



Effective Public Health Practice Project



Effectiveness of Interventions to Increase Physical Activity among Marginalized Populations

March 2007

**Funded by the
Ontario Ministry of Health Promotion
and
Hamilton Public Health Services PHRED Program**

Hamilton Public Health Services

Kingston, Frontenac and Lennox
& Addington Health Unit

Middlesex-London Health Unit

Sudbury & District Health Unit

Ottawa Public Health

Ontario Ministry of Health Promotion



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EPHPP Reviews and Summary Statements

To determine the effectiveness of interventions included in the Mandatory Health Programs and Services Guidelines (MHPSG), the following systematic reviews were completed and funded by the Public Health Research, Education and Development (PHRED) Program of the Public Health Branch, Ontario Ministry of Health and Public Health Services in the City Of Hamilton, Ontario, Canada

GENERAL STANDARDS

Equal Access

Health Hazard Investigation

- New roads and human health: A systematic review 2005
- Effectiveness of public health in organized response to non-natural environmental disasters * 1999
- Effectiveness of environmental awareness interventions * 1999

Program Planning and Evaluation

- Psychosocial and psychological interventions for preventing postpartum depression 2005
- Effectiveness of physical activity programs at worksites with respect to work-related outcomes 2005
- Meta-analysis of psychosocial interventions for caregivers of people with dementia 2005
- Health related virtual communities and electronic support groups: Systematic review of the effects of online peer-to-peer interactions 2005
- Web sites for promoting health 2003
- The effectiveness of patient diabetes education in the management of type 2 diabetes 2002
- The effectiveness of on-line health information for consumers 2002
- Mass media interventions: Effects on health services use 2001
- A meta-analysis of fear appeals: Implications for effective public health campaigns 2001
- Electronic social support groups to improve health * 2000
- Effectiveness of video for health education 2000

CHRONIC DISEASE AND INJURIES

• Effectiveness of environmental awareness interventions *	1999
Chronic Disease Prevention	
• Competitions and incentives for smoking cessation	2006
• Enhancing partner support to improve smoking cessation	2006
• Group behaviour therapy programmes for smoking cessation	2006
• Individual behavioural counselling for smoking cessation	2006
• A review of interventions to reduce tobacco use in colleges and universities	2006
• Physician advice for smoking cessation	2006
• Workplace interventions for smoking cessation	2006
• Exercise for health for early postmenopausal women: A systematic review of randomized controlled trials	2006
• Home versus center based physical activity programs in older adults	2006
• Interventions for promoting physical activity	2006
• The effectiveness of school-based interventions in reducing adolescent risk behaviours: A systematic review of reviews*	2005
• The effectiveness of interventions to prevent excessive weight gain in pregnancy*	2005
• Dietary advice given by a dietitian versus other health professionals or self-help resources to reduce blood cholesterol	2005
• A review of 25 long-term adolescent tobacco and other drug use prevention program evaluations	2005
• Counseling to promote a healthy diet in adults: A summary of evidence for the US Preventive Services Task Force	2005
• Reviews of evidence on interventions to prevent dental caries, oral and pharyngeal cancers, and sports-related craniofacial injuries	2005
• Systematic review of long-term effects of advice to reduce dietary salt in adults	2005
• Effectiveness of physical activity enhancement and obesity prevention programs in children and youth (Healthy Weights Review (HWR))*; comprised of the following five reviews:	2004
• Environmental interventions to improve nutrition and increase physical in children and youth	
• Interventions to improve nutritional intake in children and youth	
• Interventions to increase physical activity and nutritional intake in children and youth	
• Interventions to increase physical activity in children and youth	
• Interventions to reduce physical inactivity in children and youth	
• Effectiveness of worksite physical activity programs on physical activity, physical fitness and health	2004
• Exercise to improve self-esteem in children and young people	2004
• Mass media interventions for preventing smoking in young people	2004
• Exercise as an aid in smoking cessation	2004
• Young people and healthy eating: A systematic review on barriers and facilitators	2003
• The effectiveness of routinely taught breast self-examination in reducing mortality	2003
• The effectiveness of patient diabetes education in the management of type 2 diabetes	
• The effectiveness of school-based strategies for the primary prevention of obesity and for promoting physical activity and/or nutrition, the major modifiable risk factors for type 2 Diabetes*	2002
• Effectiveness of primary prevention of eating disorders *	2001
• Using school-based programs to improve heart healthy eating behaviours of children	2001
• Effectiveness of interventions to promote healthy eating in pre-school children aged 1 to 5 years	2001
• Effectiveness of smoking cessation interventions	2001
• Limited (information only) patient education programs for adults with asthma	2001
• The effectiveness of health promotion interventions in the workplace	2001
• The effect of exercise training on bone mass among pre- and postmenopausal women	2001
• The effectiveness of the health promoting schools approach and school-based health promotion interventions	2001
• Effectiveness of home based support for older people	2001
• The effectiveness of school-based interventions in promoting physical activity and fitness among children and youth: A systematic review *	2001
• Effectiveness of dust mite control to reduce asthma symptoms	2000
• The effectiveness of interventions for preventing tobacco smoke in public places	2000

- Effectiveness of a telephone intervention as a delivery strategy within the scope of public health nursing practice 2000
 - The effectiveness of postpartum smoking relapse prevention strategies: A systematic review of the evidence 1992-1999* 2000
 - The effectiveness of community interventions to increase fruit and vegetable consumption in people four years of age and older * 1999
 - Effectiveness of coalitions in heart health promotion, tobacco use reduction, and injury prevention: a systematic review of the literature 1990-1998 * 1999
 - Smoking cessation during pregnancy 1999
 - The effectiveness of community-based heart health programs: a systematic overview update * 1999
 - The effectiveness of workplace-based health risk appraisal in improving knowledge, attitudes or behaviours 1999
- Early Detection of Cancer**
- The effectiveness of interventions to promote mammography among women with historically lower rates of screening 2005
 - Effectiveness of strategies to increase cervical cancer screening in clinic-based settings: A systematic review of the literature 1989-1999 * 2000
 - Community-based strategies to promote cervical cancer screening * 2000
- Injury Prevention Including Substance Abuse Prevention**
- Home visits during pregnancy and after birth for women with an alcohol or drug problem 2006
 - Non-legislative interventions for the promotion of cycle helmet wearing by children 2006
 - Interventions for promoting booster seat use in four to eight year olds traveling in motor vehicles 2006
 - Population-based interventions for the prevention of fall-related injuries in older people 2006
 - School-based driver education for the prevention of traffic crashes 2005
 - A systematic review of the effectiveness of the community reinforcement approach in alcohol, cocaine and opioid addiction 2005
 - A review of 25 long-term adolescent tobacco and other drug use prevention program evaluations 2005
 - Post-license driver education for the prevention of road traffic crashes 2004
 - A meta-analysis of fall prevention programs for the elderly: How effective are they? 2004
 - Interventions to prevent the recurrence of elder abuse 2003
 - The effectiveness of preventative home visits to elderly people living in the community 2003
 - Interventions for increasing pedestrian and cyclist visibility 2003
 - Child pedestrian safety 2003
 - The effectiveness of physical exercise for sleep problems in adults aged 60+ 2002
 - Effectiveness of a telephone intervention as a delivery strategy within the scope of public health nursing practice 2000
 - Effectiveness of video for health education 2000
 - Effectiveness of anticipatory care interventions with community-dwelling elderly persons 2000
 - Effectiveness of coalitions in heart health promotion, tobacco use reduction, and injury prevention: a systematic review of the literature 1990-1998 * 1999
 - Prevention of unintentional injuries in childhood and young adolescence 1999
 - Effectiveness of school-based programs in reducing adolescent risk behaviour: a systematic review of reviews * 1999
 - The effectiveness of school-based curriculum suicide prevention programs for adolescents * 1999

FAMILY HEALTH

Sexual Health

- Women, sex and HIV 2004
- The effectiveness of public health interventions to reduce or prevent spousal abuse toward women * 2001
- The effectiveness of the health promoting schools approach and school-based health promotion interventions 2001
- Peer health promotion interventions for youth 2000
- Effectiveness of school-based programs in reducing adolescent risk behaviour: a systematic review of reviews * 1999
- A systematic review of the effectiveness of adolescent pregnancy primary prevention programs* 1999

- A systematic review of the effectiveness of primary prevention programs to prevent sexually transmitted diseases (STDs) in adolescents* 1999
- Reproductive Health**
- Home visits during pregnancy and after birth for women with an alcohol or drug problem 2006
 - The effectiveness of interventions to prevent excessive weight gain in pregnancy* 2005
 - The effectiveness of folate supplementation for the prevention of neural tube defects 2002
 - Antenatal education for childbirth/parenthood 2001
 - The effectiveness of public health strategies to reduce or prevent the incidence of low birth weight in infants born to adolescents: A systematic review * 2001
 - The effectiveness of postpartum smoking relapse prevention strategies: A systematic review of the evidence 1992-1999* 2000
 - Smoking cessation during pregnancy 1999
 - The effectiveness of home visiting as a delivery strategy for public health nursing interventions to clients in prenatal and postnatal period: A systematic review * 1999
- Child Health**
- The effectiveness of early childhood home visitation in preventing violence: a systematic review 2006
 - The effectiveness of school-based interventions in reducing adolescent risk behaviours: A systematic review of reviews* 2005
 - Reviews of evidence on interventions to prevent dental caries, oral and pharyngeal cancers, and sports-related craniofacial injuries 2005
 - Social deprivation and the prevention of unintentional injury in childhood. A systematic review 2005
 - Optimal duration of exclusive breastfeeding 2002
 - Community-based interventions to improve child mental health: review of reviews* 2002
 - The effectiveness of school social work from a risk and resilience perspective 2002
 - The effectiveness of school-based violence prevention programs for children at risk 2002
 - The effectiveness of public health interventions to reduce or prevent spousal abuse toward women * 2001
 - The effectiveness of the health promoting schools approach and school-based health promotion interventions 2001
 - Support for breastfeeding mothers 2001
 - Effectiveness of pre-school screening for hearing, speech, language and vision 2001
 - Antenatal education for childbirth/parenthood 2001
 - Parent-training programmes for improving maternal psychosocial health 2001
 - Effectiveness of a telephone intervention as a delivery strategy within the scope of public health nursing practice 2000
 - Effectiveness of video for health education 2000
 - The effectiveness of postpartum smoking relapse prevention strategies: A systematic review of the evidence 1992-1999* 2000
 - Promotion of healthy feeding in infants under one year of age 2000
 - Smoking cessation during pregnancy 1999
 - Effectiveness of school-based programs in reducing adolescent risk behaviour: a systematic review of reviews * 1999
 - A systematic review of the effectiveness of peer/paraprofessional 1:1 interventions targeted towards mothers (parents) of 0-6 year old children * 1999
 - Effectiveness of parenting groups with professional involvement in improving parent and child health/development outcomes * 1999
 - The effectiveness of home visiting as a delivery strategy for public health nursing interventions to clients in prenatal and postnatal period: A systematic review * 1999
 - The effectiveness of school-based curriculum suicide prevention programs for adolescents * 1999

INFECTIOUS DISEASES

- *Bioterrorism preparedness* 2003
- *The effectiveness of needle exchange programs in modifying HIV-Related outcomes: A systematic review of the evidence 1997-1999** 2000

Control of Infectious Diseases	
• The effectiveness of methoprene for controlling mosquito populations in Ontario that can carry West Nile Virus	2004
Food Safety	
• Effectiveness of food safety interventions *	2001
• Food safety in community-based settings	1999
Infection Control	
• Effective infection control interventions in day care centres	1999
Rabies Control	
Safe Water	
Sexually Transmitted Diseases	
• Review and meta-analysis of HIV prevention intervention research for heterosexual adult populations in the United States	2005
• Effectiveness of video for health education	2000
• A systematic review of the effectiveness of primary prevention programs to prevent sexually transmitted diseases (STDs) in adolescents*	1999
• The effectiveness of needle exchange programs in modifying HIV-Related outcomes: A systematic review of the evidence 1997-1999*	1999
Tuberculosis Control	
• Enhancing adherence to tuberculosis treatment	1999
Vaccine Preventable Diseases	
• Vaccines for preventing influenza in healthy children	2006
• Effect of patient reminder/recall interventions on immunization rates	2001
• The effectiveness of the health promoting schools approach and school-based health promotion interventions	2001

** indicates a review completed by the Effective Public Health Practice Project. Completed reviews and summary statements are added to our web site as they become available. Please check <http://www.hamilton.ca/phcs/ephpp/> regularly for new or updated information.*

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Preface

The Public Health Branch of the Ontario Ministry of Health released new Mandatory Health Programs and Services Guidelines (MHPSG) in December 1997. Although the MHPSG provide guidelines for a wide range of public health practices in Ontario, the strength of evidence for many of the guidelines has not been summarized in a systematic way.

The Effective Public Health Practice Project (EPHPP), under the auspices of the Public Health Research, Education and Development (PHRED) Program develops and provides systematic reviews of the effectiveness of specific requirements of the MHPSG. Each review is linked to one of the three general standards or three program standards. The reviews summarize the best available research evidence for public health practice in these areas. Research evidence is one piece of information needed to inform decision making in public health. Other factors, such as the local environment, local priorities, and available resources are also important.

The reviews are conducted by review groups composed of members of the Ontario PHRED Program Health Units as well as representatives from other Health Units around the province. The PHRED Provincial Operations Committee oversees the project.

Potential review topics are initially identified through a survey of public health practitioners and managers across Ontario. Each review group follows a systematic approach that includes comprehensive search strategies and quality assessment of each primary research study selected for inclusion in the review.

One of the primary objectives of EPHPP is to ensure that the information is relevant to public health practitioners in the field. We contact Medical Officers of Health, Program Managers and others to ask for volunteer experts to take on the role of peer reviewers for the draft reports.

The EPHPP project has many benefits. Public Health professionals develop skills in conducting systematic reviews and increase their awareness of the importance and feasibility of evidence-based practice. Through this project, we established new links with the Cochrane Collaboration. Reviews are in the process of being registered with the various Cochrane Review Groups, making the reviews accessible to the international public health community. Finally, by providing education, support and a collegial atmosphere in which to expand and share public health research, EPHPP has contributed to the development of a strong province-wide network of public health professionals.

Summary Statement



Effective Public Health Practice Project Summary Statement

April, 2007

This is a summary statement written to condense the work of the authors of a systematic review. The reference for the full review is below. The intent of this summary is to provide an overview of the findings and implications of the full review. For more information on individual studies included in the review, please see the review itself.

Reference for Review: Thomas, H., Fitzpatrick-Lewis, D. (2007) The effectiveness of interventions to increase physical activity among marginalized populations. Hamilton, ON: Effective Public Health Practice Project.

Issue: The Mandatory Health Programs and Services Guidelines (1997) have three objectives that relate to increasing physical activity to reduce morbidity and mortality from chronic diseases. There is a vast literature related to improving physical activity among the general population. While it appears that within the general population the goal of increasing adult physical activity to 40% by the year 2010 may be achieved there remain large groups within the population that are not reaching this minimum standard for moderate physical activity (MPA). These include women, adolescents, older adults, those residing in rural locations, people with low incomes, those with a disability, culturally diverse populations including refugees and new immigrants, single parents, and people with low educational attainment.

The effectiveness of interventions for these specific groups in the population has not been examined. This review could identify effective strategies for use with these populations in the future.

Review Content Summary: To be considered relevant studies had to meet all of the following criteria: the intervention described could be implemented, facilitated or promoted by staff in local public health units in Canada, the study population included one or more of the marginalized groups listed above, the reported study outcome(s) included physical activity and the primary study design was prospective and included a control group. Potentially relevant articles (n=1403) were retrieved. Of these, 68 were rated relevant. Methodologically, 7 articles rated strong, 28 rated moderate, and 33 were weak. Data were extracted from all the strong and moderate studies and synthesized in a narrative format. Eighty per cent of the included studies were RCTs. Ten studies reported improving physical activity among the intervention groups. Seven of these involved older adults. Two were school-based among minority children, and the final successful intervention involved African-American women. While many studies had

multiple outcomes, including physical activity, the successful ones usually focused on physical activity alone. Marginalized population is a complex concept. Many participants in studies would be considered marginalized for more than one reason (e.g. age and income).

Comments on this Review's Methodology: Nine relevant electronic databases were searched from 1995-2006 for relevant primary studies. Peer-reviewed journals (n=16) were hand searched from January-August 2006. Reference lists of all retrieved articles were searched for relevant studies. Primary studies were assessed for relevance and methodological quality using standardized tools. Two reviewers rated each article independently. Differences were resolved through discussion. Data were extracted from the methodologically strong and moderate studies using a standardized instrument. A narrative synthesis was presented.

Evidence and Implications for Practice & Policy

Evidence points ARE NOT weighted or ranked according to strength.

What's the evidence?	Implications for practice and policy:
> Five studies with positive outcomes involved prompts from health care practitioners for increasing physical activity among older adults.	> These strategies should be assessed for suitability in the Ontario/Canadian context and if suitable should be implemented. The relatively brief intervention (5-10 minutes) is efficient.
> A Canadian study using the Physical Activity Guide for Older Adults combined with 8 weekly behaviour change classes was successful.	> This intervention could be implemented in communities across the province/country.
> The CHAMPS program was successful with some populations.	> It could be implemented within those populations. It could be evaluated with other marginalized groups.
> Two elementary school-based programs were successful. One focused on girls only, the other on American-Mexican children.	> The program focusing on girls could be assessed for feasibility and then implemented. It is a school-driven intervention that is relatively inexpensive to implement and allows flexibility to meet the context of local schools.
> Two successful programs involved African-American women.	> These need to be assessed for suitability in the Ontario/Canadian context and if suitable could be implemented.

> There were a large number of pilot studies (n=14) found. Due to small sample sizes, they did not have the statistical power to detect between group differences.	> The promising ones need to be replicated using adequate samples. Resources for this research need to be made available.
> Participants who reported engaging in little/no physical activity, had lower educational attainment and socio-economic status before the interventions reported the greatest increase in physical activity at post-test.	> Locating groups reporting little/no physical activity, lower educational attainment and lower socio-economic status and engaging them in any of the successful interventions could maximize long-term benefits.
> A clear successful process for developing culturally sensitive programs is outlined in several of the studies.	> Practitioners need to follow this process to assure that programs are culturally sensitive.
> Accessing marginalized populations is challenging.	> Clinicians and researchers need to work with community residents to maximize access to these populations.
<p>General Implications: There are some successful projects that could be instituted for certain marginalized populations. However, for many others (e.g. recent immigrants to Ontario/Canada) there is virtually no evidence in the published literature. Health Departments need to share work done to date and to evaluate innovative programs. Marginalized populations are very complex and context for programs is crucial to participation and outcomes. Programs may not be generalizable across groups.</p>	

Cost Benefit or Cost-Effectiveness Information: No information available

References Used to Outline Issue

Ontario Ministry of Health and Long-term Care. (1997) Mandatory Health Services and Programs Guidelines. Toronto: Queen's Printer for Ontario

Canadian Fitness and Lifestyle Research Institute. 2003 Physical Activity Monitor.

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The format of this summary statement has been adapted from health-evidence.ca
(www.health-evidence.ca)

Abstract

Objectives

The objective of this systematic literature review was to answer the following question:

What is the effectiveness of interventions to increase physical activity among hard to reach and marginalized populations?

Methods

Nine relevant electronic databases were searched from January 1995- August 2006. In addition, relevant peer-reviewed journals were hand searched for the period January 2006-August 2006. All reference lists from retrieved articles were scanned for additional relevant studies.

Standardized tools were used by two reviewers to independently rate each retrieved article for relevance and methodological quality. Differences were resolved through discussion.

Data were synthesized into a narrative summary.

Results

1403 potentially relevant articles were retrieved. Of these, 68 were rated relevant. Methodologically, 7 articles rated strong, 28 rated moderate, and 33 were weak. Data were extracted from all the strong and moderate studies.

The studies included participants from a variety of backgrounds: four were Aboriginal populations, 12 were African-American, 11 involved older adults, one involved minority adolescents, four engaged participants from different cultural backgrounds and two focused on rural populations. Although many of the study participants were from families with low incomes and/or limited educational attainment, no study focused specifically on these groups.

Ten studies reported statistically significant differences in physical activity in the intervention group compared to the control group. Of these seven involved older adults, two involved minority students, and one involved African-American women. Some of these studies require replication in the Ontario context to assure that they are relevant. Others could be implemented now. Several articles provide a clear outline of excellent methods used to assure that programs are culturally relevant. These procedures should be followed when developing programs for culturally diverse groups.

Conclusions

Studies involving many marginalized groups were not located. It appears that more work needs to be focused on these groups in order to enhance their health. Future studies should address the methodological limitations found in the work to date. Successful programs should be assessed for feasibility in Ontario/Canada and then implemented. Researchers and practitioners need to work together to develop and implement programs for other marginalized populations.

Introduction

Through the Mandatory Health Programs and Services Guidelines (MHPSG) (Ontario Ministry of Health and Long-Term Care, 1997) a goal of public health is to “reduce the premature mortality and morbidity from preventable chronic diseases” (p. 12). To achieve this goal public health has outlined strategies to educate and engage citizens as well as to build public policy and environs that would facilitate smoke free environments, healthy body weights, healthy eating and increased physical activity across sectors in Ontario. As part of the overall strategy of disease reduction MHPSG outlines the following objectives regarding physical activity:

- ✓ To increase to 40 percent the proportion of all adults who include at least 30 minutes of accumulated, moderate physical activity [MPA] on most if not all days of the week by the year 2010;
- ✓ To increase to 60 percent the proportion of youth who include at least 30 minutes of accumulated , moderate physical activity on most if not all days of the week by the year 2010;
- ✓ To increase the proportion of children who are active.

Along with the Chronic Disease Prevention program the Reproductive Health program is mandated to offer programs that address physical activity.

There is a vast literature related to improving physical activity among the general population. However, the effectiveness of interventions for specific groups in the population has not been examined.

We engaged in discussion with clinical specialists as well as examined current literature in making the determination and identification of population groups that fall within the category of ‘marginalized populations’. Historically, determinants of health have been filtered through the biomedical model focusing on individual risk behaviours, genetics and access to medical interventions. There is a general movement among health researchers and providers that suggests that social determinants of health may have an equally significant influence on health outcomes. Social determinants of health include poverty, employment and working conditions, social status, social inclusion/exclusion, education and care in early life, housing and food security. With that in mind our review literature search strategy focused on the physical activity interventions with African-Americans, Aboriginal persons, adolescents, the elderly, those with a disability, culturally diverse populations including refugees and new immigrants, single parents, and people with low income, low educational attainment and those residing in rural areas.

According to the Canadian Community Health Survey¹ (CCHS) 2002/2003, 51% of Canadians (52% of Ontarians) aged 20 and over are not active enough to achieve or maintain health benefits. However, 49% of Canadians (48% of Ontarians) are at least moderately active on a daily basis. Research indicates that most adults begin to receive a health benefit from a daily energy expenditure of 1.5 kilocalories/kilogram of body weight/day or more; roughly equivalent to walking one half hour every day or more (CFLRI, 2003). While it appears that within the general population the goal of increasing adult physical activity to 40% by the year 2010 has been achieved there remain large groups within the population are not reaching this minimum standard for moderate physical activity (MPA). These include women, adolescents, older adults, immigrants, those residing in rural locations and people with low incomes.

Prevalence of physical activity in the Aboriginal population is somewhat contentious. While prevalence data is difficult to locate the literature suggests that the prevalence of inactivity within the Aboriginal population is high (Gauvin, 2003). At the same time Aboriginal people self report higher amounts of leisure time physical activity than do non-aboriginal people. “Aboriginal men and women had the highest prevalence of being physically active at ≥ 3 kkd [moderate to high level of physical activity] (M=32%, F=22%)” (Bryan et al, 2006, p. 271). An explanation for this difference might be that Aboriginal people are often treated as homogeneous, when in fact there is great variation among them based on culture, location and activity.

For all ethnic groups the prevalence of MPA is higher for males than females. Regardless of gender, aging is associated with a decreased level of physical activity. According to the CCHS 72% of women and 56% of men over the age of 70 are considered inactive. Lack of adequate physical activity has been linked with increased incidents of cardiovascular disease, obesity, metabolic disorders such as diabetes, and some forms of cancer. For an aging population regular physical activity, both aerobic and resistance training has been epidemiologically shown to be protective against cognitive impairment, depression, falls, and hip fractures while increasing stamina and social functioning (Bryan and Walsh, 2003).

New models of promoting and engaging marginalized populations that are attentive to barriers to, and facilitation of, increased physical activity with those targeted populations need to be developed. A timely and relevant systematic review of effective programs to increase physical activity with marginalized persons will help inform policy and decision makers. Therefore, the purpose of this systematic review is to determine the effectiveness of public health and health promotion strategies to increase physical activity in marginalized populations.

¹ *The target population of the CCHS includes household residents aged 12 and older in all provinces and territories, but excludes Indian Reserves, Canadian Forces Bases and some remote areas.*

Research Question

Throughout this review, the following question will be addressed:

What is the effectiveness of interventions to increase physical activity among marginalized populations?

Methods

Primary Studies were reviewed.

Searching the Literature

The following electronic databases were searched:

COCHRANE
EMBASE
PsychINFO
TRoPHi
DARE

CINAHL
Medline
PUBMED
SportDiscus

The search strategy is outlined in Appendix 1. All databases were searched for the period of January 1995 to August 2006.

Two reviewers independently scanned the citations and abstracts for relevant articles. All citations selected by either reviewer were captured into Reference Manager (Network Edition, Version 11). All potential relevant citations were retrieved.

Hand-searching of relevant peer-reviewed journals (n=16) was conducted for the period of January 2006 to August 2006 (see Appendix 2 for the journals that were hand-searched). Relevant articles were retrieved and added to the database. The reference lists of retrieved articles were examined for potential additional relevant references, and those that were relevant were retrieved.

Relevance

All articles retrieved from searching multiple sources were subjected to relevance testing. To be relevant, studies had to meet all 4 of the following criteria (see Relevance Tool, Appendix 3).

1. The intervention described could be implemented, facilitated or promoted by staff in local public health units in Canada.
2. The study focuses on any of the following populations: low income, education and/or literacy; diverse cultures including recent immigrants and refugees;

aboriginals; rural residents; disabled; adolescents; seniors; single parents and their children; homeless.

3. The reported study outcome(s) includes physical activity.
4. The primary study design is prospective and includes a control group (one group pre/post designs are NOT acceptable).

Two reviewers independently rated all retrieved articles for relevance. Differences were resolved through consensus.

The following are groups were not included in this review. The rationale for their exclusion is described.

1. Studies that included general populations were excluded if there was no demographic description of the participants. It was assumed that they included both marginalized and non-marginalized populations.
2. General school-based programs for children and adolescents were not included because the population includes both marginalized and non-marginalized groups of students. A recent review entitled “Effectiveness of Physical Activity Enhancement and Obesity Prevention Programs in Children and Youth” is available at www.hamilton.ca/ephpp (Thomas, Ciliska, Micucci, Wilson-Abra and Dobbins, 2004). It includes general populations of children and youth. Studies that focused on marginalized groups of students were included.
3. Many studies involving older adults focused on improving physical function, improving the ability to perform activities of daily living and reducing falls. These were not included. Only studies with an outcome of physical activity (e.g. walking) were included. The excluded studies did not appear to be interventions that public health/health promotion personnel would implement.
4. Some studies focused on participants who had physical, mental (e.g. chronic mental illness, severely mentally challenged) or medical disabilities (e.g. congestive heart failure, recovering from strokes). Unless participants were healthy enough to participate in regular physical activity, the studies were not included.

Quality Assessment

The Effective Public Health Practice Project has developed and tested a tool for assessing the methodological quality of primary studies in public health (Thomas, Ciliska, Dobbins & Micucci, 2004). The tool is based on guidelines set out by Mulrow et al. (Mulrow, Cook & Davidoff, 1997) and Jadad et al. (Jadad et al., 1996). It has been examined by experts in the field, and has received excellent ratings (Deeks et al., 2003). This tool consists of six criteria:

- Selection bias
- Allocation bias
- Confounders
- Blinding of outcome assessors
- Data collection methods
- Withdrawals and dropouts

The six criteria were each rated as “strong”, “moderate” or “weak” depending on characteristics of each criterion reported in the study. See Appendix 4 for the quality assessment tool. Once the ratings of criteria were totalled, each study then received an overall assessment of strong, moderate, or weak quality. In order for a study to be rated as “strong”, four of the six quality assessment criteria had to be rated as strong, with no weak ratings. A rating of “moderate” was achieved if less than four criteria were rated strong and one criterion was rated weak. A rating of weak was given if two or more criteria rated weak. Two reviewers independently scored all relevant articles for quality. Differences in scoring were resolved by discussion.

Data Extraction

Data were extracted from articles that received an overall rating of “strong” or “moderate”. A standardized data extraction form was used (see Appendix 5) utilizing SRS 4.0 (TrialStat! Corporation, Ottawa, Ontario, Canada). The form includes information on the study design, the intervention and the outcomes. The theoretical framework upon which interventions were based was collected to determine whether any framework impacted the effectiveness of interventions and which framework(s) showed the most promise. All statistically significant and non-significant outcomes that were considered to be relevant to the review question were reported.

Results

Figure 1 outlines the number of articles involved in this review. The search for published and unpublished studies resulted in the identification of potentially relevant articles. These titles and abstracts were scrutinized by EPHPP staff and 1403 articles were determined to be potentially relevant for review. Those articles were retrieved and reviewed by our internal and external relevance reviewers. Of those, 68 articles were passed by reviewers into the quality assessment phase.

Quality Assessment of the Relevant Studies

Table 2 outlines the results of the quality assessment of the 68 relevant articles. Seven articles were rated as “strong” by the quality assessors, 28 were “moderate” and 33 were rated as being methodologically “weak”. Many articles were rated weak on selection bias (33%). The problem was that many of the studies did not report the number of individuals who were eligible to participate. A number of the studies were pilot studies. Of those rated strong or moderate (n=35) fourteen were pilot studies (40%). It is interesting to note that 2 RCTs with significant between group differences on the

outcomes were labelled as pilot RCTs. Most (83%) of the articles were randomized controlled trials (RCTs). The remainder were cohort studies. Confounders were controlled in most of the articles. The other area where study methodology was frequently weak was blinding of outcome assessors. This was not done/not reported in 80% of the studies. Reliable and valid outcome measures were used in most of the studies. Withdrawal and drop-out rates varied across studies. In some projects, this was not applicable because the whole community was involved. Very few studies reported a sample size calculation ($n=2$). Many of the studies had small sample sizes so it is likely that they had inadequate statistical power to detect between group differences, even if they were present. The statistical analysis in most studies was appropriate and used intention-to-treat analysis.

Integrity of the intervention is an important aspect of program delivery. It can explain why no between group differences were found. If few participants received the program, it will not be surprising that there are no between group differences. This is an implementation problem as opposed to a intervention problem. Among the strong and moderate studies, 26% reported that >80% of participants received the intervention and 11% reported that 60-79% received the intervention. Unfortunately, 60% of the articles did not report the percentage of participants receiving the intervention. Another implementation issue relates to the consistency of the intervention (i.e. did all groups/individuals receive the same intervention). About 30% of studies indicated that the consistency of the intervention was measured and was satisfactory. Unfortunately 69% did not report whether or not the consistency of the intervention was measured. The remaining (1%) studies reported that they did not measure this variable.

Most of the studies were carried out in the United States ($n = 27, 77.1\%$). Two studies were completed in each of the Netherlands, the United Kingdom and Canada. Investigators from Australia and New Zealand each reported one study.

The studies focused on several marginalized populations. African-American populations were involved in 13 studies (Beech et al., 2003; Fitzgibbon et al., 2005c; Fitzgibbon et al., 2005b; Fitzgibbon et al., 2005a; Ford et al., 2002; Newton, Jr. & Perri, 2004; Robinson et al., 2003; Story et al., 2003; Wilson et al., 2002; Ackermann et al., 2005; Resnicow et al., 2005; Yancey et al., 2006) These studies involved populations that were from low income families, often had minimal educational attainment, and the children were often in lone parent families. As well, the participants varied in age from children to adolescents to adults. Four studies included Aboriginal populations (Going et al., 2003; Harvey-Berino & Rourke, 2003; Narayan et al., 1998; Paradis et al., 2005). The ages of participants in these studies ranged from infants and mothers to elementary school-aged children to adults 25-54 years old. One study focused on elderly immigrants (Reijneveld et al., 2003). Seniors were the focus of 5 other studies (Hopman-Rock & Westhoff, 2002; Jiang et al., 2004; Kerse et al., 1999; Kerse et al., 2005). Rural populations were addressed by 2 studies (Nafziger et al., 2001; Brownson et al., 2004) any of the participants in the studies were from low income households, but results by income level were rarely presented.

Discussion

This section provides some discussion about the studies with strong and moderate ratings on methodological assessment (n=35). The methodologically weak studies have not been included because their methodological shortcomings indicate that their results should be viewed with caution.

Table 3 summarizes the included studies. Four were pilot studies called GEMS (Girls Health Enrichment Multi-site Studies) (Baranowski et al., 2003; Beech et al., 2003; Robinson et al., 2003; Story et al., 2003). These studies targeted African-American girls ages 8 to 10 years. They had similar inclusion criteria. The purpose of the studies was to assess the feasibility of delivering culturally relevant programs to improve nutritional intake, reduce television viewing and increase physical activity with this age group. Focus groups with community residents assisted with the development of the programs by assuring that they were culturally sensitive and likely to be accepted by the girls and their families. Social cognitive theory was the basis for all of the programs. Three of the four studies involved low income families and provided weekly sessions over 12 weeks (Beech et al., 2003; Robinson et al., 2003; Story et al., 2003). The interventions varied somewhat, but were similar. In one study, parents were very involved in that they participated in the same number of sessions as the girls (Beech et al., 2003). In another, parents were invited to family night events, took part in goal setting for one nutritional and one physical activity goal for their families and were contacted regularly by the research team to support their on-going behavioural change efforts (Story et al., 2003). One study had a four week long summer day camp intervention for the girls followed by eight weeks of internet contact (Baranowski et al., 2003). Unfortunately less than 50% of the girls participated in the internet component of the intervention. Because the studies were all pilot studies they did not have an adequate sample size to detect between group differences in the physical activity outcomes. However all of the trends were in a positive direction for the intervention groups.

Fitzgibbon et al. (2005c) reported on a five year RCT focused on preschool obesity prevention through improved nutrition and increased physical activity among low income African-American and Latino children at Head Start programs. The program consisted of a 40 minute intervention three times a week for 14 weeks. The intervention focused on actual physical activity and a 20 minute interactive lesson about healthy eating and/or physical activity. No between group differences were noted in physical activity among the children at Year 1 or 2 follow-up.

Ford et al. (2002) also involved low income African-American children ages 5-12 years and their families in a brief intervention to reduce TV viewing. Families in three family practice clinics were randomly assigned to receive either 5-10 minutes of one-to-one counselling or the counselling plus a 15-20 minute behavioural intervention and three tasks. Follow-up indicated that the group receiving the additional behavioural intervention increased participation in organized physical activity and increased outside playtime (although the results were not statistically significant).

Wilson et al. (2002) reported a study focused on African-American adolescents. The outcomes were fruit and vegetable intake and physical activity. There were two

intervention groups. After a 12 week program based on Social Cognitive Theory (SCT) and SCT plus Motivational Interventions, there were statistically significant increases in fruit and vegetable intake among both intervention groups. However no differences in physical activity were noted. The authors suggest that there could be several reasons for this. First, the students in both the two intervention groups and the control group had access to the same after school sports program. Second, the sample size may have led to inadequate statistical power to detect a between group difference. Third, the intervention may not be effective for increasing physical activity.

Pate et al. (2005) reported a school-based study to promote physical activity among high school girls. Fifty per cent of the student population was African-American. The intervention group received the Lifestyle Education for Activity Program (LEAP), which consisted of 6 components: physical education class, health education, school environment, school health services, faculty/staff health promotion, and family/community involvement. The LEAP program was delivered over one academic year. All activities were designed to be user-friendly for female students. Physical activity was measured using the self-reported 3 day recall. At follow-up the prevalence of regular vigorous physical activity was significantly greater ($p=.05$) among the students in the intervention schools compared to the comparison group.

Six studies focused on African-American adults (Tan et al., 2006; Fitzgibbon et al., 2005a; Fitzgibbon et al., 2005b; Newton, Jr. & Perri, 2004; Resnicow et al., 2005; Yancey et al., 2006). Two included women only. Fitzgibbon et al. (2005a) reported a faith-based weight loss intervention compared with culturally tailored weight loss intervention. Both interventions were the same except that the faith-based group activities included addressing faith issues in a standardized way. The culturally sensitive group showed a statistically significant increase in moderate and vigorous activity compared to the faith-based group. Members of both groups reported low family incomes. In an earlier study, Fitzgibbon et al. (2005b) evaluated a 20 week breast health/weight loss intervention for middle class black women compared to a control group who received newsletters monthly about general strategies to improve health. Although this was a pilot study, the intervention group reported a statistically significant increase in frequency, duration and intensity of physical activity compared to the control group. In the third study, African-American adults between the ages of 39-55 years enrolled in one of two different intervention groups related to home based exercise programs. The first intervention group received a standard behavioural counselling program; the second group received a culturally sensitive program. The control group received physician advice. All groups increased their walking duration, however only the two intervention groups reported significant improvements in fitness (Newton, Jr. & Perri, 2004). One question these results raise is the necessity/effectiveness of culturally sensitive interventions among this population of adult African-Americans.

Yancey et al. (2006) reported on an intervention for obese African-American women. A one year free gym membership was provided to both intervention and control groups. The intervention group also received eight weekly two-hour group sessions focused on skills training, nutrition education and cancer prevention. Initially a statistically significant between group difference in physical activity was noted. However, 12 months after the baseline measure, there was no longer any between group difference.

Fried et al. (2004) and Tan et al. (2006) reported on a pilot RCT of the Experience Corps program. This program placed older, low income, African-American women as

volunteers in public elementary school for 15 hours per week for the school year. Among those that were previously active, there was no significant between group difference in physical activity at the completion of the program. However, for those with low physical activity at baseline there was a statistically significant ($p=0.03$) and clinically significant (110%) increase in reported physical activity.

In the final study, Resnicow et al. (2005) described a church-based study involving African-American adults. This sample consisted of participants with relatively high incomes and education levels. There were two intervention groups. One group received a number of self-help aids designed to be culturally sensitive and related to increasing physical activity and improving fruit and vegetable consumption. The second group received the self-help aids plus four supportive phone calls. The control group received regular information about physical activity and healthy eating. Both intervention groups had statistically significantly improved physical activity levels compared to the control group. However, their outcomes were not different from one another.

Four studies focused on Native American populations. Two had school-aged children as their focus (Paradis et al., 2005; Going et al., 2003). One was a school-based diabetes prevention program focused on 6-11 year olds with 8 years of follow-up (Paradis et al., 2005). The intervention consisted of ten 45 minute sessions per year in grades 1-6. The sessions were aimed at decreasing physical inactivity, reducing the prevalence of obesity and improving nutritional intake. As well, a number of community wide interventions were implemented to raise awareness of healthy lifestyles in relation to diabetes prevention. The comparison cohort was another school in a different community. There was no statistically significant difference in physical activity among the two groups at the first follow-up. However the comparison group reported greater frequency of gym classes. The run/walk times of the comparison group were also statistically significantly improved compared with the intervention group. None of these differences were maintained over time.

Going et al. (2003) reported on the effects of the Pathways Obesity Prevention Program on physical activity for a subset of 10 year old American Indian children. The follow-up was conducted in grade 5, three years after the intervention began. There was a trend for increased physical activity at 3 of the 4 sites, and an overall difference of about 10% in reported physical activity between intervention and control schools, however no statistically significant differences were found. The authors suggested that the variability in accelerometer use and only recording physical activity for one day may have resulted in the findings.

Harvey-Berino & Rourke (2003) compared the effectiveness of a home-based intervention for high risk Native American toddlers and their mothers in a pilot study to assess feasibility of the program. The program was directed at mothers. The control group received a 16 week parenting support program by peer educators that avoided any discussion about nutrition or exercise. The intervention group received the parent support intervention focused exclusively on the relationship between improved parenting and appropriate eating and exercise in children. Physical activity outcomes of both mothers and children were measured. There were no statistically significant between group differences in maternal or child physical activity. However, this may be a result of the lack of power to find the difference given the small sample size.

The fourth study related to Native-Americans was conducted by Narayan et al. (1998). It was a pilot study among adult Pima Indians. The RCT focused on altering lifestyle activities among the adult population ages 25-54 years. The intervention group received structured activities related to nutrition and increasing physical activity, whereas the comparison group received information about Pima culture and history. Although both groups increased their physical activity post-intervention, assessments indicated there was no statistically significant difference between them.

Two studies focused on adults in rural areas. Nafziger et al. (2001) reported on the Otsego-Schoharie Healthy Heart Program (OSHHP). This was a multi-faceted community-based intervention that took place over 5 years in a rural medically underserved area where many families had low incomes. The program, adapted from other heart health strategies included risk factor screening, exercise events, school programs, presentations and restaurant/grocery store programs. Measurement of reduction in sedentary lifestyle indicated no statistically significant difference between the intervention and comparison communities, although the intervention group had a greater reduction. Brownson et al. (2004) evaluated a community-based approach to promote walking trail use and time devoted to walking. Although walking rates among the intervention communities declined slightly, there was an increase among people with high school degrees or less and those with a family income of less than \$20,000.00 per year.

Eleven studies involved the elderly population. Several of these focused on encouraging health providers to discuss and encourage physical activity among their patients during routine visits. Kerse et al. (1999) reported the findings of a RCT in which general practitioners engaged in an educational program for their elderly patients over a 2-3 month period. The education focused on a number of topics including increasing physical activity. There was a statistically significant increase in reported walking among the intervention group ($p=0.03$) immediately post program. These results were sustained at follow-up. As well this group reported improved self-rated health status and number of social contacts. In another study using general practitioners to assist older patients in increasing physical activity, Kerse et al. (2005) reported similar findings. Ackermann et al. (2005) tested an intervention where physician(s) and other clinic personnel received prompts to discuss physical activity with patients resulting in increased activity among those in the contemplative stage regarding exercise. Dubbert et al. (2002) studied the effects of nurse counselling and follow-up phone calls on improving physical activity among those over 65 years of age. The group with nurse initiated phone calls and automated motivational calls reported significantly more walking than the other groups. Pinto et al. (2005) reported the results of an intervention similar to CHAMPS (see below) only initiated with patients in a primary care setting. This intervention also resulted in increased physical activity among the intervention group. These relatively simple, inexpensive interventions appear to significantly improve physical activity among the elderly and should be widely implemented.

Stewart et al. (1997, 2001) reported on the implementation of a program entitled CHAMPS among different groups of older adults. This program is unique in at least two ways. First, it included all those interested, regardless of other health conditions. Second, it focused on assisting individuals to determine a plan for physical activity and then provided them with the information about local resources that offered such programs. On-going support was provided through monthly group meetings for six months and regular newsletters. The focus of one study was senior residents in low

income congregate housing facilities and seniors using a local community centre. The other study involved under active seniors in a multi-specialty group practice. Both studies resulted in increased physical activity in the intervention groups.

Resnick (2002) examined the effectiveness of the WALC intervention among residents of a continuing care retirement community. Ninety percent of those in the intervention group initiated and engaged in a regular exercise program during the 6 months of the study. They reported statistically significantly more activity than the control group.

Hopman-Rock and Westhoff (2002) reported on two evaluations of the Aging Well and Healthily (AWH) program in the Netherlands. One evaluation was a RCT. The second was a community intervention trial (CIT) of the same intervention. Each of the 6 sessions of the program included a one hour peer education program and one hour of low intensity exercise taught by a physical activity instructor. The target population was those over 65 years of age who were physically inactive. The RCT results indicated no significant between group differences in physical activity, although both groups increased their physical activity levels. However, the study may not have had adequate statistical power to detect a between group difference. In the CIT there was a 30% increase in physical activity at follow-up 4-6 months after the intervention. There was also a statistically significant improvement in physical activity scores.

In another study from the Netherlands, the target group was low income Turkish immigrants 45 years of age or older (Reijneveld et al., 2003). The intervention adapted the AWH program to the needs of the Turkish population. The peer educator was fluent in Turkish. Exercise classes were gender specific. Although the program led to large improvements in mental wellbeing, there were no between group differences in physical activity levels. This may be because of lack of statistical power to find a difference because of the small sample size.

In Jiang et al.'s (2004) work adults aged 55 years or older were allocated to receive either Canada's Physical Activity Guide and Handbook for Older Adults (PAGH) or the Handbook plus an eight one-hour group sessions over eight weeks that focused on behaviour change. Both groups reported increased physical activity. The intervention group with the behaviour change sessions had a statistically significant ($p < .05$) improvement in total energy expenditure as opposed to the comparison group at the completion of the intervention. The recreational activity most frequently reported was leisurely walking. This study indicated that the PAGH was acceptable to older adults and promoted an increase in their activity.

Two studies focused upon Mexican American and Latino women respectively. Poston et al. (2001) evaluated a culturally sensitive intervention to increase physical activity among overweight Mexican American women. The 6 month intervention was followed by 6 months of weekly follow-up in peer-led groups. There were no between group differences in physical activity at follow-up. The authors suggest a number of factors could have contributed to the finding. These include both environmental factors for the women and methodological issues in the study design. Taking these limitations into account, this intervention could be repeated. Sanchez-Johnsen et al. (2006) reported on an intervention similar to that reported by Fitzgibbon et al. (2005b) among Latina women. This pilot study reported no between group differences in physical activity following the intervention.

Treviño et al. (2005) reported on the outcomes of the Bienestar Health Program. This program was developed for grade four Mexican-American students. The participants were children from low income families. Outcomes at the end of the program demonstrated statistically significantly improved physical fitness among the intervention group of students.

There are several general observations and comments about these strong and moderate studies. First, the number (n=14, 41.2%) of pilot studies found in this literature is striking. Some pilot studies did demonstrate significant positive outcomes. Those that did and those for which there are plausible explanations (other than the program itself) about the lack of findings should be repeated using a scientifically calculated sample size.

Many of the studies included changes in physical activity among a number of other outcomes. These studies were broadly divided into those trying to improve cardiovascular outcomes (including nutrition, smoking, blood pressure) or those also interested in social support, general health and hospitalization outcomes. Of the ten programs with successful programs, most focused solely or nearly so on physical activity (Jiang et al., 2004; Kerse et al., 2005; Fitzgibbon et al., 2005b; Kerse et al., 1999; Pate et al., 2005). Several additional studies (see Table 3) did not report overall differences in physical activity outcomes, however subgroup analysis resulted in sizeable improvements in physical activity among those that were least active before the intervention, and had lower educational and income levels. One study that tried to recruit participants with low levels of physical activity found this very challenging (Hopman-Rock & Westhoff, 2002). Strategies to encourage this segment of the population to participate in these programs need to be developed and tested. Future work needs to provide subgroup analysis to determine those that get the maximum benefit from such programs. In that way, programs can be targeted to those individuals.

Seven studies were focused on African-American children and youth of different ages from low income families. Another focused on African-American women. The issue of generalizability to the Ontario context is an important one. Although they demonstrate favourable process outcomes in that the target population became engaged and there were high retention rates, few changed levels of physical activity. Several were pilot studies and may have inadequate power to detect between group differences. Another issue is that none of them focused on physical activity alone, but all included nutritional improvements as well. This is important when considering obesity prevention, however it may be that focusing on both interventions simultaneously may have an effect on the outcomes. The process of developing many of the programs, which involved community participation may improve cultural sensitivity and be in part responsible for the high retention rates. As well, some of the programs identified barriers to participation such as availability of transportation.

One successful school-based intervention focused on a female school population that was about 50% African-American (Pate et al., 2005). This program should be tested in the Ontario/Canadian context. Given that the program is school-driven it would be relatively straightforward to implement with little or no additional resources and with the assistance of public health personnel.

None of the interventions involving Native American children or adults resulted in increasing physical activity. A variety of reasons were postulated for this finding. One

reason that was not mentioned is all of the programs focused on a number of changes in life style behaviour and the emphasis on physical activity is unknown. As well, it may be that more intense programs of longer duration are required to change physical activity levels. The other issue is that although these projects all focused on Native Americans, the groups could be very different in many other characteristics that influence physical activity. In addition, the degree of involvement of the community with program development is unknown and this could influence participation rates as well as outcomes.

Of the 10 studies with positive outcomes, seven involved older adults (Jiang et al., 2004; Kerse et al., 1999; Ackermann et al., 2005; Dubbert et al., 2002; Pinto et al., 2005; Stewart et al., 2001; Kerse et al., 2005). In five of them, general practitioners were used to provide brief educational sessions (i.e. 15 minutes) to their older adult patients. This one-to-one intervention could be used by others in Ontario/Canadian settings where seniors gather (i.e. community centres, apartment buildings) and evaluated. Another program was delivered in the community to a group of older adults. The behaviour change program could be delivered by a prepared public health nurse. The CHAMPS program is an excellent model that should be tested in the Ontario/Canadian context.

There are two issues related to the studies focusing on older adults that could confound their results and limit their generalizability. First, the age ranges of participants vary from study to study (e.g. over 75 years, over 65 years, over 45 years). This variation in age groups is important when examining the outcomes of these studies because the younger cohort may skew the results toward higher levels of physical activity. There is good evidence that adults become less active as they age. Therefore the studies with older adult participants might require additional strategies to increase physical activity. Second, some of the participants reported being in better health and having more education than the general population their age. This may indicate that strategies to recruit those who are less healthy and have lower levels of education need to be developed and tested. This requires working with practitioners who are familiar with these populations.

In reviewing the studies for this paper it became evident that “marginalized populations” is a very broad concept and that many participants have several characteristics that could include them as marginalized people (e.g. age, low educational attainment, low income, recent immigrant). Although some of these characteristics are not mutually exclusive, this does confound the results in that having several characteristics could negatively influence the uptake of physical activity. Conversely, there are wide variations within any of the characteristics used to identify marginalized groups. For example, not all older adults would be considered marginalized.

Conclusions

Implications for Practice

- Successful programs delivered in Canada should be widely implemented.
- Successful programs delivered in other countries should be tested in the Ontario context and then implemented.
- The process of making programs culturally sensitive is outlined in several of these studies and should be used as a template for setting the groundwork for program development.

Implications for Research

- Strategies for improving the participation rates of less advantaged older adults in studies need to be developed and tested. This should be a joint research/ public health practitioner initiative in that practitioners have a lot of experience dealing with these groups.
- Promising pilot studies should be replicated with adequate sample sizes to find a between group difference if it exists.
- There needs to be a larger focus on improving physical activity among marginalized populations. Studies should include adequate sample sizes to perform subgroup analysis to identify the impact of being marginalized on the outcomes.

Implications for Policy

- Agencies/organizations funding research in the area of physical activity should emphasize the importance of focusing studies on people from marginalized populations.
- A number of pilot studies show promise. Funds should be made available for these to be repeated with adequate sample sizes and within the Ontario/Canadian context.

This review has focused on the effectiveness of interventions to improve physical activity among marginalized populations. Given the wide net that was used to define marginalized, a comprehensive literature search found relatively few studies on the topic. Unfortunately, of those studies that were located very few reported positive results. Those that did should be implemented. Marginalized people represent a significant group in the population who may require specific interventions to improve their physical activity. Researchers and practitioners need to work together to find the answers.

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Experience Corps Project Account

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Figures and Tables

Figure 1 Search Strategy

Table 1 Quality Assessment Result for All Relevant Articles

Table 2 Results Table (Strong and Moderate)

Figure 1: Search Results

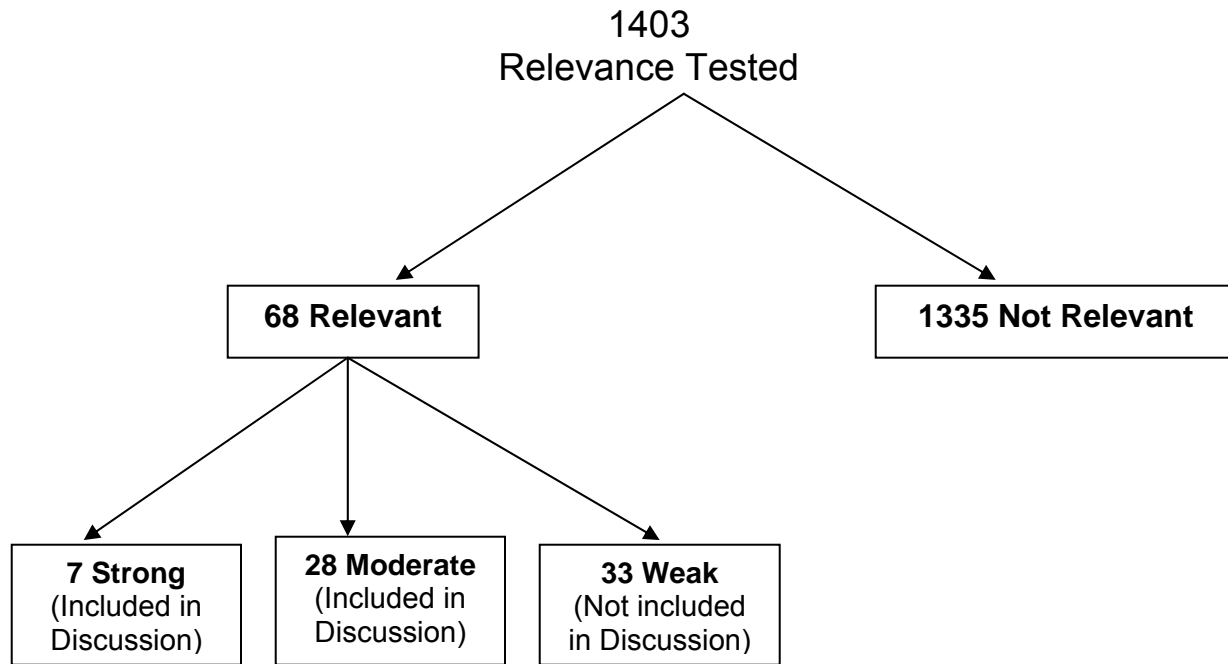


Table 1: Quality Assessment Results for All Relevant Studies (n=68)

Author/Date	Selection Bias	Allocation Bias	Confounders	Blinding	Data Collection Methods	Withdrawals and Drop-Outs	GLOBAL RATING
Ackermann et al., 2005	Moderate	Strong	Strong	Strong	Strong	Strong	STRONG
Ades et al., 1996	Weak	Strong	Weak	Weak	Strong	Moderate	WEAK
Amaro et al., 2006	Strong	Strong	Strong	Weak	Weak	Strong	WEAK
Ball et al., 2005	Weak	Strong	Strong	Weak	Strong	Strong	WEAK
Baranowski et al., 2003	Weak	Strong	Strong	Weak	Strong	Moderate	MODERATE
Beech et al., 2003	Strong	Strong	Strong	Weak	Strong	Strong	MODERATE
Bell et al., 2001	Weak	Moderate	Strong	Weak	Strong	Weak	WEAK
Bennett et al., 2006	Weak	Strong	Strong	Weak	Strong	Moderate	WEAK
Brownson et al., 2004	Strong	Moderate	Strong	Weak	Moderate	Not Applicable	MODERATE
Coleman et al., 2005	Weak	Moderate	Strong	Weak	Strong	Strong	WEAK
Conn et al., 2003	Moderate	Strong	Weak	Weak	Strong	Strong	WEAK
Daniel et al., 1999	Weak	Moderate	Strong	Strong	Strong	Weak	WEAK

Author/Date	Selection Bias	Allocation Bias	Confounders	Blinding	Data Collection Methods	Withdrawals and Drop-Outs	GLOBAL RATING
Dubbert et al., 2002	Strong	Strong	Strong	Weak	Strong	Strong	MODERATE
Emmons et al., 2005	Weak	Strong	Strong	Weak	Strong	Strong	WEAK
Fisher, and Li, 2004	Weak	Strong	Strong	Weak	Strong	Strong	WEAK
Fitzgibbon et al., 2005a	Strong	Strong	Strong	Weak	Strong	Moderate	MODERATE
Fitzgibbon et al., 2005b	Strong	Strong	Strong	Weak	Strong	Strong	MODERATE
Fitzgibbon et al., 2005c	Moderate	Strong	Strong	Strong	Strong	Weak	MODERATE
Ford et al., 2002	Strong	Strong	Strong	Weak	Strong	Strong	MODERATE
Fried et al., 2004	Strong	Strong	Strong	Weak	Strong	Strong	MODERATE
Froehlich-Grobe, and White, 2004	Strong	Weak	Strong	Weak	Strong	Moderate	WEAK
Fujita et al., 2003	Weak	Strong	Strong	Weak	Strong	Strong	WEAK
Going et al., 2003	Moderate	Strong	Strong	Weak	Strong	Strong	MODERATE

Author/Date	Selection Bias	Allocation Bias	Confounders	Blinding	Data Collection Methods	Withdrawals and Drop-Outs	GLOBAL RATING
Grahn Kronhed et al., 2006	Moderate	Moderate	Weak	Weak	Moderate	Weak	WEAK
Hamdorf et al., 1999	Moderate	Strong	Weak	Weak	Strong	Moderate	WEAK
Harvey-Berino and Rourke 2003	Moderate	Strong	Strong	Strong	Strong	Strong	STRONG
Hopman-Rock and Westhoff, 2002	Moderate	Moderate	Strong	Weak	Strong	Strong	MODERATE
Hunt et al., 2003	Weak	Strong	Strong	Weak	Weak	Moderate	WEAK
Jacobs et al., 2004	Weak	Moderate	Strong	Not Applicable	Strong	Strong	MODERATE
Jarvis et al., 1997	Weak	Strong	Strong	Weak	Strong	Strong	WEAK
Jiang et al., 2004	Moderate	Moderate	Strong	Weak	Strong	Strong	MODERATE
Kelley and Abraham, 2004	Moderate	Strong	Weak	Weak	Strong	Strong	WEAK
Kennedy et al., 2005	Weak	Strong	Strong	Weak	Weak	Moderate	WEAK

Author/Date	Selection Bias	Allocation Bias	Confounders	Blinding	Data Collection Methods	Withdrawals and Drop-Outs	GLOBAL RATING
Kerse et al., 1999	Weak	Strong	Strong	Strong	Strong	Strong	MODERATE
Kerse et al., 2005	Moderate	Strong	Strong	Not Applicable	Strong	Strong	STRONG
Kosma et al., 2005	Weak	Strong	Strong	Weak	Strong	Weak	WEAK
Lowther et al., 2002	Weak	Strong	Weak	Strong	Strong	Weak	WEAK
McAuley et al., 2003	Moderate	Strong	Weak	Weak	Strong	Moderate	WEAK
McKenzie et al., 2004	Moderate	Strong	Weak	Weak	Strong	Not Applicable	WEAK
Mihalko et al., 2006	Moderate	Strong	Strong	Weak	Strong	Weak	WEAK
Nafziger et al., 2001	Strong	Moderate	Strong	Weak	Strong	Not Applicable	MODERATE
Narayan et al., 1998	Moderate	Strong	Strong	Strong	Strong	Strong	STRONG
Neumark-Sztainer et al., 2003	Weak	Strong	Strong	Weak	Strong	Strong	WEAK
Newton, Jr. and Perri, 2004	Moderate	Strong	Strong	Weak	Strong	Moderate	MODERATE
Paradis et al., 1999	Moderate	Moderate	Strong	Weak	Strong	Moderate	MODERATE

Author/Date	Selection Bias	Allocation Bias	Confounders	Blinding	Data Collection Methods	Withdrawals and Drop-Outs	GLOBAL RATING
Pate et al., 2005	Strong	Strong	Strong	Weak	Strong	Moderate	MODERATE
Pfeiffer et al., 2001	Moderate	Strong	Weak	Weak	Strong	Strong	WEAK
Pinto et al., 2005	Strong	Strong	Strong	Weak	Strong	Strong	MODERATE
Poston et al., 2001	Strong	Strong	Strong	Weak	Strong	Moderate	MODERATE
Ransdell et al., 2004	Moderate	Strong	Strong	Weak	Strong	Weak	WEAK
Reijneveld et al., 2003	Moderate	Strong	Strong	Weak	Strong	Moderate	MODERATE
Resnick, 2002	Moderate	Strong	Strong	Weak	Strong	Strong	MODERATE
Resnicow et al., 2005	Strong	Moderate	Strong	Weak	Moderate	Strong	MODERATE
Robinson et al., 2003	Strong	Strong	Strong	Strong	Strong	Strong	STRONG
Sánchez-Johnsen et al., 2006	Moderate	Strong	Strong	Weak	Moderate	Strong	MODERATE
Schneider et al., 2004	Weak	Strong	Weak	Weak	Strong	Strong	WEAK
Sorensen et al., 2005	Weak	Strong	Strong	Weak	Strong	Moderate	WEAK
Stevens et al., 1998	Moderate	Strong	Strong	Weak	Strong	Weak	WEAK

Author/Date	Selection Bias	Allocation Bias	Confounders	Blinding	Data Collection Methods	Withdrawals and Drop-Outs	GLOBAL RATING
Stewart et al., 1997	Strong	Moderate	Strong	Not Applicable	Strong	Strong	STRONG
Stewart et al., 2001	Moderate	Strong	Strong	Weak	Strong	Strong	MODERATE
Story et al., 2003	Moderate	Strong	Strong	Weak	Strong	Strong	MODERATE
Tan et al., 2006	Strong	Strong	Strong	Strong	Strong	Strong	STRONG
Trevino et al., 2006	Strong	Strong	Strong	Weak	Strong	Moderate	MODERATE
William et al., 2005	Weak	Moderate	Strong	Weak	Strong	Strong	WEAK
Wilson et al., 2002	Moderate	Strong	Strong	Weak	Strong	Moderate	MODERATE
Witmer et al., 2004	Weak	Strong	Weak	Weak	Strong	Strong	WEAK
Yancey et al., 2006	Moderate	Strong	Strong	Weak	Strong	Moderate	MODERATE
Yanek et al., 2001	Weak	Strong	Strong	Weak	Strong	Strong	WEAK

Table 2: Results of Relevant Studies (Strong and Moderate) (n=35)

Author, date, country	Design and participants	Intervention	Outcomes	Limitations
Ackermann et al., 2005 United States STRONG	RCT English Intervention=172 Control=164 Mean Age : 66 Seniors- 99% Males Urban	Targeted patients in both intervention and control as contemplative for behavioural change in areas of physical activity or tobacco use. Intervention : primary care physicans provided patients with an eight page community exercise resource guide and a preprinted prescription advising the patient to contact a community exercise site to gradually adopt regular moderate-intensity physical activity.	The intervention group was more likely to receive exercise advice(adjusted odds ration = 1.5, 95% confidence interval = 1.0-2.3) and more likely to report regular exercise participation 4 months later than were the control group. Post intervention: intervention group 35% reported regular physical activity vs 28% of control group (p=.06).	Study was randomized by primary care provider therefore there is an increased possibility of between-group differences in patients' characteristics. The "regular exercise" was an approximate gauge of self-reported exercise participation. The study was conducted in a single Veteran's Affairs general medicine clinic.

Author, date, country	Design and participants	Intervention	Outcomes	Limitations
		Control : did not receive exercise advice and were not provided with community resource guide or prescriptions. They were provided with tobacco cessation information and directed toward tobacco cessation classes.		

Author, date, country	Design and participants	Intervention	Outcomes	Limitations
<p>Baranowski et al., 2003</p> <p>United States</p> <p>MODERATE</p>	<p>Pilot Study</p> <p>RCT</p> <p>English</p> <p>Intervention= 19 Control= 16</p> <p>Mean Age: 8.3</p> <p>African American Girls and Parents</p> <p>Urban</p> <p>Household Income: 47.4% of intervention and 43.8% of control = ≤\$40,000</p> <p>Well educated parents</p>	<p>Intervention: summer day camp for girls only and separate internet program (Fun Food Fitness Project) for girls and parents.</p> <p>Control: different day camp and monthly home internet intervention, neither of which included the GEMS-FFFP enhancements.</p> <p>To assure relevance of the program, consumers were involved through focus groups prior to program development and implementation.</p> <p>Theory: Social Cognitive</p>	<p>There was a trend toward lower BMI among the heavier girls in the treatment vs control group at the end of summer day camp. This suggests that summer day camp served as a useful tool for intervening on diet and Physical Activity (PA) practices among heavier African American girls, which is consistent with the finding of other recent studies.</p>	<p>Small sample size and short duration meant that this pilot study did not have sufficient power to test for between group differences.</p> <p>The impact of the internet intervention in maintaining PA gains from the camp is not known. Less than 50% of intervention group logged onto the website.</p>

Author, date, country	Design and participants	Intervention	Outcomes	Limitations
Beech et al., 2003 United States MODERATE	Pilot Study RCT English Intervention =21 Control = 18 Age:Mean: 8.9 African American Urban Family income: 68% ≤\$40,000	Intervention 1: 12 week - child targeted intervention Intervention 2: 12 week - parent targeted intervention. Control: monthly - Self Esteem intervention - nutrition and physical activity were not addressed in this condition. Focus group informed the implementation of the program. Theory: Social Cognitive	Relative to the comparison group, the 2 active intervention groups, when averaged, demonstrated an 11.7% increase in minutes of moderate to vigorous physical activity (MVPA).	The 12 week pilot study was not designed to have sufficient statistical power to observe between group outcome differences. Despite this limitation, the direction of the changes was encouraging in that it favoured the active interventions in most cases.

Author, date, country	Design and participants	Intervention	Outcomes	Limitations
Brownson et al., 2004 United States MODERATE	Quasi-Experimental English Intervention= 653 Control= 580 Ethnicity: White - 69.7% Black - 29.1%, other/unknown - 1.3% Rural	Intervention : information on walking trails, newsletters and walking clubs. Control: Comparison communities. Theory: community-based health promotion using the ecological framework	In both 7 day total walking (p=0.91) and 7 day walking for exercise (p=0.37) there was no significant difference between intervention and control groups.	This study was community based - although there were 6 intervention and control communities, within these there was no individual community breakdown or data extraction. Reliance on self-reported telephone survey may lead to potential bias.

Author, date, country	Design and participants	Intervention	Outcomes	Limitations
Dubbert et al., 2002 United States MODERATE	RCT English Intervention 1=69 Intervention 2=73 Control=70 Mean Age: 68.7 Department of Veteran's Affairs Medical Clinic patients	After completing baseline measures all participants viewed a locally developed motivational and walking/exercise safety video that portrayed older men and women walking in various settings. Participants then set walking goals and created a walking plan. Intervention 1: 20 personal motivational phone calls over 12 months. Intervention 2: 10 personal phone calls from the nurse randomly interspersed with 10 automated phone calls that delivered a message recorded by the nurse. Control: No phone calls Theory: Unknown	Self reported walking and activity measures indicated improvements for participants in all three groups at the 6- and 12- month assessment visits. Minutes walked for exercise during the past 7 days increased overall from 24.3(±58.4) minutes at baseline to 87.2 (±99.4) minutes per week at the 12 months (p=.0001). Across time, the phone calls with automated calls group reported more time walking for exercise than the other two groups (p=.002). Total estimated time per day walking for any reason increased significantly, from 31.5(±44.4) minutes at baseline to 50.2(±46.6) minutes at 12 months (p=.0001). Total weekly hours of moderate intensity PA increased from 3.6±4.5 hours at baseline to 5.1±6.2 hours at 6 months (p=.001).	It is possible that walking adherence was underestimated in this study. Some participants did not return the diaries telling study staff that they disliked the "paperwork".

Author, date, country	Design and participants	Intervention	Outcomes	Limitations
<p>Experience Corps Project</p> <p>United States</p> <p>STRONG</p>	<p>Pilot Study</p> <p>RCT</p> <p>English</p> <p>Intervention= 59 Control= 54</p> <p>Mean Age: 69</p> <p>96% African American</p> <p>94% women</p> <p>Urban</p> <p>Income: 84% - <\$15,000</p>	<p>Intervention 1: Experience Corp - volunteers >60 years old placed in kindergarten to grade 3 classes providing one on one activities.</p> <p>Control: in wait list for Experience Corp.</p> <p>School principals were involved in choosing the volunteer roles that would meet the needs in their schools.</p> <p>Theory: Generativity Theory and Social Capital Theory</p>	<p>When adjusted for age, gender and education, there was a trend toward increased physical activity in the EC participants as calculated by a kilocalorie per week increase of 40% versus a 16% decrease in the controls ($p=0.49$).</p> <p>EC participants who reported “low activity” at baseline experienced an average of 110% increase in the PA vs the control who reported “low activity” at baseline experiencing a 12% increase ($p=0.30$).</p>	<p>This pilot study was relatively short and had a small sample size resulting in a lack of sufficient power to determine between group differences.</p> <p>Some measures relied on self reported data.</p>

Author, date, country	Design and participants	Intervention	Outcomes	Limitations
Fitzgibbon et al., 2005a United States MODERATE	Pilot Study RCT English Intervention 1=13 Intervention 2=18 Control 1=14 Control 2=19 Africa -American Females Urban Mean Income: \$42,500	Intervention 1 (cohort 1): small group format Intervention 2 (cohort 2): small group format Control: weekly newsletters by mail Feedback was sought from cohort 1 and this information was used to modify the intervention given to cohort 2. Attention was paid to making interventions culturally appropriate for Black women. The control intervention was identical for both cohorts. Theory: Social Cognitive	Physical Activity – Cohort 1 no significant difference between intervention and control. Cohort 2 Changes in frequency of regular physical activity in sessions/week ($p < 0.05$) and changes in intensity of PA ($p = 0.01$).	Primary outcome measurement was Breast Self-Examination proficiency. Majority of women were well educated and middle-class, results may not be generalizable to lower-income African American populations. Reliance on self reported data.

Author, date, country	Design and participants	Intervention	Outcomes	Limitations
Fitzgibbon et al., 2005b United States MODERATE	Pilot Study RCT English Intervention= 30 Control= 29 Age Mean: 48.4 African-American Females Urban Income: ≤\$20,500	Intervention 1: faith-based weight loss Control: culturally tailored weight loss program Small group format Group met twice weekly for 12 weeks Theory: Social Cognitive	Total energy expenditure and energy expended in moderate and vigorous activity increased significantly ($p < 0.01$) in the weight loss group, though not in the faith-based weight loss group.	No standard control group. Findings may not be generalizable for younger, high-income women without defined spiritual or religious beliefs'. Relied on self report data.

Author, date, country	Design and participants	Intervention	Outcomes	Limitations
<p>Fitzgibbon et al., 2005c</p> <p>United States</p> <p>MODERATE</p>	<p>RCT</p> <p>English</p> <p>Intervention=197 Control= 212</p> <p>Age: Mean 48.6 mos.</p> <p>African American and Latino communities</p> <p>Low income families (using Head Start programs)</p> <p>Urban</p>	<p>Intervention 1: Hip-Hop to Health Jr. culturally specific healthy eating and exercise intervention.</p> <p>Children: 45 minutes 3 times per week for 14 weeks.</p> <p>Parents: weekly newsletter, homework assignments, 30 minutes aerobic class twice weekly.</p> <p>Control: General health lessons</p> <p>Theory: Transtheoretical with Self-Determination Theory and Social Learning Theory</p>	<p>Primary outcome measures - change in BMI.</p> <p>Secondary outcome Measures - total fat and fibre intake; exercise frequency and intensity; hours of TV viewing per day.</p> <p>Exercise frequency and intensity was similar between groups post intervention and at both Year 1 and Year 2 follow up.</p>	<p>Intervention designed to meet the developmental, cultural and financial needs of low-income minority children so may have limited generalizability.</p>

Author, date, country	Design and participants	Intervention	Outcomes	Limitations
Ford et al., 2002 United States MODERATE	Pilot Study RCT English Intervention= 15 Control= 13 Mean Age: 9.5 African American Urban Low Income	Intervention : brief 1-1 counselling plus 15-20 minute behavioural intervention that gave parents 3 tasks: identify time child spends watching TV, video games, etc., set a media budget with the child and assist the child to stick to the budget. Control: counseling only. Theory: Social Cognitive	The behavioural intervention group reported significantly greater ($p=0.004$) increases in organized physical activity and nearly significant ($p=0.06$) greater increases in playing outside.	Small sample size Reliance on self-reported data Families selected within family practice units and the intervention was delivered by a medical resident.
Going et al., 2003 United States MODERATE	RCT English Age: Mean: 7.6 Aboriginal Students	Intervention: in school increase in frequency and quality of physical education including (PE) classes and activity breaks. Control: Regular curriculum. Theory: Social Learning Theory	Intervention schools were more active (+6.3 to +27.2%) than control schools at three of the four sites, although overall difference between intervention and control schools was not significant ($p>0.05$). Boys were more active than girls by 17 to 21% ($p\leq 0.01$) at both baseline and follow-up.	Although an attempt was made to measure the physical activity level of the same children at baseline and at follow up, this was not always possible. Of the follow-up sample (total $n= 1704$), 16.3% wore Tritrac at both baseline and follow-up intervals. Variable use of the accelerometers and recording only one day of activity may have contributed to the findings.

Author, date, country	Design and participants	Intervention	Outcomes	Limitations
Harvey-Berino, and Rourke, 2003 United Kingdom STRONG	Pilot Study RCT English Intervention= 22 pair Control= 21 pair Age: Mean age of mothers - 26.5 American Aboriginal Rural	All mothers participated in a core parenting program All individual interventions were delivered one-on-one in homes by an indigenous peer educator. Curriculum was adapted as necessary to make it culturally appropriate. Intervention: Obesity Prevention plus Parenting Support (OPPS). The focus of the lessons was on how improved parenting skills could facilitate the development of appropriate eating and exercise behaviours. Control: The peer educator was to refrain from discussing child/parent eating and exercise and to limit conversation when this issue came up.	There were no time or group differences in any of the determinants of maternal exercise behaviours.	This study was designed primarily as a pilot to assess the feasibility of recruiting mothers for a home visiting intervention and to test the intervention materials and measurement techniques. The study was limited in sample size and short in duration. The intervention may have been too diffuse to be effective. A number of the measures relied on self reported data.

Author, date, country	Design and participants	Intervention	Outcomes	Limitations
<p>Hopman-Rock, and Westhoff, 2002</p> <p>Netherlands</p> <p>MODERATE</p>	<p>RCT and Community Intervention Trial (CIT)</p> <p>English</p> <p>Intervention= 234 Control= 156</p> <p>Age: Mean 72.3</p> <p>Dutch</p> <p>Urban</p> <p>Seniors who reported being better educated and in better health than the general population</p>	<p>Intervention : 6 sessions, each consisting of 1 hour of health education and 1 hour of exercise.</p> <p>Control: not described.</p> <p>The educational and exercise program was changed based on the feedback from RCT participants, the educator and the exercise instructor.</p> <p>Theory: Unknown</p>	<p>Effects on PA (household and sport) between intervention and control group there was significant difference (p=0.05) between pre and post test.</p>	<p>Limited budget resulted in working with a small number of participants that could have resulted in lack of statistical power to detect differences in the RCT.</p> <p>Statistical power unintentional lowered due to problem with recruiting physically inactive people by means of random approach.</p> <p>CIT demonstrates collaboration of many organizations to deliver the program community-wide.</p> <p>Program should be tested on less healthy older adults.</p>

Author, date, country	Design and participants	Intervention	Outcomes	Limitations
Jiang et al., 2004 Canada MODERATE	Quasi- Experimental English Intervention1= 15 Intervention 2 (comparison)=14 Age: Mean: 76.8 Urban	Intervention 1: (PAGH+) Physical Activity Guide plus 8 weekly behaviour change classes. Intervention 2: PAGH only. Theory: Transtheoretical and Social Cognitive	The PAGH+ group had a 62.3% increase in estimated total energy expenditure following the 8 week program; this was significantly greater than the 14.6% increase observed in the PAGH group ($p<0.05$). Energy expended during recreational activities also increased significantly in both groups during the 8 week study ($p<0.05$).	Short duration of the intervention may have contributed to the positive impact of using PAGH.
Kerse et al., 1999 Australia MODERATE	RCT with one year follow-up English Intervention = 135 Control= 132 Urban	Intervention: GPs undertook a 5 stage educational programme (covering social and physical activity and prescribing and immunization practices for elderly patients) incorporated into their daily practice passing the health promotion information on to their patients. Control: usual care. Theory: Unknown	On average, the amount of weekly walking in the intervention group was 44 minutes more than in the control group ($p<0.032$).	Results may not be generalizable to the entire elderly population. Variability in the change of activity and width of confidence intervals around positive results suggests caution in interpretation.

Author, date, country	Design and participants	Intervention	Outcomes	Limitations
<p>Kerse et al., 2005</p> <p>New Zealand</p> <p>STRONG</p>	<p>RCT</p> <p>English</p> <p>Intervention= 140 Control= 130</p> <p>Age: mean 71.6</p> <p>Primary care patients</p>	<p>Intervention : Patients prompted their primary physican or practice nurse to deliver brief activity counselling. "Green Prescription" was written involving negotiated activity goals. Trained exercise specialists from regional sports facilities provided follow-up phone support over 3 months.</p> <p>Control: usual care.</p> <p>Theory: Unknown</p>	<p>A statistically non-significant increase in the proportion of participants reaching health-related activity goals of 2.5 hours of moderate or vigorous activity per week.</p> <p>Leisure time moderate activity and energy expenditures increased significantly in the intervention group.</p> <p>Total energy expenditure increased but not significantly.</p>	<p>The increase in amount of moderate or vigorous activity observed in this trial is modest – an average of 40 minutes per week.</p>

Author, date, country	Design and participants	Intervention	Outcomes	Limitations
Nafziger et al., 2001 United States MODERATE	Quasi-Experimental English Intervention=363 Control= 263 Caucasian 98% - 100% Rural	Intervention: Heart Health Program offered at the community level included walking programs, risk factor screening for adults, media involvement, school programs, classroom presentations. It was estimated that at least one of the interventions reached most of the population who were school age or above. Control: Reference population – Non Heart Healthy designated community.	There was a non-significant reduction in the prevalence of self-reported sedentary lifestyle among the intervention population (from 72.5% to 60.9%), while the reference population has a stable rate of 68% sedentary lifestyle.	Study duration short and sample size small.
Narayan et al., 1998 United States STRONG	Pilot Study RCT English Intervention= 47 Control= 48 Mean Age: 33.5 Aboriginal	Intervention: Pima Action - subjects could choose from a variety of non-vigorous PA. Control: Pima Pride - self directed learning including group discussions and Pima culture and history. Theory: Can't Tell	Members of both groups reported a increase in PA (mostly walking) with no significant differences between groups measured at 6 months (MET-h month $p=0.52$) and 12 months (MRT-h month $p=0.51$).	Results may not be generalizable due to recruitment issues – being female and at higher risk for diabetes were associated with higher likelihood of volunteering to participate in trial. Some measures relied on self reported data.

Author, date, country	Design and participants	Intervention	Outcomes	Limitations
<p>Newton, Jr. and Perri, 2004</p> <p>United Kingdom</p> <p>MODERATE</p>	<p>Pilot Study</p> <p>RCT</p> <p>English</p> <p>Intervention 1= 22</p> <p>Intervention 2=20</p> <p>Control= 10</p> <p>African-American</p> <p>Income: 62.5% - \$25,000-74,999</p> <p>12.5% - ≥%75,000</p> <p>Employment: 86% reported working full or part time</p>	<p>Intervention 1: Standard Behaviour (SB) Exercise Counseling.</p> <p>Intervention 2: Culturally sensitive (SC) exercise counseling.</p> <p>Control: physician advice/recommended care (PA).</p> <p>Theory: Can't Tell</p>	<p>Cardiorespiratory fitness and physical activity.</p> <p>Post-hoc tests showed significant differences between SB and PA conditions (p=.006) and between SC and PA conditions (p=.034).</p>	<p>The small sample size limits this study's generalizability and its power to detect between group differences.</p> <p>Majority of participants were highly educated, which may limited generalizability to less educated samples.</p> <p>Some measures relied on self reported data.</p>

Author, date, country	Design and participants	Intervention	Outcomes	Limitations
Paradis et al., 2005 Canada MODERATE	Quasi-Experimental English Intervention= 458 Control= 199 Aboriginal Children Rural	Intervention: healthy education curriculum delivered in grades 1 through 6. Control: normal curriculum. Theory: Social Learning Model, the Precede-Proceed Model, the Ottawa Charter for Health Promotion and traditional learning styles of native children.	Children in intervention community reported a significant decrease in frequency of gym class at school - 2.84 to 1.85 per week. Children in the comparison community improved their performance in the run/walk test (8% improvement on average).	No follow up data on comparison group after 1996 because the program was then delivered to the comparison school. No benefits were maintained over the long term.

Author, date, country	Design and participants	Intervention	Outcomes	Limitations
Pate et al., 2005 United States MODERATE	RCT English Intervention= 863 Control= 741 Mean Age: 13.6 48.7% African American, 46.7% White Students grades 8-9	Intervention 1: LEAP - Lifestyle Education for Activity Program. Control: regular school curriculum. Theory: Social Ecological Model drawn primarily from Social Cognitive Theory	At follow up the prevalence of regular vigorous activity was greater in the LEAP intervention schools than in the control schools (p=0.05).	Some measures relied on self reported data. Program increased activity both in school and outside of school, which has not been demonstrated before. Facilitative approach to intervention where schools take the key elements and incorporate them into the existing curriculum and programs. Local school LEAP teams determine how to reallocate resources to meet the goals.
Pinto et al., 2005 United States MODERATE	RCT English Intervention=52 Control=48 Mean Age: 68.5±7.16 85.3% Caucasian 63.2% women Primary care patients	Intervention: Extended advice which included 1) three face to face PA counselling sessions with a health educator at months 0, 1, and 3 lasting an average of 30 to 45 minutes 2) PA prescriptions tailored to the participants motivational readiness	Participants in the extended-advice arm reported significantly greater participation in moderate-intensity PA than the brief-advice group at 3 months (+57.69 minutes vs 12.45 minutes, p=<0.05) and 6 months (62.84 minutes vs. 16.60 minutes, p=<0.05). Objective activity monitoring also showed significantly increased PA among extended-advice versus brief-advice participants at both points (+50.79 vs -11.11; +42.39 vs -24.18, respectively).	Limitations in this study include the convenience sample of practices and volunteer sample of patients drawn from only one region of the country. The sample was made up of relatively young adults and predominantly English-speaking, white adults. All these factors reduce the generalizability of the findings.

Author, date, country	Design and participants	Intervention	Outcomes	Limitations
		<p>3) 12 PA counselling phone calls – weekly for the first 3 months and then alternate weeks for the second 3 months lasting an average of 10 to 15 minutes</p> <p>4) 40 - 12 PA tip sheets mailed simultaneously with the phone counselling. All counselling tailored to the patient's stage of readiness.</p> <p>Control: Brief advice group did not receive any additional counseling apart from the advice given by their clinician.</p>		

Author, date, country	Design and participants	Intervention	Outcomes	Limitations
Poston et al., 2001 United States MODERATE	Quasi-Experimental Group randomization of intact groups (blocks) of Mexican-American women Intervention: 17 blocks Control: 16 blocks English Intervention= 194 Control= 185 Mean Age: Intervention 39.2±10.6 Control 40.0±6.4 Mostly bilingual (79%) Spanish/English speaking	Intervention: 6 month physical activity program followed by 6 months of follow-up in peer led groups. Control: Wait list Instructors were bilingual Mexican-Americans, and all program materials were available in both English and Spanish . Theory: Social Cognitive Theory	Participants in both the intervention and control groups reported significant increases in activity level at 6 and 12 months compared to their baseline data. However, treatment did not have a significant impact on changes in physical activity among the study participants who completed the 12 month intervention ($F_{2, 31}=0.02$, $p=0.98$).	Randomization by groups may produce less equivalent groups than would randomization by individual. Intervention carried out in a small town – possible between group contamination as the intervention group may have interacted with and/or transmitted information to the control participants. Other barriers to physical activity and to participation (e.g. lack of transportation, child care) may have impacted results. High drop out rates (62%) by the 12 month measure may have impacted results.

Author, date, country	Design and participants	Intervention	Outcomes	Limitations
Reijneveld et al., 2003 Netherlands MODERATE	RCT English Intervention= 74 Control= 52 Mean Age: 54.8 Turkish immigrants Urban	Intervention: 8 sessions with a combination of health education and physical activity. Control: 6 education sessions regarding the available welfare services for the elderly. Information from focus groups helped in the adaptation of this program for the target population. Prior to full implementation the program was piloted with 12 Turkish women leading to minor modifications in the manuals and the materials.	Non significant effect ($p=0.76$) on physical activity levels.	Power of the study was lower than anticipated due to follow up losses.

Author, date, country	Design and participants	Intervention	Outcomes	Limitations
Resnick, 2002 United States MODERATE	RCT English Intervention=10 Control=7 Mean Age: 88 ±3.7 years Women	Intervention: Exposure to the WALC intervention (<u>W</u> alk; <u>A</u> ddress pain, fear and fatigue; <u>L</u> earn about exercise and verbal encouragement and <u>C</u> uing). Six month intervention. Control: Routine care. Theory: Self-efficacy	At baseline, none of the participants engaged in regular exercise. The treatment group averaged 8 ± 5.8 hours (approximately 4 hours per month) of exercise activity between the baseline and the 2 month testing period, and averaged 14.1 ± 9.6 hours of exercise activity between the 2- and 6-month testing period (approximately 3.5 hours per month). The control group had no change in exercise activity from their baseline scores of 0. Effect size for exercise activity=.400 Power=.93.	Small sample size led to inadequate statistical power to find between group differences. Sample enlisted from one continuing care retirement community may impact the generalizability of the findings.
Resnicow et al., 2005 United States MODERATE	Quasi-Experimental 16 churches were randomly assigned to three intervention conditions English Group 1=267 among 5 churches Group 2=335 among 6	Group 1: received standard nutrition and PA intervention materials (comparison group). Group 2: received culturally targeted self-help nutrition and PA intervention materials (SH). Group 3: received same intervention as Group 2 plus four telephone calls based on Motivational	SH and SH + MI groups reported statistically significantly (p<.05) more physical activity on all three measures than the control group. There was no difference in outcomes between the SH and SH + MI groups.	This study was looking at the effect of intervening on two health behaviour simultaneously – F&V consumption and physical activity. Results may be confounded by this process. Participants recruited using a quota sampling framework (first come/first served) therefore the sample may not be representative of the entire church population. Sampling bias, response rate and external validity might be an issue.

Author, date, country	Design and participants	Intervention	Outcomes	Limitations
	<p>churches</p> <p>Group 3=304 among 5 churches</p> <p>African-American</p> <p>70%+ reported at least some college education</p> <p>60%+ reported income >\$70,000</p>	<p>Interviewing (MI) techniques.</p>		

Author, date, country	Design and participants	Intervention	Outcomes	Limitations
Robinson et al., 2003 United States STRONG	Pilot Study RCT English Intervention= 28 Control= 33 Mean Age: 9.5 African American Urban 72% reported total family income ≤\$40,000.	Intervention 1: GEMS Jewels dance classes and a 5 lesson intervention over 3 months, delivered in the participants' homes. Control: "Active Control" state-of-the-art information based health education: included monthly community health lecture. Theory: Social Cognitive	Girls in the intervention group self reported approximately 12% more total minutes of moderate-to-vigorous physical activity relative to the controls.	The study was not designed to have sufficient power to test the efficacy of the treatment intervention, as compared to the control intervention, however trends were in the direction of favouring the intervention group. Lack of transportation negatively impacted attendance.

Author, date, country	Design and participants	Intervention	Outcomes	Limitations
<p>Sanchez-Johnsen et al., 2006</p> <p>United States</p> <p>MODERATE</p>	<p>Pilot Study</p> <p>RCT</p> <p>Intervention=14 Control= 13</p> <p>Latina Women</p> <p>Mean Age : 44.9±8.2</p> <p>Family Income : 57.1% >\$16,000</p>	<p>Intervention: 6 week - twice weekly meetings that included 30 minutes on diet and weight loss strategies, 30 minutes on breast health and 30 minutes engaged in low impact aerobic activities. Classes led by bilingual (Spanish/English) doctor and aerobics instructor.</p> <p>Control: Received mailed health education material on a schedule comparable to the intervention.</p> <p>Theory : Social Cognitive Theory</p>	<p>There was no significant difference in the number of times exercised, the duration of physical activity or the amount of effect exerted during PA (all p-values>.1) between participants in the intervention versus control group.</p>	<p>Self reported data – PA that is self reported has been found to be vulnerable to subjectivity, low levels of precision and overestimations.</p>

Author, date, country	Design and participants	Intervention	Outcomes	Limitations
Stewart et al., 2001 United States MODERATE	RCT English Intervention=81 Control=83 Seniors Mean Age : 74±6 66% female 77% annual income > \$20,000 34% college or higher education	Intervention : individualized program of physical activity promotion in which participants were asked to try one or two activities that suited their ability, interest, income and transportation resources. Intervention delivered over a 12 month period. Participants encouraged to attend 6 monthly support meetings. Control: wait list. Theory : Social Cognitive Theory	Those in the intervention group increased their estimated caloric expenditure on moderate-intensity (or greater) activities more than those in the control group: $F(1, 159) = 8.84$, ($p=.003$). The intervention group also increased their caloric expenditure in all activities significantly more than the control group: $F(1,159) = 9.06$, ($p=.003$).	Sample fairly well educated and did not include many minority participants. Study setting was a high quality health care setting. Results may not be generalizable to more vulnerable populations.

Author, date, country	Design and participants	Intervention	Outcomes	Limitations
Stewart et al., 1997 United States MODERATE	Comparison-Group Design Intervention = 59 Comparison Group = 30 Mean age 76.9 ± 6.8 83% women Years of education 13.8 ± 3.5 22 members of a senior centre also completed the intervention. They were slightly younger and better educated than the congregated housing groups.	Intervention: 6 month intervention designed to encourage participants to attend moderate-intensity physical activity programs within the community. Encouragement/information through a motivational information meeting, one-to-one assistance in selecting programs, distribution of a local Physical Activity Directory, 6 monthly group meetings, newsletter, telephone support, and small incentives for attending the meetings. Comparison group: wait list	No overall between group differences in physical activity or caloric expenditure. Intervention group reported statistically significantly more participation in community classes or programs in each month (p=.05) than the control group. However, among those who adopted and maintained a new activity, the intervention group reported significantly greater frequency of activity. Senior Centre participants that adopted and maintained a new activity increased both their caloric expenditure and their frequency per week of physical activity.	Participants were residents of government subsidized housing facilities, therefore all had low incomes. No participants were denied access because of health problems.

Author, date, country	Design and participants	Intervention	Outcomes	Limitations
<p>Story et al., 2003</p> <p>United States</p> <p>MODERATE</p>	<p>Pilot Study</p> <p>RCT</p> <p>English</p> <p>Intervention= 26 Control=28</p> <p>Mean Age: 9.3</p> <p>African-American</p> <p>Urban</p> <p>Family Income ≤\$40,000 (71.2%)</p>	<p>Intervention: 12 week after school program called "Girlfriends for Keeps", a family component to reinforce learnings included weekly family packs (practical suggestions for healthy eating and exercise, fridge magnet, a "Fridge Fact" card and colourful tip sheets). On alternate weeks the packs included ingredients for healthy snacks Family nights were held during the 2nd and 9th weeks of the intervention. Motivational phone calls by trained GEMS staff to support family determined goals re nutrition, physical activity and TV viewing. Personally tailored newsletters sent to families.</p> <p>Control: The GEMS club served as an "active placebo" non-nutrition/ physical activity condition, and focused on promoting positive self esteem and cultural awareness.</p> <p>Theory: Social Cognitive</p>	<p>Physical activity measures demonstrated consistently greater activity levels in the intervention, compared to the control group; CSA counts per minute, minutes of moderate to vigorous PA between 12 PM and 6 PM, all increased more among girls in the intervention group over the control group, although none of these differences reached statistical significance.</p>	<p>This pilot study was relatively short and had a small sample size resulting in a lack of sufficient power to determine between group differences.</p> <p>Some measures relied on self reported data.</p>

Author, date, country	Design and participants	Intervention	Outcomes	Limitations
Treviño et al., 2005 United States MODERATE	RCT English 389 fourth grade students Intervention= 5 schools Control= 4 schools 97% of students were Mexican-American Mean Age : 9.75 Median Family Income : \$10,337 (intervention group) \$11,691 (control group)	The Bienestar Health Program had 4 components each delivered to at the intervention schools. Intervention School: Bienestar Parent Program: four fun activities: students performed a dance, a hands-on craft project, a bingo game and a salsa dancing class. Bienestar Health Class: PE curriculum promoting a variety of physical activities. Bienestar Health Club: 32 lesson plans aimed at rehearsing and reinforcing classroom learning and promoting leisure time moderate to vigorous physical activity. Bienestar School Food Services: 6 lesson plans to improve the nutrition knowledge of food service staff and to persuade students to	Results of the two-way ANCOVA found that physical fitness score (PFS) changed significantly between intervention and control students after adjusting for age and pre-intervention BMI, $F(1, 381)=8.69$, ($p=.003$). With adjustment for covariates, PFS increased significantly during the 8-month period in the invention group (+2.9 points) and decreased slightly in the control group (-.2 points).	Physical fitness was measured instead of physical activity as it has been suggested that PA recall in children younger than 10 years of age has been shown to be less reliable and less valid than with older children and because short-term recall questionnaires may reveal seasonal instead of usual physical activity.

Author, date, country	Design and participants	Intervention	Outcomes	Limitations
		<p>choose and eat more F&V and fewer fatty foods.</p> <p>Control Schools: Regular Curriculum</p> <p>Theory : Social Cognitive Theory</p>		

Author, date, country	Design and participants	Intervention	Outcomes	Limitations
Wilson et al., 2002 United States MODERATE	Pilot Study RCT English Intervention 1=17 Intervention 2=20 Control= 16 Age: 11-15 year olds African-American Urban	Intervention 1: Social Cognitive Theory - Nutrition and Physical Activity Weekly session for 12 weeks focusing on education, behaviour skills training, feedback and reinforcement. After school sports program 3 times per week. Cooking class once per week. Intervention 2: as above plus Motivational Intervention- Nutrition and Physical Activity. Control: maintain usual nutrition and physical activity - students were provided with educational materials about general health-related issues. Theory: Social Cognitive and Motivational Intervention Theory	Fruit and vegetable consumption; physical activity. The SCT + MI and SCT groups showed significantly greater increases in physical activity self-efficacy measures as compared with the control group. No between group differences in levels of physical activity .	This was a pilot for feasibility reasons (i.e., available staff and resources). No differences in physical activity outcomes could be related to inadequate statistical power to detect a difference, to the fact that the control group also had access to the school sports program or to the actual program being ineffective. Some measures relied on self reported data.

Author, date, country	Design and participants	Intervention	Outcomes	Limitations
Yancey et al., 2006 United States MODERATE	RCT English Intervention=197 Control=192 Mean Age : Intervention 44.56±10.82 Control 46.52±10.82 African-American Women	Intervention Group received eight weekly 2 hour interactive group sessions, including exercise instruction, usually facilitated by project staff. Intervention includes skills building, nutrition education and social support was built through participants being encouraged to invite a friend to the meetings – invitees were not considered study subjects. Participants were given a one year free gym membership. Control group received eight 2 hour interactive group sessions on current African-American women's health topics without the external support component.	PA levels increased significantly from baseline among intervention participants ($p < 0.0001$ and $p = 0.04$ at 2 months and 6 months respectively). There was a significant main effect of the intervention on PA at 2 months ($p = 0.0148$), remaining marginally significant at 12 months ($p = 0.058$).	Significant but modest changes immediately post-intervention that decayed over time thereafter. Some self reported data used.

Appendices:

Appendix 1: Search Strategy

Appendix 2: Hand-searched Journals

Appendix 3: Relevance Tool

Appendix 4: Quality Assessment Tool

Appendix 5: Data Extraction Tool

Appendix 1: Search Strategy

Effectiveness	Public Health	Interventions	Physical activity	Marginalized Pop.
effect: efficacy evaluat: outcome: impact evidence assess: compar:	“public health” “health promotion” “health education” “primary prevention” “preventive health services” prevention “community development” education prophyla: “population health”	program: intervention: project: coalition: curricul: strateg: education: campaign: counsel: media school: activit: advoca: environment:	physical activit: exercise:	marginalized “low income” “low socioeconomic” poverty “low literacy” “low education:” “diverse cultures” immigrant: refugee: ethnic aboriginal native “American Indian” rural disability: disable: adolescent: youth teenage: elderly senior: aged/ “single parent:” homeless “African American:” migrant: transient: vulnerable

COCHRANE TRoPHi 1995-2006 ENGLISH
CINAHL SportDiscus
DARE EMBASE
PsycINFO PUBMED
Medline

Appendix 2: Hand-searched Journals

Searched from January 2006 to July 2006 :

American Journal of Epidemiology
American Journal of Preventive Medicine
American Journal of Public Health
British Medical Journal
Canadian Journal of Public Health
Canadian Medical Association Journal
Ethnicity and Disease
Health Education and Behavior
Health Promotion International
Journal of the American Geriatrics Society
Journal of Health Care for the Poor and Underserved
Journal of Immigrant and Minority Health
Journal of Nutrition Education and Behavior
Journal of Rural Health
Obesity
Rural and Remote Health

Appendix 3: Relevance Tool

Physical Activity for Marginalized Populations

Ref. ID: _____

Reviewer: *reviewer's name*

Relevance Criteria:

- | | | | |
|----|---|---|---|
| 1. | Is there enough information to determine status. | Y | N |
| 2. | The intervention described could be implemented, facilitated or promoted by staff in local public health units in Canada. | Y | N |
| 3. | The study focuses on any of the following populations: low income, education and/or literacy; diverse cultures including recent immigrants and refugees; aboriginals; rural residents; disabled; adolescents; seniors; single parents and their children; homeless. | Y | N |
| 4. | The reported study outcome(s) includes physical activity. | Y | N |
| 5. | The <u>primary</u> study design is prospective and includes a control group, for example, RCTs, cohort studies, before/after comparisons, time series. One group pre/post designs are NOT acceptable. | Y | N |
| 6. | If this article is NOT going to pass the relevance criteria, would it make a good background article on the subject? One 'no' answer to the above questions will disqualify the article from inclusion in the review. | Y | N |

Reviewer Decision:

1. Include in critical appraisal (only if answer 'yes' to all 5 relevance criteria).
Y N

2. If Discrepancy in Inclusion Decision:

Reason for discrepancy:

Oversight

Difference in interpretation of criteria

Differences in interpretation of study

Additional Comments:

FINAL DECISION:

INCLUDE IN STUDY

EXCLUDE IN STUDY

Appendix 4: Quality Assessment Tool

COMPONENT RATINGS

A) SELECTION BIAS

(Q1) Are the individuals selected to participate in the study likely to be representative of the target population?

- 1 Very likely
- 2 Somewhat likely
- 3 Not likely
- 4 Can't tell

(Q2) What percentage of selected individuals agreed to participate?

- 1 80 - 100% agreement
- 2 60 - 79% agreement
- 3 less than 60% agreement
- 4 Not applicable
- 5 Can't tell

RATE THIS SECTION	STRONG	MODERATE	WEAK
See dictionary	1	2	3

B) STUDY DESIGN

Indicate the study design

- 1 Randomized controlled trial
- 2 Controlled clinical trial
- 3 Cohort analytic (two group pre + post)
- 4 Case-control
- 5 Cohort (one group pre + post (before and after))
- 6 Interrupted time series
- 7 Other specify _____
- 8 Can't tell

Was the study described as randomized?

- No
- Yes

If NO, go to component C

If Yes, was the method of randomization described? (see dictionary)

- No
- Yes

If Yes, was the method appropriate? (see dictionary)

- No
- Yes

RATE THIS SECTION	STRONG	MODERATE	WEAK
See dictionary	1	2	3

C) CONFOUNDERS

(Q1) Were there important differences between groups prior to the intervention?

- 1 Yes
- 2 No
- 3 Can't tell

The following are examples of confounders:

- 1 Race
- 2 Sex
- 3 Marital status / family
- 4 Age
- 5 SES (income or class)
- 6 Education
- 7 Health status
- 8 Pre-intervention score on outcome measure

(Q2) If yes, indicate the percentage of relevant confounders that were controlled (either in the design (e.g. stratification, matching) or analysis)?

- 1 80 – 100%
- 2 60 – 79%
- 3 Less than 60%
- 4 Can't Tell

RATE THIS SECTION	STRONG	MODERATE	WEAK
See dictionary	1	2	3

D) BLINDING

(Q1) Was (were) the outcome assessor(s) aware of the intervention or exposure status of participants?

- 1 Yes
- 2 No
- 3 Can't tell

(Q2) Were the study participants aware of the research question?

- 1 Yes
- 2 No
- 3 Can't tell

RATE THIS SECTION	STRONG	MODERATE	WEAK
See dictionary	1	2	3

E) DATA COLLECTION METHODS

(Q1) Were data collection tools shown to be valid?

- 1 Yes
- 2 No
- 3 Can't tell

(Q2) Were data collection tools shown to be reliable?

- 1 Yes
- 2 No
- 3 Can't tell

RATE THIS SECTION	STRONG	MODERATE	WEAK
See dictionary	1	2	3

F) WITHDRAWALS AND DROP-OUTS

(Q1) Were withdrawals and drop-outs reported in terms of numbers and reasons per group?

- 1 Yes
- 2 No
- 3 Can't tell

(Q2) Indicate the percentage of participants completing the study. (If the percentage differs by groups, record the lowest).

- 1 80 -100%
- 2 60 - 79%
- 3 less than 60%
- 4 Can't tell

RATE THIS SECTION	STRONG	MODERATE	WEAK
See dictionary	1	2	3

G) INTERVENTION INTEGRITY

(Q1) What percentage of participants received the allocated intervention or exposure of interest?

- 1 80 -100%
- 2 60 - 79%
- 3 less than 60%
- 4 Can't tell

(Q2) Was the consistency of the intervention measured?

- 1 Yes
- 2 No
- 3 Can't tell

(Q3) Is it likely that subjects received an unintended intervention (contamination or co-intervention) that may influence the results?

- 1 Yes
- 2 No
- 3 Can't tell

H) ANALYSES

(Q1) Indicate the unit of allocation (circle one)

community organization/institution practice/office provider client

(Q2) Indicate the unit of analysis (circle one)

community organization/institution practice/office provider client

(Q3) Are the statistical methods appropriate for the study design?

- 1 Yes
- 2 No
- 3 Can't tell

(Q4) Is the analysis performed by intervention allocation status (i.e. intention to treat) rather than the actual intervention received?

- 1 Yes
- 2 No
- 3 Can't tell

GLOBAL RATING

COMPONENT RATINGS

Please transcribe the information from the gray boxes on pages 2-4 onto this page.

A SELECTION BIAS

RATE THIS SECTION	STRONG	MODERATE	WEAK
-------------------	--------	----------	------

B STUDY DESIGN

RATE THIS SECTION	STRONG	MODERATE	WEAK
-------------------	--------	----------	------

C CONFOUNDERS

RATE THIS SECTION	STRONG	MODERATE	WEAK
-------------------	--------	----------	------

D BLINDING

RATE THIS SECTION	STRONG	MODERATE	WEAK
-------------------	--------	----------	------

E DATA COLLECTION METHODS

RATE THIS SECTION	STRONG	MODERATE	WEAK
-------------------	--------	----------	------

F WITHDRAWALS AND DROPOUTS

RATE THIS SECTION	STRONG	MODERATE	WEAK
-------------------	--------	----------	------

GLOBAL RATING FOR THIS PAPER (circle one)

- | | | |
|---|-----------------|---|
| 1 | STRONG | (four STRONG ratings with no WEAK ratings) |
| 2 | MODERATE | (less than four STRONG ratings and one WEAK rating) |
| 3 | WEAK | (two or more WEAK ratings) |

WITH BOTH REVIEWERS DISCUSSING THE RATINGS:

Is there a discrepancy between the two reviewers with respect to the component (A-F) ratings?
No Yes

If yes, indicate the reason for the discrepancy

- | | |
|---|---|
| 1 | Oversight |
| 2 | Differences in interpretation of criteria |
| 3 | Differences in interpretation of study |

FINAL DECISION OF BOTH REVIEWERS (circle one):

- | | |
|---|-----------------|
| 1 | STRONG |
| 2 | MODERATE |
| 3 | WEAK |

Appendix 5: Data Extraction Tool

PHRED Effective Public Health Practice Project

Core Data Extraction Form Physical Activity for Marginalized Populations

Study Identification

First Author _____

Year of publication _____

Language of publication English
French
Other language (specify) _____

Country Canada
United States
United Kingdom
Other (specify) _____
Can't tell

Do you have any comments to add to the study identification section?

Design

Years data collected _____ to _____
Can't tell

Is this a pilot study? Yes No

Number of intervention groups _____ Can't tell N/A
Number of control groups _____ Can't tell N/A
Number of subjects screened _____ Can't tell N/A
Number of eligible subjects _____ Can't tell N/A

Number of allocated subjects (total and by group)

Total _____ Can't tell N/A
Intervention #1 _____ Can't tell N/A
Intervention #2 _____ Can't tell N/A
Intervention #3 _____ Can't tell N/A
Control _____ Can't tell N/A

Number of drop-outs (total and by group)

Total	_____	Can't tell	N/A
Intervention #1	_____	Can't tell	N/A
Intervention #2	_____	Can't tell	N/A
Intervention#3	_____	Can't tell	N/A
Control	_____	Can't tell	N/A

Source of funding for the study (check all that apply)

- Governmental organization
- Commercial organization
- Health-care provider organization
- Voluntary body (e.g. Health Promotion Organization)
- Charitable trust
- Research funding body (e.g. Medical Research Council)
- Other (specify) _____
- Can't Tell

Do you have any comments to add to the study design section?

Sample

Sex (Check one box only)

- Male Female Mixed Can't tell

Age (specify mean and range) mean_____upper_____lower _____
 Can't tell

Ethnicity (specify) _____ Can't tell

Education (Check one box only)

- Completed grade school
- Completed high school
- Completed university
- Mix
- Other _____
- Can't tell

Residential Setting (Check one box only)

- Urban Mix
 Rural Can't Tell

Social-economic status (specify)

Income (enter numerical value only, currency field next) _____

Employment _____

Currency (for income)

- Dollar (Canadian)
 Dollar (American)
 Euro (Europe)
 Pound (Britain)
 Other

Do you have any comments to add to the Study Sample section?

Intervention Data – Describe for each intervention as applicable:

Intervention #1	Intervention #2	Intervention #3	Control
<i>Eg. Frail elders personalized program plus community development program</i>	_____	_____	<i>Eg. Visits by project community development program</i>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Do you have any comments to add to the Intervention Data section?

Intervention Descriptors: (check all that apply)

	Intervention #1	Intervention #2	Intervention #3	Control
Community development	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Community-based Mass media	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Distribution of printed educational materials (eg. Fact sheets, posters)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Educational session (workshops)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
School curriculum	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Counseling (one to one)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Computer-based learning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Audio-visual materials (eg. Videos)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Support group	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other Intervention descriptor (specify)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Do you have any comments to add to the Intervention Descriptors section?

Theoretical framework: (check all that apply for each intervention and control)

	Intervention #1	Intervention #2	Intervention #3	Control
Trans theoretical PRECEDE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Intention and action	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Health belief model	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Social cognitive theory	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Diffusion of innovation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Social marketing theory	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Can't tell	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other theoretical framework (specify)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Do you have any comments to add to the Theoretical Framework section?

Intervention provider: (state who (or what) delivered the intervention. Check all that apply)

	Intervention #1	Intervention #2	Intervention #3	Control
Professional (state profession)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Research worker (member of study team)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Para professional	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lay person	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Peer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Volunteer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Computer system	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Community groups	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Can't tell	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (Specify)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Do you have any comments to add to the Intervention Provider section?

Internal training provided:

	Intervention #1	Intervention #2	Intervention #3	Control
Yes (Specify)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Can't tell	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Do you have any comments to add to the Internal Training Provided section?

Intervention setting: (check all that apply)

	Intervention #1	Intervention #2	Intervention #3	Control
Community	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Home	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hospital	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
School	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Telephone	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Worksite	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clinic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Can't Tell	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (Specify)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Do you have any comments to add to the Intervention Setting section?

Intervention target group: (check all that apply)

	Intervention #1	Intervention #2	Intervention #3	Control
Infants	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Preschool	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Grade School	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Adolescents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pregnant women	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Parents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Adults	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Seniors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Family care givers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Health Professionals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (Specify)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Can't tell	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Do you have any comments to add to the Intervention Target Group section?

Target group size: (check all that apply)

	Intervention #1	Intervention #2	Intervention #3	Control
Individual	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Family	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Group	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Community	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Can't Tell	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Do you have any comments to add to the Target Group Size section?

Consumer involvement:

Were consumers (i.e. members of the public) involved at any point of the design, conduct or interpretation of the study? (e.g., consumers involved in guideline development, or their views collected)

	Intervention #1	Intervention #2	Intervention #3	Control
Yes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Can't Tell	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Do you have any comments to add to the Consumer Involvement section?

Intervention Duration:

	Intervention #1	Intervention #2	Intervention #3	Control
Specify in weeks	_____	_____	_____	_____
Can't tell	ρ	ρ	ρ	ρ

Do you have any comments to add to the Intervention Duration section?

Intervention Frequency:

	Intervention #1	Intervention #2	Intervention #3	Control
Specify in weeks	_____	_____	_____	_____
Can't tell	ρ	ρ	ρ	ρ

Do you have any comments to add to the Intervention Frequency section?

Length of Post-Intervention Follow-up (all data collection points):

	Intervention #1	Intervention #2	Intervention #3	Control
Specify in weeks	_____	_____	_____	_____
Can't tell	ρ	ρ	ρ	ρ

Do you have any comments to add to the Length of Post Intervention Follow-up section?

Outcome Category (check all that apply):

- ρ Client goal attainment
- ρ Client satisfaction/perception
- ρ Cost or other economic indicators
- ρ Health care utilization
- ρ Health risk behaviours
- ρ Knowledge/attitudes/intentions
- ρ Mental health
- ρ Physical health status/development
- ρ Program process measures
- ρ Quality of care given by health professional
- ρ Quality of care given by family member
- ρ Quality of life
- ρ Social health indicators
- ρ Parent/child interactions

Do you have any comments to add to the Outcome Category section?

Indicate the outcome measure (specify): _____

Do you have any comments to add to the Outcome Measure section?

Indicate the unit of measurement (e.g. infections per month) with specific numeric values:

Do you have any comments to add to the Unit of Measurement section?

Was the outcome measured at baseline?

Yes

No

Do you have any comments to add to the Outcome Measure Assessed at Baseline section?

Indicate number of post-intervention outcome assessments:

Do you have any comments to add to the Number of Post-intervention Outcome Assessments section?