in 10 issues to consider when adapting physical activity interventions. The authors believed that by including community members from the beginning, interventions can be framed, developed, implemented and evaluated in ways that address issues of culture and tailor the intervention to the community, thereby maximising the potential for community benefit.

Healey et al. (2013) described the development on a community health partnership which aimed to improve the health of African American Austin residents in the USA. The partnership was between a local health authority and research department. Physical therapy students within the research department were engaged in CBPR, which aimed to expand their learning and development as future health professionals. Project one involved focus groups to explore community members' attitudes towards physical activity. Project two involved a peer-based approach to increasing physical activity by developing and evaluating the effectiveness of a physical activity promoter training curriculum. Project three involved measuring the effectiveness of the physical activity promoters. The authors believed that increased time together, open discussion of partner perspectives, and agreement on shared goals all promoted the trusting and sustainable partnership.

Murrock et al. (2010) described the development of a dance intervention developed through community partnership approach to reduce obesity in African American women in a large, urban Midwestern city, USA. A community partnership was formed with African American Baptist churches. Church ministers identified a respected female member of the church to act as a liaison

between the church congregation and the research team. Women met with dance instructor to select gospel songs for the intervention. The authors' described how community partnerships enabled everyone involved to work together to develop interventions to address the important health concerns that are consistent with the beliefs and values of that specific community.

Para-Medina et al. (2011) explored participation in physical activity among Mexican-origin women in Texas and South Carolina, USA. The project was designed to develop partnerships between the community, researchers and partner organisations and community participation in intervention planning research. Focus groups identified community assets and resources and explored community members' experiences, opinions, values, preferences, and perceived needs related to physical activity. Community involvement and input provided specific guidance for the development of a leisure time physical activity intervention that was subsequently implemented and evaluated. The authors believed that the CBPR contributed to increased community capacity and support for long-term programme implementation.

3.6.6 *Participatory research team*

Estabrooks et al. (2008) described how a participatory research team was organised to respond to the need to increase the rates of physical activity in rural Kansas, USA. The team was developed as a CBPR group and led by the K-State Research and Extension Health Specialist who held the decision-making authority to make health programmes available for systemic implementation. The team also included a behavioural scientist, a local county extension agent who would deliver the programme, and community members who were the intended audience. The participatory research team also made decisions on the project research questions, design, and interpretation of the project outcomes. The authors suggested that by using CBPR, programmes can be developed that are attractive to community members.

3.6.7 *Other approaches*

Hood et al. (2015) described formative research as part of intervention development aimed at promoting physical activity to African American men who visit barbershops in the USA. The researchers sought involvement from the target community in the intervention planning process via interviews and focus groups which explored knowledge, perceived barriers, and interests or concerns about physical activity, as well as how to best intervene in the barbershop. The researchers made sure the intervention design reflected the priorities and perceptions of the target population. The authors believed they achieved a more thorough understanding of the health-related needs and preferences of African American men.

Burroughs et al. (2006) report the development social marketing program to promote walking and other moderate-intensity physical activities among members of the community in Sumter County, USA. Focus groups with community members aimed to understanding the target audience and this identified a more specific target population for the second phase of the research. In the second phase irregularly active women aged 35-54 were the focus for discussion. A social marketing programme promoting walking and other moderate-intensity physical activities was developed in to meet the needs of irregularly active women. The authors believed that the focus groups were key to enrich their understanding of consumers' perceptions of walking and trail-use benefits and costs.

3.7 Challenges and facilitating factors in conducting CBPR for community-based physical activity promotion

This section provides an outline of the challenges and lessons learned from the conduct of CBPR in the planning and implementation of community-based physical activity programmes.

3.7.1 *Time needed to undertake good quality CBPR studies*

Several authors commented on the significant time it took to undertake CBPR approaches. This included allowing sufficient time to develop relationships and involve stakeholders in a meaningful way. Specific activities were identified as being particularly time-consuming, for example participatory decision making processes requiring that multiple stakeholders vote [29, 32] and the time needed to liaise with statutory departments for approvals and permits to carry out community improvements [24]. Derose and colleagues (2014) suggested that the need for concentrated time and investment to ensure quality CBPR work could limit the scope of CBPR projects to small geographical areas. Other authors saw a narrow geographical focus as a strength of CBPR, providing more genuine opportunities for citizens to participate, enabling more capacity building and thus more sustainable change [22].

Strategies to overcome these challenges included building extra time into the planning of projects. Brach and colleagues (2016) noted the importance of involving community participants early and interacting with them frequently. They preferred face-to-face communication as a way to develop good rapport and demonstrate genuine interest in the community. Adequate funding to support partners was identified by Healey and colleagues (2013) as key to enabling structured, regular time to be invested by all parties. In the community development project described by Vail (2007), increased time spent developing relationships was perceived to be associated with better understanding of project aims and shared belief in the value of community partnerships, resulting in a focus on broader community development issues with wider benefits.

3.7.2 *Partnership issues - identifying and engaging the right partners*

CBPR projects faced several challenges related to the formation and management of partnerships across and within the community. One such challenge existed around identifying and choosing who to involve in the project. Not engaging with a broad enough range of community partners limited access to crucial community knowledge and resources [35] and prevented multilevel partnerships being established [25]. In one case, church ministers were identified as key community champions but lacked the capacity to participate fully in the project. An effective solution was to ask those minsters to nominate trusted ambassadors from their congregation to represent the church instead [17].

Brownson and colleagues (2004) responded to this challenge by alternating between different community events including small group meetings, focus groups and town hall meetings, which allowed them to locate a variety of skills and needs across the community. Matsuoka et al. (2005) also held community events, but additionally credited their well-developed volunteer program for its ability to engage stakeholders. Projects facilitated collaboration across sectors by aiming for representation from all key partners [25]. Local businesses [24] and existing groups that were established as active and vocal members of the community were identified as particularly useful allies [17].

3.7.3 *Maintaining involvement over time*

Once partnerships were established there were challenges associated with maintaining these and ensuring continuity in relationships. Turnover of staff and volunteers adversely affected the ability to build mutual trust or collaborative relationships [13, 14, 32]; this was a particular challenge in studies utilising local students undertaking time-limited courses and placements. Participants representing vulnerable groups in the community had characteristically unpredictable or disruptive lives, and could not always attend regular partnership meetings [12].

In the studies reported by Frisby and colleagues, these challenges were met by providing facilities such as child-minding, free meeting space, honoraria, bus tickets and refreshments [3]. Offering a choice regarding the degree of participation depending on interests and availability was intended to maximise accessibility and prevent any vulnerable participants being excluded. In addition, Baker and colleagues (2013) and Vail (2007) suggested, where possible, identifying engaged and committed members of the community who could provide some consistency in the structure of the CBPR.

3.7.4 *Managing or reconciling vested interests of community members*

Several studies encountered conflicts or tensions between the vested interests of community members and the aims of the project. In some cases, this took the form of a bias towards the interests of their own organisation or subgroup [30, 35]. For others, the aim of the project was perceived as being at odds with their wishes; in the study by Derose and colleagues (2014) aiming to increase use of the park, some members expressed concern that this could negatively impact on park experience and management.

Whilst negotiating multiple and conflicting agendas was recognised as a typical challenge within CBPR work [12] few strategies were identified on how to specifically address this. Vail (2007) suggested that ongoing efforts were needed by the researcher to educate participants about the importance of partnership building. This encouraged community members to recognise and accept shared goals that benefited the wider community and not just their own interests [35].

3.7.5 *Gaining the trust of community members*

In several of the studies reported, projects and/or research teams were greeted with scepticism or resistance from the community. In some cases, previous experiences of academic research or local county-run projects had been negative, leading to perceptions that they were potentially exploitative of the community [11] or at least unlikely to result in benefits that would be felt by the community [10, 17]. Community members expressed concerns about power brokers (e.g., local authorities) who would resist change in the interests of maintaining the status quo [11].

Confidence and trust in the project was facilitated in cases where existing, trusted partners or champions in the community were involved in recruiting and engaging community members [3, 12, 35]. This enhanced information sharing, as individuals could communicate information in culturally sensitive ways, use suitable language and the information presented by them was perceived as credible [26]. Frequent and reliable communication was highlighted as a necessity along with clearly delineated and jointly agreed roles and responsibilities, or memorandums of understanding between academics and local authorities and community partners [13, 32]. Trust increased when community members could see that their voices were being heard and their ideas being acted upon [11] or when the project was seen as responsive to, or operated directly by the community [17, 23].

3.7.6 *Addressing power imbalances between researchers and community participants*

Fundamental power differences existed in some cases that were challenging to reconcile. For example, low literacy skills of community participants limited their ability to engage with some academic activities including reviewing manuscripts, producing outputs or writing grant applications

[3]. In the same study, funding for the project was held centrally by the University, inadvertently placing the researcher in a position of privilege. Some researchers concluded that in CBPR studies, it was unavoidable that researchers would have to lead some activities, thus potentially restricting the 'empowerment potential' of the project [3, 23].

In other cases, authors described successful strategies to develop the community members' skills and ownership of the project. This included the establishment of community committees and coalitions, preferably early in the project, where members were given specific duties and tasks to encourage ownership [8]. Several studies described a shift in power dynamics over time. Community members moved from regarding the researchers as the decision makers and leaders, to developing confidence and stronger voices, taking on greater responsibilities such as chairing meetings and organising activities [10, 11]. Encouraging the sharing or rotation of leadership responsibilities was a conscious effort on the part of researcher, requiring them to resist temptation to lead activities and persevere with asking community members to step up until over time confidence developed [12]. A major strength of projects initiated by the community themselves was that they assumed a sense of ownership from the outset [11]. Focus groups were also identified as educational, providing community members with an opportunity to learn or ask questions [11, 36]. These capacity building activities provided members with the skills to interact with local government and advocate on behalf of the community, using the coalition as a backing [17, 32].

3.7.7 *Managing expectations regarding study outcomes*

In five studies, community members generated research questions, ideas or solutions that were deemed outside the scope of the project to investigate, resolve or implement [3, 26]. In one case, the authors noted that although the study produced policy change priorities, it did not identify a strategy for how these changes could be achieved [16]. Frisby and colleagues suggest that CBPR processes seldom result in significant or immediate outcomes, and recommend focusing on more modest or longer-term effects at both individual and community levels [11].

3.7.8 *Methodological issues*

A number of the studies reviewed highlighted possible limitations related to sampling, questioning whether the people involved in the CBPR approach were representative of the wider community [7, 18, 25, 27, 28]. Primary authors reflected on possible selection bias amongst community participants, especially in those studies using convenience sampling, towards those with a specific or prior interest in the study topic (e.g., physical activity) [16, 25]. Nevertheless, few of the papers included in this review described characteristics of CBPR participants, making it difficult to draw conclusions about how representative they were of the target community. Small sample sizes were

also identified as a possible limitation [21]. Some authors questioned whether their sample was sensitive enough to ensure that the priorities of different population subgroups were identified [16] or that more outspoken participants did not dominate the agenda [19]. Careful consideration and negotiation is also needed regarding how the results of participatory research are communicated, to avoid voice appropriation.

Collating different sources of data was highlighted as one way to check whether priorities and ideas generated by the CBPR activities reflected community opinion. For example, in the study by Whaley and colleagues (2008), coalition members' perceptions of community barriers to physical activity were sometimes accurate, but some differed from the 'average' community member. This was only identified by comparing responses from a wider community survey to the coalition-generated ideas.

Several authors queried whether their findings could be generalised beyond the immediate project setting [11, 19, 22]. The principles behind CBPR approaches emphasise that the project should reflect and work within the specific local context. This will naturally differ across communities and raises an important question about whether seeking to generalise findings to another community is at odds with the spirit of CBPR. This tension can be seen in issues regarding data collection. Derose and colleagues (2014) noted that using standardised measures limited their ability to tailor survey questions to individual sub-communities. In contrast, Zoellner and colleagues (2011) relaxed the inclusion and exclusion criteria for their walking intervention to ensure it was broadly accessible to the larger community, but highlighted that this resulted in wide variation and large standard deviations, necessitating a bigger sample size to adequately power the study to determine effect.

CBPR also poses challenges for researchers because it does not necessarily fit with academic convention. Frisby and colleagues (2005) noted that reward systems for researchers (e.g., frequency of publications) are incongruent with the time taken to undertake CBPR approaches. Ethical review boards are not always equipped to consider participatory projects, and the need to share information with community-based participants can pose significant challenges in terms of confidentiality and data protection [3].

Few primary authors recommended any direct strategies in response to these methodological challenges in their manuscripts. The only suggestion was to work with the community, involving them with both planning and implementation [7] and reflecting wherever possible on the principles of CBPR.

3.7.9 *Impact and Sustainability*

An ambition of CBPR approaches is to develop relationships, ideas or interventions that can be sustained or continue to benefit the community beyond the involvement of external researchers or the length of the initial project funding. Six studies identified enablers to sustainability. Finances were significant; two studies highlighted the need for adequate funding to invest in community members and equipment [13, 22]. Others focused instead on working with established structures in the community, building on and connecting people with assets and resources that already existed and were therefore more likely to be sustainable after the project [26, 31]. Engaging community partners who could provide in-kind services was a way to connect the community but also reduced the need for further funding [17]. Some authors also described using the study results to demonstrate need for support or investment in the future [31], as the CBPR approach provided what they considered "compelling" practice-based evidence [9].

3.7.10 *Information gaps*

The majority of the included studies did not contain any outcome or impact data specific to the CBPR component of the intervention, but instead presented results demonstrating the impact or effectiveness of the physical activity intervention itself. Consequently, little or no data were provided on the impact or success of the CBPR approach. However, it was not the aim of this review to explore the impact of CBPR approaches.

4 Discussion

The findings from this review show that CBPR approaches have been used in a range of different communities and contexts in developed countries. CBPR approaches aid the development of community-based physical activity programmes and deepen understanding of the experience of physical activity for particular communities including barriers to and facilitators of participation. This review has not aimed to provide evidence for the impact of CBPR when used to plan and deliver community-based physical activity programmes. Disparity regarding study aims, methods, settings and participants, and in many cases a lack of sufficient information reported in the manuscripts, makes it difficult to draw reliable conclusions about which specific CBPR approaches are most beneficial for promoting community-based physical activity. Rather the aim has been to describe the literature that has used CBPR approaches in community-based physical activity research and to present the key principles, benefits and lessons learned.

Amongst the studies reported, CBPR approaches had two key benefits. They allowed researchers to develop a more nuanced understanding of the needs and perspectives of the community, which

many believed led to the development (or potential for future development) of physical activity interventions that better reflected the target community. They also enabled the community to take more ownership and control in physical activity promotion, and served as a vehicle for capacity building of individuals and partners.

CBPR appears to work well when responsibility for leading and delivering components of the research is embedded within the community, by trusted individuals, organisations and partners. Researchers need to identify and work with people and organisations who can leverage wider engagement and buy-in from the community. Committees and coalitions are a useful way to encourage consensus decision-making, but careful consideration needs to be given to membership, to ensure this reflects the whole community. Where possible, multiple opportunities should be provided to allow community members to get involved or have their voices heard. A common benefit or outcome of CBPR approaches was in the development or fostering of relationships across the community. CBPR projects enabled collaboration and sharing of information and resources that might allow the community to work together for common good in future. However, time and skill was needed to facilitate and broker the development of these partnerships, and to manage potentially conflicting interests or entrenched power structures.

Guidelines for applying CBPR are intentionally broad [4, 5]. This reflects the local specificity of the approach and the need to tailor the approach and methods to each individual setting and community. However, this also makes it challenging to report CBPR studies and to draw conclusions or comparisons about their delivery and quality. It also limits the extent to which mechanisms for the effectiveness of CBPT can be identified, relying instead on the reflections of study authors.

In terms of impact, CBPR approaches offer the potential and are often intended to develop interventions that can be successfully sustained, owned and managed by the community. This is an attractive prospect given the challenges associated with promoting and maintaining physical activity within communities. Key facilitators to this include the identification and utilisation of community assets, including people, relationships, organisations and equipment. Building on these assets, and taking the time to develop them can enable more commitment, structure and sustainability and may help to empower community participants who may not have previously taken ownership. Researchers can therefore see themselves as educators and facilitators, brokering relationships and initiating collaborations, but should aim to share responsibility for leadership, decision making and organisational activities, stepping back and allowing the community to take the lead wherever and as early as possible.

4.1 Evaluation

The findings of this review should be considered in light of the following methodological issues. The broad range of included studies and lack of detail in the original manuscripts has limited the ability to draw conclusions about whether the choice of CBPR approach or methodology used makes a difference to the quality of a physical activity intervention or its outcomes. We are also limited in our understanding about whether it is preferable under CBPR principles to let the community decide upon the target population and behaviour for intervention. Interventions involving nutrition or other health behaviour component were excluded and so it is possible that we have not included literature that contains relevant information about CBPR approaches in community-based physical activity promotion. The search was limited to studies written in English and published after 1990, therefore this review may not have synthesised all the available literature using CBPR approaches for community based physical activity. Due to the time frame available to conduct this review, we were not able to source the full texts of all potentially eligible articles and thus may not have synthesised all the available data. The majority of included studies were based in the USA and only two studies were conducted in the UK. Cultural differences may limit the applicability of the findings to UK settings were cultures, policies and physical activity services may vary.

5 Conclusions

This review has described a systematic search and synthesis of the literature of CBPR approaches in the promotion of community-based physical activity. The review findings demonstrate that CBPR approaches have been used in a range of different communities and contexts in developed countries. CBPR approaches aid the development of community-based physical activity programmes and deepen understanding of the experience of physical activity for particular communities. The review has developed understanding of the barriers and enablers to using community engagement and development approaches for physical activity interventions and what approaches have successfully overcome these barriers.

6 References

1.   Sport England: Active Lives Survey 2016-2017. In.; 2017.
2.   Salimi Y, Shahandeh K, Malekafzali H, Loori N, Kheiltash A, Jamshidi E, Frouzan AS, Majdzadeh R: Is community-based participatory research (CBPR) useful? A systematic review on papers in a decade. International journal of preventive medicine. 2012; 3(6):386.
3.   Frisby W, Reid CJ, Millar S, Hoeber L: Putting "participatory" into participatory forms of action research. Journal of sport management. 2005; 19(4):367-386.
4.   Israel BA, Schulz AJ, Parker EA, Becker AB: Review of community-based research: assessing partnership approaches to improve public health. Annual review of public health. 1998; 19(1):173-202.
5.   Green LW, George MA, Daniel M, Frankish CJ, Herbert CJ, Bowie WR, O'Neill M: Study of participatory research in health promotion. Review and recommendations for development of participatory research in health promotion in Canada Ottowa, Ontario: The Royal Society of Canada. 1995.
6.   Coughlin SS, Smith SA: A review of community-based participatory research studies to promote physical activity among African Americans. Journal of the Georgia Public Health Association. 2016; 5(3):220.
7.   Baker EA, Motton F, Lewis EY: Issues to Consider When Adapting Evidence-Based Physical Activity Interventions with and within Racial/ethnic Minority Communities. International Public Health Journal. 2012; 4(3):285.
8.   Davies J, Lester C, O'Neill M, Williams G: Sustainable participation in regular exercise amongst older people: Developing an action research approach. Health Education Journal. 2008; 67(1):45-55.
9.   Estabrooks PA, Bradshaw M, Dzewaltowski DA, Smith-Ray RL: Determining the impact of Walk Kansas: applying a team-building approach to community physical activity promotion. Annals of Behavioral medicine. 2008; 36(1):1-12.
10.   Frahsa A, Rütten A, Roeger U, Abu-Omar K, Schow D: Enabling the powerful? Participatory action research with local policymakers and professionals for physical activity promotion with women in difficult life situations. Health promotion international. 2012; 29(1):171-184.
11.   Frisby W, Crawford S, Dorer T: Reflections on participatory action research: The case of low-income women accessing local physical activity services. Journal of Sport Management. 1997; 11(1):8-28.
12.   Frisby W, Millar S: The actualities of doing community development to promote the inclusion of low income populations in local sport and recreation. European sport management quarterly. 2002; 2(3):209-233.
13.   Healey WE, Reed M, Huber G: Creating a Community–Physical Therapy Partnership to Increase Physical Activity in Urban African-American Adults. Progress in Community Health Partnerships. 2013; 7(3):255.
14.   Rosso EGF, McGrath R: Community engagement and sport? Building capacity to increase opportunities for community-based sport and physical activity. Annals of Leisure Research. 2017; 20(3):349-367.
15.   Sharpe PA, Burroughs EL, Granner ML, Wilcox S, Hutto BE, Bryant CA, Peck L, Pekuri L: Impact of a Community-Based Prevention Marketing Intervention to Promote Physical Activity Among Middle-Aged Women. Health Education & Behavior. 2010; 37(3):403-423.
16.   Taylor WC, Sallis JF, Lees E, Hepworth JT, Feliz K, Volding DC, Cassels A, Tobin JN: Changing social and built environments to promote physical activity: recommendations from low income, urban women. Journal of physical activity & health. 2007; 4(1):54.
17.   Williams LC, Olano VR: Mobilizing and Maintaining a Coalition to Promote Physical Activity among African Americans in Southeast Stockton, California. Journal of Health Education. 1999; 30(2,suppl.):31-36.

18.   Burroughs E, Peck L, Sharpe P, Granner M, Bryant C, Fields R: Using focus groups in the consumer research phase of a social marketing program to promote moderate-intensity physical activity and walking trail use in Sumter County, South Carolina. Preventing chronic disease. 2006; 3(1):A08.

19.   Dave SS, Craft LL, Mehta P, Naval S, Kumar S, Kandula NR: Life stage influences on US South Asian women's physical activity. American Journal of Health Promotion. 2015; 29(3):e100-e108.

20.   Frisby W: Promising physical activity inclusion practices for Chinese immigrant women in Vancouver, Canada. Quest. 2011; 63(1):135-147.

21.   Hood S, Linnan L, Jolly D, Muqueeth S, Hall MB, Dixon C, Robinson S: Using the PRECEDE planning approach to develop a physical activity intervention for African American men who visit barbershops: Results from the FITShop study. American journal of men's health. 2015; 9(4):262-273.

22.   Mahmood A, Chaudhury H, Michael YL, Campo M, Hay K, Sarte A: A photovoice documentation of the role of neighborhood physical and social environments in older adults' physical activity in two metropolitan areas in North America. Social science & medicine. 2012; 74(8):1180-1192.

23.   Partington J, Totten M: Community sports projects and effective community empowerment: a case study in Rochdale. Managing Leisure. 2012; 17(1):29-46.

24.   Matsuoka CT, Nett B, Stromberg H, Maddock JE: Improving Access to Physical Activity: Revitalizing the Old Kona Airport Walking/Jogging Path. 2005.

25.   Stewart AL, Grossman M, Bera N, Gillis DE, Sperber N, Castrillo M, Pruitt L, McClellan B, Milk M, Clayton K *et al*: Multilevel perspectives on diffusing a physical activity promotion program to reach diverse older adults. Journal of aging and physical activity. 2006; 14(3):270.

26.   Parra-Medina D, Messias DKH: Promotion of physical activity among Mexican-origin women in Texas and South Carolina: an examination of social, cultural, economic, and environmental factors. Quest. 2011; 63(1):100-117.

27.   Sharpe PA, Burroughs E, Hooker S, Pekuri L, Blumberg C, Hutto B: Promoting a Bicycle-Friendly Environment: Community Assessment and Action. Progress in community health partnerships. 2011; 5(2):151-159.

28.   Zoellner J, Hill J, Zynda K, Sample A, Yadrick K: Environmental perceptions and objective walking trail audits inform a community-based participatory research walking intervention. International Journal of Behavioral Nutrition and Physical Activity. 2012; 9(1):6.

29.   Brach JS, Perera S, Gilmore S, VanSwearingen JM, Brodine D, Wert D, Nadkarni NK, Ricci E: Stakeholder involvement in the design of a patient-centered comparative effectiveness trial of the "On the Move" group exercise program in community-dwelling older adults. Contemporary clinical trials. 2016; 50:135-142.

30.   Cohen DA, Han B, Derose KP, Williamson S, Marsh T, McKenzie TL: Physical activity in parks: a randomized controlled trial using community engagement. American Journal of Preventive Medicine. 2013; 45(5):590-597.

31.   Derose KP, Marsh T, Mariscal M, Pina-Cortez S, Cohen DA: Involving community stakeholders to increase park use and physical activity. Preventive medicine. 2014; 64:14-19.

32.   Brownson RC, Baker EA, Boyd RL, Caito NM, Duggan K, Housemann RA, Kreuter MW, Mitchell T, Motton F, Pulley C: A community-based approach to promoting walking in rural areas. American journal of preventive medicine. 2004; 27(1):28-34.

33.   Murrock CJ, Gary FA: Culturally specific dance to reduce obesity in African American women. Health Promotion Practice. 2010; 11(4):465-473.

34.   Zoellner J, Connell C, Madson MB, Wang B, Reed V, Molaison E, Yadrick K: HUB city steps: methods and early findings from a community-based participatory research trial to reduce blood pressure among african americans. International Journal Of Behavioral Nutrition And Physical Activity. 2011; 8(1).

35. Vail S: Community Development and Sport Participation. Journal of Sport Management. 2007; 21(4):6.

36. Whaley D, Haley P: Creating Community, Assessing Need: Preparing for a Community Physical Activity Intervention. Research Quarterly for Exercise and Sport. 2008; 79(2):245-255.

7 Appendix 1

Search terms

"community based participat*" OR "community-based participat*" OR "community based participatory research" OR "community-based participatory research" OR "participatory research" OR "community based participatory action research"

OR "participatory research" OR "participatory action research" OR "action research" OR "community led action research" OR "community-led action research"

OR "community engagement" OR "community engage* OR "community involve*" OR "community collaboration" OR "community collaborat*" OR "community partnership*" OR "community centred approach*" OR "community-centred" OR "community centred" OR "community development"

OR "civic engagement" OR "civic involve*" OR "public engagement" OR "public involve*" OR "stakeholder engagement" OR "stakeholder involve*"

OR coalition OR "community coalition"

OR "collaborative partnership" OR "collaborative action"

OR "co-design" or codesign OR co-produc* OR coproduc*OR co-deliver* OR codeliver* OR "experienced based co-design" OR "experienced based codesign"

OR "user centred design" OR "user-centred design" OR "human-centred design" or "human centred design"

OR "appreciative inquiry" OR "appreciative enquiry"

OR "action based" OR "action-based" OR "place based" OR "place-based"

OR "assets-based" OR "assets based" OR "asset-based" OR "asset based" OR "area-based initiativ*" OR "community asset*" OR "assets based community development"

OR "social network approach*"

AND

"physical activit*" OR "physical exercis*" OR "physical fitness" OR exercis* OR sport OR fitness OR "active lifestyle"

OR biking OR bicycl* OR cycl*OR walk* OR swim* OR jog* OR runn* OR yoga OR aerobics OR circuits OR "gym class" OR danc*

OR "active transport*" OR "active travel" OR "active commut*"

Searches limited to:

- Adults
- Human
- English language
- Developed countries
- Post- 1990