

What is the effectiveness of community-based/primary care interventions in reducing obesity among adults in the general population?

EFFECTIVE PUBLIC HEALTH PRACTICE PROJECT (EPHPP)

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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), systematic reviews completed prior to 2007 were 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 Standard

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
Effectiveness of environmental awareness interventions *	1999

Chronic Disease and Injuries

Chronic Disease Prevention

What is the effectiveness of community-based/primary care interventions in reducing obesity among adults in the general population?*	2008
Is there a relationship between food insecurity and overweight/obesity? *	2007

The effectiveness of multi-faceted health promotion interventions in the workplace to reduce chronic disease *	2007
The effectiveness of intervention to promote physical activity among marginalized populations *	2007
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
Counselling 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 activity 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	2002
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

Workplace interventions to prevent substance misuse*	2008
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 travelling 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

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/ephpp> regularly for new or updated information.*

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Preface

The Public Health Branch of the Ontario Ministry of Health released the Mandatory Health Programs and Services Guidelines (MHPSG) in December 1997. Although the MHPSG provide guidance 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) develops and provides systematic reviews of the effectiveness of public health interventions in Canada. Our reviews summarize the best available research evidence for public health practice. 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 from across the country. Potential review topics are initially identified through a survey of public health practitioners and managers across Canada. 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 the 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-informed 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, the EPHPP has contributed to the development of a strong Canadian-wide network of public health professionals.

Effective Public Health Practice Project Summary Statement



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: Thomas, B.H., Fitzpatrick-Lewis, D., Rideout, L., & Muresan, J. (2008). What is the effectiveness of community-based/primary care interventions in reducing obesity among adults in the general population? Effective Public Health Practice Project, McMaster University, Hamilton, Ontario.

Issue: The number of Canadians who are overweight and/or obese has risen in recent years. In 2004, the Canadian Community Health Survey: Nutrition (CCHS) (Health Canada, 2007) was completed and for the first time included a direct measurement of height and weight for a subsample of respondents. This is in contrast to past studies which relied on self-reported data from respondents, which is known to result in an underestimate of the prevalence of obesity (Blanger-Ducharme & Tremblay, 2007; Colman, 2001; Starky, 2005). The 2004 CCHS study indicated that 23.1% of Canadian's aged ≥ 18 years had a BMI of 30 or more, indicating that they were obese. This percentage represents an estimated 5.5 million adults within Canadian society. An additional 8.6 million or 36.1% of Canadian adults were overweight (BMI 25-29.9). Under the Chronic Disease Prevention Section of the Mandatory Health Programs Service Guidelines (Ontario Ministry of Health/Public Health Branch, 1997), public health departments are required to assist in community-based strategies aimed at reducing the prevalence of risk factors that lead to chronic diseases by 2010. One stated outcome is to ensure that Ontarians have a BMI within the range of 20.0 to 27.0 kg/m².

Review Content Summary: To be relevant, studies had to meet all six of the following criteria: the primary study involved an intervention relevant to public health practice and/or primary care. Programs implementing pharmaceutical (including herbal remedies) or surgical interventions, very low caloric diets (i.e. < 1000 calories per day) or meal supplements/replacements were NOT relevant; the intervention took place in a country where health practices and standards are similar to those in Canada; the study reported on an intervention targeted at changing behaviour, weight loss maintenance programs were NOT included, the intervention(s) took place in a community-based setting, including weight loss centres or a primary care setting; the population of interest was overweight (BMI 25 to 29.9) or obese (BMI ≥ 30), adult (18 \geq years of age) with no co-morbid conditions (e.g. cardiovascular disease requiring medication, non-insulin dependent diabetes, arthritis, cancer in active treatment, pregnancy or lactating, and psychiatric conditions being treated with prescription medication); outcomes included weight or BMI or other measures related to weight; studies must have included a comparison group (RCT, cohort or prospective before/after design).

Studies excluded on the first criterion were excluded from this review because they required physician or registered dietician supervision and therefore were not considered to be relevant to public health. Exclusion of populations with certain medical conditions (criterion 4) was deemed necessary to ensure that no study participants had a medical condition that would be a barrier to weight loss. Two reviewers independently rated all retrieved articles for relevance. Differences were resolved through review by a third party. Studies focused on the structural and community level characteristics of neighbourhoods/communities were excluded from this review.

Comments on this review's methodology: Eight databases were searched for the period of 1990-2007 to locate relevant primary studies. Peer reviewed journals were hand-searched for the period of January to September 2007. 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 studies (n = 23) using a standardized instrument. A narrative synthesis was presented.

Evidence and implications for practice and policy

Evidence points ARE NOT weighted or ranked according to strength.

Evidence	Implications
Many of the primary studies had methodological issues.	Methodological issues make the reliability/validity of reported results questionable.
Selection bias occurred due to recruitment practices.	Selection bias can be addressed in large community-based initiatives through implementing several simultaneous recruitment strategies.
There were small sample sizes, a lack of sample size calculations and a lack of intention-to-treat analysis.	Sample size calculations and intent-to-treat analysis are paramount for interpreting results, especially with the apparently high drop-out rates.
There were large numbers of drop-outs.	Understanding the barriers to completing the programs may shed light on drop-out rates and may also reveal barriers to healthy eating and physical activity.
Inadequate reporting of confounders.	Attention should be given to the reporting of confounders as they may reveal some of the social determinants of health that impact obesity.
Funding agencies need to require methodological rigour in the research they support.	
<p>Promising practice:</p> <p>There is some promising practice regarding culturally relevant programs. One successful program incorporated lay facilitators for the cultural community of the participants.</p> <p>Some internet programs showed promising results.</p>	<p>These programs need to be explored, giving emphasis to program development and evaluation in a Canadian context.</p> <p>Use of a variety of forms of social support should be incorporated into weight loss programs.</p> <p>Successful programs need long-term follow-up to determine their effects over time. Investigators should make attempts to gather relevant long-term data from non-completers as well as completers.</p>
Individual level interventions have modest results at best.	<p>Population level interventions should be identified and explored.</p> <p>Public health agencies need to carefully assess the applicability and transferability of any successful programs into their particular context.</p>

Cost Benefit or Cost-Effectiveness Information: No information available.

References Used to Outline Issue:

Blanger-Ducharme, F. & Tremblay, A. (2007). Prevalence of obesity in Canada. *Obesity Reviews*, 6, 183-186.

Health Canada (2007). Canadian community health survey cycle 2.2, nutrition (2004): Income-related household food security in Canada. Ottawa: Authority of the Minister of Health, Office of Nutrition Policy and Promotion, Health Products and Food Branch, Health Canada.

Ontario Ministry of Health/Public Health Branch (1997). Mandatory health programs and service guidelines (Rep. No. Cat. # 2206557).

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Background

The Ontario Ministry of Health and Long-Term Care Mandatory Health Programs and Services Guidelines (MHPSG) (1997) sets standards that Public Health Departments in the province of Ontario are expected to meet. Under the Chronic Disease Prevention Section of the MHPSG, public health departments are required to assist in community-based strategies aimed at reducing the prevalence of risk factors that lead to chronic diseases by 2010. One stated outcome is to ensure that Ontarians have a healthy BMI within the range of 20.0 to 27.0 kg/m².

Prevalence of Obesity

The number of Canadians who are overweight and/or obese has risen in recent years. In 2004, the Canadian Community Health Survey: Nutrition (CCHS) (Health Canada, 2007) was completed and for the first time included a direct measurement of height and weight for a subsample of respondents. This is in contrast to past studies which relied on self-reported data from respondents, which is known to result in an underestimate of the prevalence of obesity (Blanger-Ducharme & Tremblay, 2007; Colman, 2001; Starky, 2005). The 2004 CCHS study indicated that 23.1% of Canadian's aged ≥ 18 years had a BMI of 30 or more, indicating that they were obese. This percentage represents an estimated 5.5 million adults within Canadian society. An additional 8.6 million or 36.1% of Canadian adults were overweight (BMI 25-29.9).

Canada's rising trend of obesity is similar to the prevalence of the condition among other industrialized nations. As stated by Flegal (1999) in a review of systematic surveys from 1989-1998, obesity has risen by 5% among the population in Canada, the United Kingdom, Finland (men only) and New Zealand while smaller increases were recorded in Brazil, Australia, Germany, Israel, the Netherlands, China (men only) and Sweden.

There are many measurements used to determine overweight and obesity in adults. For the purpose of this review, the most popular method, the Body Mass Index (BMI), will be used. Body Mass Index is calculated by using weight in kilograms divided by height in metres squared. Overweight is a BMI of 25.0 to 29.9 and obese is ≥ 30.0 (WHO, 2000).

Health Impacts of Obesity

Negative health consequences of overweight/obesity are well known. Obesity has been linked to many chronic illnesses and is a risk factor for: cardiovascular disease (coronary heart disease, ischemic stroke), type 2 diabetes, dyslipidemia, insulin resistance, cancer (breast, endometrial, colon, prostate, kidney), gallbladder disease, sleep apnea and other respiratory problems, hypertension, osteoporosis, psychosocial problems, functional limitations and impaired fertility (Colman, 2001; Public Health Agency of Canada [PHAC], 2002; Starky, 2005). As well, obesity is one of the five risk factors for metabolic syndrome which has been shown to increase rates of heart disease and stroke (National Heart Lung and Blood Institute; Disease and Conditions Index, 2007). In 2003, Fontaine, Redden, Wang, Westfall and Allison estimated the number of years of life lost (YLL) across the life span due to overweight and obesity. They concluded that obesity appeared to lessen life expectancy markedly, particularly for young adults.

Economic Impact of Obesity

Canadian reporting on the economic consequences of overweight/obesity is scarce. However, the total direct costs were estimated to be over \$1.8 billion of the total \$76.6 billion of health care costs for 1997. The proportion attributed to obesity was therefore 2.4% of the total cost of illness within Canadian society. The most recent estimate of the total economic impact of obesity in Canada is from 2001. In that year, the figure had risen to \$4.3 billion, which equates to 2.2% of the total health care expenditures (Blanger-Ducharme & Tremblay, 2007; Katzmarzyk & Janssen, 2004). It should be noted that these figures are based on the prevalence of adults with a BMI \geq 30.0 as determined by self-reported data. Therefore, these economic cost reports may be seen as conservative (Ibid).

In the United States, estimates suggest that individuals identified as obese increase health care costs 36% and medication costs by 77% compared to those within the normal weight range. In terms of costs to inpatient hospital care and ambulatory care, obesity was associated with an average increase of \$395 per patient, per year. These averages must be taken with caution as the probability of underreporting may compromise the true absolute effects (Sturm, 2002). Sturm's report suggests that obesity appears to have moved ahead of other health risks in terms of health care costs. For example, past or current smoking (once considered the most costly health risk behaviour) increases health care costs by only 21% and medication costs by only 28-30% (Ibid).

Research Question

The purpose of this review is to address the following question:

What is the effectiveness of community-based/primary care interventions in reducing overweight/obesity among adults in the general population?

Methods

Primary studies were reviewed.

Searching the Literature

The following electronic databases were searched:

- Cochrane Database of Systematic Reviews
- DARE (Database of Abstracts of Reviews of Effectiveness)
- CINAHL
- EMBASE
- ERIC
- MedLine/PUBMED
- PsycINFO
- Sociological Abstracts

The search strategy is outlined in Appendix 1. All databases were searched for the period of January 1990 to September 2007. Two reviewers independently scanned the citations and abstracts to identify relevant articles. All citations selected by either reviewer were captured into Reference Manager (Network Edition, Version 11). All potentially relevant citations were retrieved.

Hand-searching of relevant, peer-reviewed journals was conducted for the period of January 2007 to February 2008 (see Appendix 2). Relevant articles were retrieved and added to the database. The reference lists of retrieved articles were examined for potentially relevant references that were also retrieved.

Key informants submitted articles from the grey literature. As well, many government websites (Canadian, American, British, European and Australian) were searched for relevant reports or documents. These were added to the database.

During the search for potentially relevant primary studies, a number of reviews were located. The primary studies from these reviews were added to the database and tested for relevance. The methodological quality of the systematic reviews was assessed using the AMSTAR measurement tool (Shea, et al., 2007). The tool consists of 11 items. It was developed by building on previous tools, empirical evidence and expert consensus. It has good content validity.

Relevance

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

1. The primary study involved an intervention relevant to public health practice and/or primary care. Programs implementing pharmaceutical (including herbal remedies) or surgical interventions, very low caloric diets (i.e. < 1000 calories per day) or meal supplements/replacements were NOT relevant.
2. The intervention took place in a country where health practices and standards are similar to those in Canada: United States, Australia, New Zealand, United Kingdom or north-western Europe.
3. The study reported on an intervention targeted at changing behaviour. Weight loss maintenance programs were NOT included. The intervention(s) took place in a community-based setting, including weight-loss centres or a primary-care setting.
4. The population of interest was overweight (BMI 25 to 29.9) or obese (BMI \geq 30), adult (18 \geq years of age) with no co-morbid conditions (e.g. cardiovascular disease requiring medication, non-insulin dependent diabetes, arthritis, cancer in active treatment, pregnancy or lactating, and psychiatric conditions being treated with prescription medication).
5. Outcomes included weight or BMI or other measures related to weight.
6. Studies must have included a comparison group (RCT, cohort or prospective before/after design).

Studies excluded on the first criterion were excluded from this review because they required physician or registered dietitian supervision and therefore were not considered to be relevant to public health. Exclusion of populations with certain medical conditions (criterion 4) was deemed necessary to ensure that no study participants had a medical condition and/or treatment that would be a barrier to weight loss.

Two reviewers independently rated all retrieved articles for relevance. Differences were resolved through review by a third party.

Studies focused on the structural and community level characteristics of neighbourhoods/communities were excluded from this review. Raine et al. (2008) recently conduct a review on this topic related to urban areas.

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, Cook & Davidoff (1997) and Jadad et al. (1996). It has been examined by experts in the field, and has received excellent ratings (Deeks, Higgins, Altman, 2008). The tool and accompanying dictionary are available from our website; hamilton.ca/ephpp. This tool consists of six criteria:

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

The six criteria were each independently rated by two reviewers as “strong”, “moderate” or “weak” depending on characteristics of each criterion reported in the study (see Appendix 4, Quality Assessment Tool). Once the ratings of characteristics 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 and Analysis

Data were extracted from articles that received an overall rating of “strong”. The data are reported in a narrative format that 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. The decision about whether or not to complete a meta-analysis was determined after the studies had been reviewed.

Results

Figure 1 outlines the number of articles involved in this review. The search for published and unpublished studies resulted in the identification of 6,143 potentially relevant articles. Two EPHPP staff scrutinized these titles and abstracts independently and 431 articles were tagged for relevance testing. The tagged articles were retrieved and reviewed by our internal and external relevance reviewers. Of the 431 articles, 98 were deemed relevant and moved into the quality assessment phase with the following results: 23 articles were rated as “strong”, 51 were “moderate” and 24 were rated as being methodologically “weak”.

The majority of the 23 methodologically strong studies were conducted in the United States ($n = 18$) with two from Canada and one from each of Australia, Denmark and seven European countries (one study). The methodological ratings of all relevant studies are outlined in Table 1. There were rating challenges for a few of the criteria. The selection bias criterion has two questions: likelihood that the individuals selected are representative of the target population and, percentage of the selected individuals who agreed to participate. Recruitment of samples was frequently conducted through one or more of the following strategies; newspaper advertising, internet/website advertising, flyers distributed in various settings where likely representative individuals would see them and use of radio and television advertising. If only one strategy for recruitment was reported, the response for this item was that individuals were not likely to be representative of the population. If more than one strategy was employed, subjects were judged to be somewhat likely to be representative of the population. Given that these were community samples, there was no denominator of selected individuals, so this item was rated ‘can’t tell’. Studies received an overall selection bias rating of moderate if participants were somewhat likely to be representative of the target population, and a weak rating if they were unlikely to be representative.

Allocation bias was difficult to assess in these studies. All of the strong studies reported that they were randomized controlled trials (RCTs), however very few (22.7%) described the method of randomization.

Before the review began, the review group considered the following as potential confounders: race, age, marital status, gender, socio-economic status, education, health status and pre-intervention BMI or weight. However, as we began to assess the presence of confounders in the relevant studies it was evident, with few exceptions, that very few of the confounders were reported. Gender, age, health status (most studies excluded participants with any of the potential health problems) and pre-intervention weight were reported in most studies. Most of the studies received a rating of strong for the confounder’s item as long as they mentioned that there were no significant differences between groups at baseline, even if they only considered a few potentially relevant confounders.

Very few studies commented on blinding of participants or outcome assessors. Given the type of intervention, it is unlikely participants could be blinded to the intervention, however outcome assessors could have been. Only 30.43% of the outcome assessors were blinded to the intervention or exposure status of the participants.

The numbers and reasons for withdrawals and drop-outs were reported in most of the studies and in all of the studies rated strong. There was great variation in the length of post-intervention follow-up among the studies, and many of them offered the program to the comparison group at the conclusion of the intervention with the experimental group. As a result we decided to use withdrawal and drop-out rates at the post-test following the intervention to complete this criterion. Unfortunately withdrawal/drop-out rates

even at this point in time were frequently very high. Many authors reported no statistically significant differences when comparing those who completed the intervention with those who dropped out on variables such as age, gender and pre-intervention weight.

There were strengths and limitations in the analysis used in the studies. Most used appropriate statistical procedures for analysis. However, only 27.3% reported using intention-to-treat analysis, in spite of the high drop-out rates. Several authors completed the final analysis using different samples: intention-to-treat, completers, and “high” compliance completers. Very few studies (17.39%) reported calculating a sample size. It is possible that some interventions for which there was no statistically significant difference between experimental and comparison groups had inadequate power to detect a difference if it was present (Type II error).

The consistency of the intervention was measured in most studies (82.61%). Participants were required to keep daily food intake and/or exercise records. These were randomly evaluated by the study teams. In interventions where participants attended regular group sessions, attendance rates were reported. Co-intervention or contamination was unlikely in most of the studies.

Meta-analysis of the results was not used in this review for several reasons. A separate meta-analysis would be required for each intervention (i.e. exercise only, diet only and diet and exercise). Among both the eight diet only interventions and the four studies with exercise only interventions, the actual interventions were very different, so a narrative summary was used. Among the studies that combined diet and exercise interventions (n = 11) the same challenge was encountered. Not only were the interventions not standardized, but the degree of emphasis on diet or exercise from one study to the next was unknown.

During the searching process a number of reviews were found. Of the 19 reviews located, eight were not relevant to this review. They covered a number of interventions that had been excluded a priori: partial meal replacement (Heymsfield, van Mierlo, van der Knaap, Heo, Frier, 2003), surgery and drug use (McTigue et al., 2003a, 2003b) preventing regain after weight loss (Cooper & Fairburn, 2001), hypnosis (Kirsch, 1996; Allison & Faith, 1996). Two additional papers were narrative reviews to which the AMSTAR rating could not be applied (Kalodner & DeLucia, 1990; Schmitz & Jeffery, 2000).

Table 2 displays the results of assessing the 11 systematic reviews for methodological rigour using the AMSTAR tool (Shea et al., 2007). No review met all of the 11 criteria. The area where all reviews received a partial rating was the listing of included and excluded studies in the review. Most listed the included studies but only one listed the excluded studies. Another criterion which was infrequently met (n = 5) was documentation of comprehensive assessment of the scientific quality of the included studies. It follows then, that the scientific quality of included studies could not be used in formulating conclusions (criterion 8). Strengths of most of the reviews included the use of two people to independently assess the articles, comprehensive literature searching, and outlining the characteristics of individual studies.

Findings from Relevant Studies

The methodologically strong studies employed a number of strategies to reduce overweight/obesity. They are briefly described below and grouped by the strategy (ies) used.

Dietary and Exercise Interventions:

Eleven studies focused on energy restriction and increasing exercise among participants. They are displayed in Table 3A. In a two-year intervention using four groups, Wing, Venditti, Jakicic, Polley & Lang (1998) compared the effectiveness of diet alone, exercise alone, diet and exercise combined and a non-intervention control group. All participants had a family history of type 2 diabetes, but none were currently diabetic. The intervention participants attended weekly group meetings for the first six months and then bi-weekly for the next six months and then two six-week refresher courses during the second year. At six months both the diet and diet plus exercise groups had lost statistically significantly ($p < 0.001$) more weight than the exercise alone or the control groups. However, by 24 months weight loss did not differ by treatment group, although the diet plus exercise group maintained a significant decrease in body weight.

Utter, Nieman, Shannonhouse, Butterworth & Nieman (1998) conducted a similar study with a duration of 12 weeks. Post-intervention, the diet and diet plus exercise groups had lost significantly ($p < 0.001$) more weight than either the exercise alone or the comparison groups.

Tate, Wing, Winett (2001) compared the effectiveness of a 24-week educational program with the educational program plus internet behaviour therapy which consisted of weekly email messages regarding behavioural interventions, weekly on-line submissions of self-monitoring diaries, regular individual feedback and access to an electronic bulletin board to facilitate group interaction. Results demonstrated that participants in the behavioural therapy group lost statistically significantly ($p = .07$) more weight than those in the education group only immediately post-intervention.

In a more recent study, Tate, Jackvony, Wing (2003) used the same intervention with a population of overweight/obese individuals at risk for type 2 diabetes. They also expanded the intervention period to one year. Results at the end of one year indicated that the behaviour therapy group lost statistically significantly ($p = .04$) more weight than the basic weight loss intervention group.

Jason, Greiner, Naylor, Johnson & Van Egeren (1991) reported on a three-week intervention including TV programming, and a self-help booklet related to losing weight and increasing exercise. The intervention group also enrolled in a weekly self-help group for weight reduction. Although participants in both groups lost some weight and increased their exercise, there were no between group differences at the end of the intervention or at three-month follow-up. It is difficult to determine whether the lack of difference between groups is because of the small sample size, or whether it is reflective of the effectiveness of the intervention.

Carels et al. (2005a) based their intervention on the LEARN program, a behavioural weight loss program (BWLP), and a stepped-care approach where participants are moved into a more intensive treatment when less intensive ones are unsuccessful. Participants were randomly allocated to two groups: BWLP (Group 1) or BWLP plus stepped-care approach (Group 2). After six months of intervention, Group 2 had lost statistically significantly ($p < 0.01$) more weight, increased physical exercise and met weight-loss goals

more frequently. At 12 months Group 2 continued to lose more weight but the difference was no longer statistically significant. The Type II error may explain this finding.

Kiernan, King, Stefanick & Killen (2001) conducted a study with three groups of men and women. The first group involved a diet only program where participants met weekly for three months and monthly for the remaining three months with a registered dietician. The second group had the same dietary intervention and also additional aerobic exercise for up to 45 minutes three times per week for four months. The third group served as a comparison group and had no intervention. At the end of one year, the men in the diet only group had lost statistically significantly ($p < 0.01$) more weight than controls and those in the diet and exercise group had lost even more. Women in both the diet only and the diet and exercise groups lost more weight than the comparison group, but there was no difference between the two intervention groups.

Tanco, Linden & Earle (1998) evaluated the difference in weight loss among participants in three groups: a standardized behavioural weight loss program or a cognitive treatment program that did not emphasize dieting and a comparison group. Contamination occurred in that the standard behaviour therapy group also received four weeks of cognitive treatment. Both groups lost weight compared to the comparison group, however there were no differences between the intervention groups.

Avila & Howell (1994) implemented an eight-week diet and exercise program among Mexican-American women. At the end of the program, the intervention group had significantly lower BMI ($p < .001$). At three-month follow-up this trend continued, however less than 50% of the participants attended the follow-up. A unique feature of this program was that all intervention participants were assigned a "buddy" for support.

Poston et al. (2001) tested a 12-month culturally relevant dietary restriction and exercise intervention for Mexican-American overweight women that included pre-existing social networks. There were no differences in BMI between treatment and comparison groups at either 6 or 12 months.

McNabb, Quinn, Kerver, Cook & Karrison (1997) implemented the PATHWAYS program among women from urban African-American churches. This 14 week project provided a weekly support group for the intervention participants. They were encouraged to increase exercise by walking on their own time. At the end of the intervention, participants in the PATHWAYS group had lost statistically significantly ($p < 0.0001$) more weight and had increased exercise more than the comparison group. This is an interesting intervention because it was led by trained lay facilitators and also provided a stable known peer group for support.

Exercise Interventions:

Four studies used exercise only as an intervention to reduce weight. They are displayed in Table 3B.

Dicken-Kano & Bell (2006) evaluated a six-month exercise program that consisted of providing the intervention group with a pedometer and asking them to work up to a daily goal of twice their baseline steps. Although the intervention group increased their walking more than the comparison group, there was no weight loss in either group. This study had a very small sample which may have led to inadequate statistical power to detect a between group difference.

In order to reduce total body fat mass, subcutaneous abdominal fat and BMI, Schmitz et al., (2007) evaluated a two-year strengthening exercise program among women. There was no between group difference in BMI post-intervention, and changes in the other outcomes were marginal.

In an RCT, Jeffery, Wing, Sherwood & Tate (2003) evaluated an 18-month standard behavioural weight loss program with an exercise goal of either 1000 kcal per week or 2500 kcal per week (High Physical Activity HPA). Both groups lost weight, however, the HPA group lost statistically significantly ($p = 0.01$) more than the lower energy expenditure (EE) group. Tate, Jeffery, Sherwood, Wing (2007) followed the sample at 30 months (12 months after the intervention finished). At this time there was no between group difference in weight loss. Many in the HPA group had reduced their duration/intensity of exercise activity. The investigators combined the data from both treatment groups and regrouped them by three levels of EE. They analyzed the data to determine the association between the magnitude of physical activity and long-term weight loss. There was a statistically significant difference in weight loss and in weight regain in the group who continued to have EE of > 2500 kcal per week compared to the other two groups. As well, men had lost more weight than women.

Bond Brill, Perry, Parker, Robinson & Burnett (2002) evaluated the effect of different durations of regular exercise on weight loss among participants who were on a low-fat diet. Follow-up at three- months post-intervention indicated that all groups lost weight from pre- to post-test, however there were no statistically significant between group differences. The final analysis only included those that were compliant with the exercise regime (63.7%).

Dietary Interventions:

Eight studies used dietary restrictions alone as an intervention. Petersen et al. (2006) compared the effects of a calorie-reduced, low-fat diet with a calorie-reduced, high-fat diet. After 10 weeks, participants in both groups lost weight, but there was no between group difference.

Using standard behavioural treatment strategies, Wing et al. (1996) compared weight outcomes for four groups after 26 weeks. All groups were assigned a 1000-1500 calorie diet and attended weekly meetings for six months to learn about a number of behavioural strategies. Group 1 received no specific instructions about what to eat. Group 2 received written, structured meal plans and a grocery list. Group 3 received the same as group 2 as well as a box of food for which they paid. Group 4 received the same as group 3 but the food was free. At post-intervention and at one-year follow-up there was statistically significant ($p < 0.003$) weight loss among the three intervention groups compared to the control group, but there were no differences among the three intervention groups.

In an earlier well-designed study, Jeffery et al. (1993) compared four different methods of food provision. Group 1 received standard behavioural therapy (SBT) alone. Group 2 received SBT plus free food for breakfast and dinner and a meal plan for other meals. Group 3 received SBT plus a monetary reward based on the amount of weight lost. Group 4 received SBT, food and the monetary incentive. Group 5 served as the control group and was told to lose weight on their own. In this 18-month intervention, participants met weekly for 20 weeks and then monthly for the remaining time. The two groups for whom food was provided had a statistically significantly (p -value not reported) reduction in their BMI compared to the other groups. Financial incentives had no effect on weight outcomes.

McMillan-Price et al. (2006) assessed the effectiveness of four diets of varying glycemic load in weight reduction. All participants consumed the same reduced-fat, moderate-fibre diets but had the carbohydrate (CHO) portion manipulated. They were provided with meal plans, all key CHO and protein foods and some frozen meals. Intention-to-treat analysis indicated that all groups lost weight, but there were no between

group differences. However, higher proportions of participants in the high glycemic diet groups lost more than 5% of their body weight.

Meckling, O'Sullivan & Saari (2004) compared weight loss and other factors related to diabetes and cardiovascular risk among two groups of healthy obese/overweight adults who were randomly assigned to either a low-fat diet or a low-carbohydrate diet. After 10 weeks, both groups had lost weight, but there was no statistically significant difference between the groups in weight loss. This study had a small sample size and 23% drop-out rate over the 10 weeks, which made detecting a between group difference difficult.

Heshka et al. (2000, 2003) compared the effectiveness of Weight Watchers (WW) commercial program with a self-help program. The participants engaged in the program over a two-year period. At both the end of year 1 and year 2 an intention-to-treat analysis indicated that the WW participants had a statistically significant decrease in BMI. However, the decrease was modest (BMI -1.1 at 2 year follow-up). Several other studies include testing the effectiveness of Weight Watchers (Rippe et al., 1998; Bellisle et al., 2007; Lowe, Miller-Kovach, Frye, Phelan, 1999), however they did not meet the criteria for strong methodological quality and are not discussed here.

Skov, Toubro, Ronn, Holm & Astrup (1999) and Due, Toubro, Skov & Astrup (2004) tested the effectiveness of high protein versus high carbohydrate plus low-fat diets in a 12-month intervention with a one-year follow-up. The two intervention groups received all their food free from a store designed for the purpose for the first six months. In months 7-12 they purchased food with guidance from dietitians at behavioural group sessions every second week. At the end of six months there were statistically significant ($p < 0.01$) differences in weight loss between the two intervention groups, with the high protein group having lost more weight. At 12 and 24 months the weight loss was similar between the two groups. The control group was not included in the follow-up.

Kalodner & DeLucia (1991) evaluated the effect of cognitive therapy versus nutrition education along with SBT on weight loss. After the 10-week intervention all four groups had lost weight, however there were no statistically significant between group differences. This study had a small sample ($n = 69$) and a high drop-out rate (36%) which may have resulted in a Type II error.

Discussion

Many of the primary studies reviewed had several limitations that compromised their methodological quality and that should be dealt with in future work. First, most studies did not have adequate sample sizes or a sample size calculation so it is difficult to know if the lack of between group differences was a product of the intervention not being effective or because of a Type II statistical error. Second, blinding of outcome assessors was rarely addressed. Although reliable and valid measures of weight (fairly objective) and sometimes exercise (more self-report) were used to assess the outcomes, there was a potential for bias in these studies that was unnecessary. Third, intention-to-treat analysis should be used in all studies. This is particularly important in this area where there are large numbers of drop-outs in many studies. It was surprising that very few authors addressed this challenge at all, beyond comparing drop-outs to those who completed the studies. Several authors reported no statistically significant differences between the drop-outs and the completers on a few obvious potential confounders (e.g. age, gender, pre-intervention BMI). Fourth, it was difficult to ascertain the extent of selection bias. Authors need to clearly describe their target population and then use strategies to ensure they are included. Fifth, given the understanding of the

impact of social determinants of health such as education, income and marital status, it was surprising that these potential confounders were rarely included in the assessment of groups pre-intervention. These shortcomings meant that many studies did not meet the criteria for being methodologically strong.

In this review of community-based interventions to reduce overweight/obesity, three different types of interventions were reported. Eleven studies evaluated the effectiveness of combinations of diet and exercise to produce weight loss. Support in different forms was offered as well as diet and exercise interventions to produce weight loss in three studies. Only Pathways found a between group difference (McNabb, et al., 1997). This study is of particular value to others in that the facilitators were trained lay people. This has implications for resources, if one were to implement it. Three studies included groups with diet only interventions, exercise only interventions and both interventions as well as a control group (Utter, et al., 1998; Kiernan, et al., 2001; Wing, et al., 1998). Short-term differences between the diet and exercise groups and other groups were reported in two studies. The third found short-term (six months) differences, but after 24 months the differences were no longer apparent.

Culturally appropriate interventions were used in two studies (Poston, et al., 2001; Avila & Howell, 1994). Only the Avila & Howell study resulted in changes. The one reporting no differences had several methodological flaws.

Four studies used Behavioural Weight Loss Programs (BWLP) (Tate, et al., 2001, 2003; Carels, et al., 2005a; Kalodner & DeLucia, 1991). Two used the internet to deliver the program over six and 12 months respectively (Tate, et al., 2001; 2003). Both were well designed and implemented. Both resulted in statistically significant differences in weight loss. Another used BWLP and a stepped-care approach (Carels, et al.). Although there were between group differences at 6 months follow-up, these disappeared by 12 months. Both BWLP and cognitive therapy were explored in another study (Kalodner and DeLucia). Both groups had significantly greater weight loss than the control group however there was no difference in outcome between the two interventions. Some of the statistically significant differences are unlikely to be clinically significant.

Exercise interventions alone were evaluated in four studies. Three of the four resulted in no weight loss (Bond Brill, et al., 2002; Dicken-Kano & Bell, 2006; Schmitz et al., 2007}. The fourth study involved all subjects participating in the same diet and then the intervention group engaged in high physical activity whereas the comparison group engaged in much less physical activity. At the end of the program, those engaging in high physical activity had lost more weight than the comparison group. However, at follow-up, one year following program completion, there were no between group differences in BMI or physical activity. When the participant results were analyzed according to intensity/level of physical activity, those who had continued the high physical activity had lost significantly more weight than the others. These results support the need for high levels of physical activity to lose and maintain weight loss (Jeffery, et al., 2003).

Dietary reduction interventions alone were used in eight of the strong studies. Several studies (n = 5) compared different kinds of energy restrictions (e.g. low-fat and low-calorie diets with similar energy restrictions, low-fat and low-carbohydrate intake, different proportions of carbohydrates and proteins, comparison of Weight Watcher's restricted calorie diet and a comparison group) (McMillan-Price, et al., 2006; Meckling, et al., 2004; Petersen, et al., 2006; Due, et al., 2004; Jeffery, et al., 1993; Heshka, et al., 2000). Only the high-protein, low-fat diet was successful in weight reduction in the short term. The project ended at six months and at 12 and 24 months there were no between group differences. Weight Watchers led to very modest but statistically significant weight loss over two years.

Two other studies used a Standard Behavioural Treatment and different methods/incentives of providing food and meal plans. Food provision and provision of meal plans without actual food resulted in greater weight loss than monetary incentives (Wing, et al., 1996). The results were statistically significant at the end of the intervention (s). Longer term follow-up is required to determine the long-term effects of these programs given that food provision is unlikely to be on-going. The second study (Jeffery, et al., 1993) reported that food provision was more effective than financial incentives in improving weight loss.

The final study compared SBT with Cognitive Therapy and Nutritional education (Kalodner & DeLucia, 1991). This study had several methodological flaws. There were no differences in weight loss at the end of the intervention. Overall, dietary interventions alone produced modest results at best, with many studies showing no difference post-intervention.

Results of the effectiveness of diet and exercise in reducing weight are mixed. Overweight/obesity are complex issues that are influenced by many factors. Interventions at the individual level appear to produce at best, modest results. It is possible that practitioners, policy-makers and researchers need to reframe the problem. One possibility would be to use a population-based approach and explore the effects of the social determinants of overall health including, among others, the impact of income, gender, healthy eating and physical activity on overweight/obesity.

The methodological rigour of the systematic reviews that were located had a few limitations when assessed by a standardized tool. Specifically, they need to identify the excluded as well as included studies in the results and to critically assess the methodological rigour of the primary studies included. The soon to be published updated version of the [Cochrane Manual](#) includes a tool for assessing risk of bias in primary studies which could be used for this purpose.

Conclusions

Implications for Practice

Unfortunately, the implications for practice, based on this review, are unclear. There is no strong evidence for effective programs to reduce overweight/obesity within a community-based or primary health care setting. Some interventions were effective in one study, but have not been replicated. From this review, the following more specific implications for practice emerge.

- Either food provision or actual meal plans can be effective in the short term. Although long-term food provision is not feasible, providing specific meal plans could be useful.
- One study indicated that high levels of physical activity made a difference in weight loss over a 30-month period, however many people could not continue exercise regimes over extended periods of time. Publicizing easily accessible, low cost ways for exercise may be helpful. Formal evaluation of these types of interventions is required.
- Although long term evaluation of the effects of social support on weight loss is needed, use of different forms of social support should be incorporated into weight loss programs.
- Interventions combining both diet or healthy eating and exercise should be encouraged.

Implications for Research

- The methodological flaws identified in many of these studies must be addressed in future work. They make it impossible to determine if the lack of effect is a result of the program or the poor methodology.
- Sample size calculations and intention-to-treat analysis are paramount for others to interpret the results of studies. This is particularly important because of the apparent high drop-out rates in this field.
- Barriers to study completion need to be explored as it is possible that these are also barriers to healthy eating and physical activity.
- Strategies to enhance participant engagement need to be developed and tested to reduce drop-out rates.
- Internet approaches are very promising and should be evaluated in the Canadian context.
- Given the impact of social determinants of health (e.g. economic status, employment status, marital status) on health in general and probably on weight and weight loss, it would be helpful if studies included more details re the demographics of participants and of those who withdraw/drop out.
- Longer-term follow-up of successful programs should be instituted to determine their effects over time. Investigators should make attempts to gather relevant long term data from completers as well as non-completers.
- Culturally relevant programs with diet and exercise components deserve more attention. Use of lay facilitators, although promising, needs to be carefully evaluated for cost-effectiveness in the Canadian context.
- Funding agencies need to require better methodology of research that they support in this area. As well, they should require a collection of data related to all the social determinants of health within study groups.

Implications for Policy

- Public health agencies need to carefully assess the applicability and transferability of any successful programs into their particular context.
- Given that individual level interventions have modest results at best, population level interventions should be identified and explored.

This review has summarized the available peer-reviewed literature related to the effectiveness of community-based programs to reduce overweight/obesity. Some interventions appear to be effective in the short-term. They should have longer-term evaluations. Others do not appear to impact on weight. Weight loss appears to be challenging, but given the impact overweight/obesity has on chronic diseases, it is imperative that we continue to strive to find effective interventions at both the individual and the population level.

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TABLES

Table 1: Quality Assessment Results for all Relevant Studies

Table 2: AMSTAR

Table 3A: Included Studies, Diet & Exercise

Table 3B: Included Studies, Exercise Only

Table 3C: Included Studies, Diet Only

Table 1: Quality Assessment Results for all Relevant Studies (n = 98)

Author/Date	Selection Bias	Allocation Bias	Confounders	Blinding	Data Collection Methods	Withdrawals/ Dropouts	Global Ratings
(Jason et al., 1991)	Moderate	Strong	Strong	Moderate	Strong	Strong	STRONG
(Tate et al., 2003)	Moderate	Strong	Strong	Moderate	Strong	Strong	STRONG
(McMillan-Price et al., 2006)	Moderate	Strong	Strong	Moderate	Strong	Strong	STRONG
(Meckling et al., 2004)	Moderate	Strong	Strong	Strong	Strong	Moderate	STRONG
(Carels et al., 2005a)	Moderate	Strong	Strong	Moderate	Strong	Strong	STRONG
(Due et al., 2004)	Moderate	Strong	Strong	Moderate	Strong	Strong	STRONG
(Bond Brill et al., 2002)	Moderate	Strong	Strong	Strong	Strong	Moderate	STRONG
(Wing et al., 1996)	Moderate	Strong	Strong	Moderate	Strong	Strong	STRONG
(Poston et al., 2001)	Strong	Strong	Strong	Strong	Strong	Strong	STRONG
(Utter et al., 1998)	Strong	Strong	Strong	Strong	Strong	Strong	STRONG
(Kiemann et al., 2001)	Moderate	Strong	Strong	Strong	Strong	Strong	STRONG
(Dicken-Kano & Bell, 2006)	Moderate	Strong	Strong	Moderate	Strong	Strong	STRONG
(Wing et al., 1998)	Moderate	Strong	Strong	Moderate	Strong	Strong	STRONG
(Petersen et al., 2006)	Moderate	Strong	Strong	Strong	Strong	Strong	STRONG
(Avila & Howell, 1994)	Moderate	Strong	Strong	Moderate	Strong	Strong	STRONG
(Jeffery et al., 1993)	Moderate	Strong	Strong	Moderate	Strong	Strong	STRONG
(Jeffery et al., 2003)	Moderate	Strong	Strong	Moderate	Strong	Strong	STRONG
(Heshka et al., 2000)	Strong	Strong	Strong	Strong	Strong	Strong	STRONG
(Tate et al., 2001)	Moderate	Strong	Strong	Moderate	Strong	Strong	STRONG
(Tanco et al., 1998)	Moderate	Strong	Strong	Moderate	Strong	Strong	STRONG
(McNabb et al., 1997)	Moderate	Strong	Strong	Moderate	Strong	Strong	STRONG
(Kalodner & DeLucia, 1991)	Moderate	Strong	Strong	Moderate	Strong	Strong	STRONG

Table 1: Quality Assessment Results for all Relevant Studies (n = 98)

Author/Date	Selection Bias	Allocation Bias	Confounders	Blinding	Data Collection Methods	Withdrawals/ Dropouts	Global Ratings
(Schmitz et al., 2007)	Moderate	Strong	Strong	Strong	Strong	Moderate	STRONG
(Hellerstedt & Jeffery, 1997)	Weak	Strong	Moderate	Moderate	Strong	Strong	MODERATE
(Jones & Burkett, 2002)	Moderate	Strong	Weak	Moderate	Strong	Moderate	MODERATE
(Kennedy et al., 2005)	Moderate	Strong	Moderate	Moderate	Strong	Strong	MODERATE
(Foster et al., 2003)	Weak	Strong	Strong	Moderate	Strong	Moderate	MODERATE
(Harvey-Berino, 1999)	Weak	Strong	Strong	Moderate	Strong	Moderate	MODERATE
(Pritchard et al., 1997)	Weak	Strong	Moderate	Moderate	Strong	Strong	MODERATE
(DeLucia & Kalodner, 1990)	Weak	Strong	Strong	Moderate	Strong	Moderate	MODERATE
(Womble et al., 2004)	Weak	Strong	Strong	Moderate	Strong	Moderate	MODERATE
(Ortega et al., 2006)	Moderate	Strong	Weak	Moderate	Strong	Strong	MODERATE
(Wing & Jeffery, 1999)	Weak	Strong	Strong	Moderate	Strong	Strong	MODERATE
(Jeffery et al., 2006)	Moderate	Strong	Strong	Moderate	Strong	Moderate	MODERATE
(Sbrocco et al., 1999)	Weak	Strong	Strong	Moderate	Moderate	Strong	MODERATE
(Djuric et al., 1999)	Moderate	Strong	Moderate	Weak	Strong	Moderate	MODERATE
(Ebbeling et al., 2007)	Moderate	Strong	Moderate	Moderate	Strong	Moderate	MODERATE
(Jakicic et al., 2003)	Weak	Strong	Strong	Moderate	Strong	Strong	MODERATE
(Jakicic et al., 1999)	Weak	Strong	Strong	Moderate	Strong	Moderate	MODERATE
(Noakes et al., 2005)	Weak	Strong	Moderate	Moderate	Strong	Moderate	MODERATE
(Perri et al., 1997)	Weak	Strong	Moderate	Moderate	Strong	Strong	MODERATE
(Thompson et al., 2005)	Moderate	Strong	Moderate	Moderate	Strong	Strong	MODERATE
(Ciliska, 1998)	Moderate	Strong	Strong	Moderate	Strong	Weak	MODERATE
(Rippe et al., 1998)	Moderate	Strong	Strong	Moderate	Strong	Moderate	MODERATE

Table 1: Quality Assessment Results for all Relevant Studies (n = 98)

Author/Date	Selection Bias	Allocation Bias	Confounders	Blinding	Data Collection Methods	Withdrawals/ Dropouts	Global Ratings
(Munsch et al., 2003)	Weak	Strong	Moderate	Moderate	Strong	Moderate	MODERATE
(Waller et al., 2004)	Moderate	Strong	Strong	Moderate	Weak	Strong	MODERATE
(Logue et al., 2004)	Moderate	Strong	Moderate	Moderate	Strong	Moderate	MODERATE
(Bellisle et al., 2007)	Weak	Strong	Strong	Moderate	Strong	Moderate	MODERATE
(Turmin et al., 2001)	Moderate	Strong	Strong	Moderate	Strong	Moderate	MODERATE
(Nickols-Richardson et al., 2005)	Weak	Strong	Strong	Moderate	Strong	Strong	MODERATE
(Boschi et al., 2002)	Moderate	Moderate	Moderate	Moderate	Strong	Weak	MODERATE
(Neumark-Sztainer et al., 1995)	Moderate	Strong	Moderate	Moderate	Strong	Weak	MODERATE
(Schlundt et al., 1993)	Weak	Strong	Strong	Moderate	Strong	Strong	MODERATE
(Truby et al., 2006)	Moderate	Strong	Strong	Weak	Strong	Moderate	MODERATE
(Jakicic et al., 1995)	Weak	Strong	Strong	Moderate	Strong	Strong	MODERATE
(Dennis et al., 2001)	Moderate	Strong	Strong	Weak	Strong	Moderate	MODERATE
(Bolognesi et al., 2006)	Moderate	Strong	Strong	Weak	Strong	Strong	MODERATE
(Fitzgibbon et al., 2005)	Weak	Strong	Strong	Moderate	Strong	Moderate	MODERATE
(Jeffery & French, 1999)	Moderate	Strong	Strong	Moderate	Strong	Moderate	MODERATE
(Kraus et al., 2001)	Moderate	Strong	Strong	Moderate	Strong	Moderate	MODERATE
(Golay et al., 1996)	Moderate	Strong	Strong	Moderate	Moderate	Strong	MODERATE
(Gold et al., 2007b)	Moderate	Strong	Strong	Moderate	Strong	Moderate	MODERATE
(West & de Looy, 2001)	Moderate	Strong	Strong	Moderate	Strong	Moderate	MODERATE
(Rothert et al., 2006)	Moderate	Strong	Strong	Moderate	Strong	Weak	MODERATE
(Green et al., 2005)	Weak	Strong	Moderate	Moderate	Strong	Moderate	MODERATE
(Byrne et al., 2006)	Moderate	Strong	Weak	Moderate	Strong	Moderate	MODERATE

Table 1: Quality Assessment Results for all Relevant Studies (n = 98)

Author/Date	Selection Bias	Allocation Bias	Confounders	Blinding	Data Collection Methods	Withdrawals/ Dropouts	Global Ratings
(Jeffery et al., 1998)	Moderate	Strong	Strong	Moderate	Strong	Moderate	MODERATE
(Gold et al., 2007a)	Moderate	Strong	Strong	Moderate	Strong	Moderate	MODERATE
(Sbrocco et al., 2005)	Weak	Moderate	Strong	Moderate	Strong	Strong	MODERATE
(Gardner et al., 2007)	Moderate	Strong	Strong	Moderate	Strong	Moderate	MODERATE
(Katz et al., 2002)	Moderate	Strong	Strong	Strong	Strong	Weak	MODERATE
(Hannum et al., 2004)	Weak	Strong	Strong	Moderate	Strong	Strong	MODERATE
(Carels et al., 2007)	Weak	Strong	Strong	Moderate	Strong	Strong	MODERATE
(Harvey-Berino, 1998)	Weak	Strong	Strong	Moderate	Strong	Moderate	MODERATE
(Cousins et al., 1992)	Weak	Strong	Strong	Moderate	Strong	Weak	WEAK
(Rushing et al., 2006)	Weak	Strong	Strong	Moderate	Strong	Weak	WEAK
(Meyers et al., 1996)	Weak	Strong	Weak	Moderate	Strong	Moderate	WEAK
(Gappaier et al., 2006)	Weak	Strong	Weak	Moderate	Strong	Moderate	WEAK
(McManus et al., 2001)	Moderate	Strong	Strong	Weak	Strong	Weak	WEAK
(Dalle Grave et al., 2004)	Weak	Strong	Strong	Moderate	Strong	Weak	WEAK
(Jeffery et al., 1995)	Weak	Strong	Moderate	Moderate	Strong	Weak	WEAK
(Kirk et al., 2003)	Weak	Weak	Weak	Weak	Weak	Weak	WEAK
(Agras et al., 1990)	Weak	Strong	Weak	Moderate	Strong	Strong	WEAK
(Viegner et al., 1990)	Weak	Strong	Strong	Moderate	Weak	Moderate	WEAK
(Taylor et al., 2003)	Moderate	Strong	Weak	Moderate	Strong	Weak	WEAK
(Petrofsky et al., 2004)	Weak	Weak	Moderate	Moderate	Strong	Moderate	WEAK
(Carels et al., 2005b)	Weak	Strong	Weak	Moderate	Strong	Moderate	WEAK
(Andersen et al., 1999)	Weak	Strong	Moderate	Weak	Strong	Moderate	WEAK

Table 1: Quality Assessment Results for all Relevant Studies (n = 98)

Author/Date	Selection Bias	Allocation Bias	Confounders	Blinding	Data Collection Methods	Withdrawals/ Dropouts	Global Ratings
(Racette et al., 1995)	Moderate	Strong	Strong	Weak	Strong	Weak	WEAK
(Campbell et al., 1999)	Weak	Moderate	Weak	Moderate	Strong	Strong	WEAK
(Marks et al., 1995)	Weak	Strong	Weak	Moderate	Strong	Moderate	WEAK
(Taylor et al., 1991)	Weak	Strong	Weak	Moderate	Strong	Moderate	WEAK
(Macera, 2000)	Weak	Strong	Weak	Moderate	Strong	Moderate	WEAK
(Leslie et al., 2002)	Moderate	Strong	Weak	Moderate	Weak	Moderate	WEAK
(Donnelly et al., 2000)	Weak	Strong	Weak	Weak	Strong	Weak	WEAK
(Riebe et al., 2005)	Weak	Moderate	Weak	Moderate	Strong	Weak	WEAK
(Annesi, 2000)	Weak	Moderate	Weak	Moderate	Strong	Moderate	WEAK
(McTierman et al., 1999)	Weak	Strong	Moderate	Moderate	Strong	Weak	WEAK

TABLE 2: AMSTAR Criteria Applied to the Reviews

	Avenell, et al., (2004)	Tsai & Wadden (2005)	Glenny, et al., (1997)	Shaw, et al., (2005)	Nordmann, et al., (2006)	McTigue, et al., (2003a)	Pignone, et al., (2003)	Serra-Majem, et al., (2006)	Wantland, et al., (2004)	Wareham, et al., (2005)	Weinstein (2006)
'A priori' design	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Duplicate study selection and Data extraction	Y	Y	N	Y	Y	Y	P	C	C	C	C
Comprehensive literature search	Y	N	Y	Y	Y	Y	P	P	Y	N	P
Status of publication use as an inclusion criterion	Y	Y	C	Y	N	Y	C	P	N	C	N
List of included/excluded studies	P	P	P	Y	P	P	P	P	P	P	P
Characteristics of individual studies (aggregate)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Scientific quality of the included studies assessed and documented	Y	N	Y	Y	Y	N	N	N	Y	N	N
Scientific quality of the included studies used appropriately in formatting conclusions	Y	N	Y	Y	Y	N	N	C	Y	N	N
Appropriate methods to combine studies	Y	NA	Y	Y	Y	Y	Y	C	Y	N	N
Publication bias assessed and charted	Y	Y	C	N	Y	N	N	C	Y	N	N
Conflict of interest stated	Y	Y	N	Y	Y	Y	N	C	Y	N	N

Legend: Y = Yes; N = No; P = Partial; C = Can't Answer; NA = Not Applicable

Table 3A: Included Studies, Diet & Exercise (n = 11)

Study Identification	Design and Participants	Intervention	Results/Outcomes	Comments/Limitations
<i>Avila & Howell (1994)</i> United States	RCT Intervention offered in English and Spanish. 44 Latino women, healthy adults; overall mean age 42; mean weight 68.5 and BMI 31.2; 74% married; all were Mexican-American. Randomized to diet and exercise or control. Funding : source not reported.	Intervention: <i>Experimental group</i> received weekly 1-hour sessions for 8 weeks consisting of nutritional education, behavioural modification strategies, an assigned “buddy”; an exercise component of walking and stretching; a 1200-1500 calorie per day diet; telephone calls between sessions from group facilitator. <i>Control group</i> attended weekly cancer education sessions; wait-listed for weight reduction intervention. Integrity of intervention: All components of intervention presented by the same individual. Duration of intervention: 10 weeks total with one session at beginning and end for data collection; data collection again at 3 months post intervention.	Outcomes: Primary outcome was BMI; others included hip/waist ratio, waist and hip circumference, knowledge and action related to exercise and diet, blood pressure and measure of maximum oxygen consumption ($\dot{V}O_2\text{Max}$) (not reported here). Results: Decrease in BMI ($p < 0.001$); experimental group (-1.4) vs. Control group (+1.3) also decrease in hip/waist ratio and both hip and waist circumference at completion of intervention; BMI decreased further in experimental group and increased in control group.	No intention-to-treat analysis or indication of blinding of assessors. Decrease in BMI statistically significant but may be of limited clinical significance. 44% of control and 47% of experimental group returned for assessment at 3 month follow-up. Effectiveness of support from facilitator and “buddy” should be explored further. Comprehensive description of sample: age, marital status, occupation, employment status economic status, educational achievement.
<i>Carels et al. (2005a)</i> United States	RCT 44 obese (BMI ≥ 30), sedentary adults. Funding : source not reported.	Intervention: Participants were assigned to 1 of 2 groups: <i>Group1:</i> Behavioural Weight Loss Program (BWLP). <i>Group2:</i> BWLP plus a stepped care approach (participants moved to more intensive approach when less intensive ones are unsuccessful). 75-minute, weekly small group sessions for both groups (BWLP).	Data collected at 1, 2, 4, 6 and 12 months. No treatment contact between 6-12 months. Post-intervention, Group 2 lost statistically significantly more weight, 21.1 lbs. vs. 14.6 lbs ($p < .05$) reported greater physical activity, and were more likely to	Small sample size and drop-outs after post-intervention assessment and 12-month follow-up may have contributed to inadequate power to detect a difference at follow-up (Type II error).

Table 3A: Included Studies, Diet & Exercise (n = 11)

Study Identification	Design and Participants	Intervention	Results/Outcomes	Comments/Limitations
<p><i>Jason, et al. (1991)</i> United States</p>	<p>RCT English 58 females and 16 males randomized into two groups. Funded by: PruCare, Trust Value Hardware Stores and the Chicago Lung Association.</p>	<p><i>Group 2</i> received additional counselling based on a priori criteria. Integrity of the Intervention: Daily activity records. Duration: 24 weeks. Based on the LEARN program for weight loss.</p>	<p>achieve their within-treatment weight loss goals than Group 1. At 12-month follow-up Group 2 continued to report more weight loss, although the difference was no longer statistically significant.</p>	
<p><i>Jason, et al. (1991)</i> United States</p>	<p>RCT English 58 females and 16 males randomized into two groups. Funded by: PruCare, Trust Value Hardware Stores and the Chicago Lung Association.</p>	<p>Intervention: TV program and self-help booklets vs. above plus weekly self-help support groups. Research Assistant assisted those needing to find a self-help support group and followed up by phone to ensure that they were attending a group. Integrity of the intervention: daily food diaries. Duration: 3 weeks.</p>	<p>Outcomes: Weight and exercise. Although both groups lost weight, there were no statistically significant between group differences in weight loss immediately post-intervention or at 3 month follow-up. A number of other outcomes (i.e. hopelessness, physical attribution, motivation, stimulus control and energy knowledge) were collected, but are not reported here.</p>	<p>Small sample size may have contributed to the lack of between group differences. Can't tell if outcome assessors were blinded to participant group.</p>
<p><i>Kiernan et al. (2001)</i> United States</p>	<p>RCT English 132 men and 132 pre-menopausal women randomized to either diet only; diet plus exercise or assessment-only control group.</p>	<p>Intervention: <i>Diet-only program:</i> weekly classes for 3 months, every other week for 3 months and monthly for remaining 6 months; encouraged to make dietary changes according to National Cholesterol Education Program; sessions led by registered dietitians.</p>	<p>Outcomes: Included weight and BMI, also measures of eating concerns, depression, anxiety and perceived stress.</p>	<p>Intention-to-treat analysis conducted. Can't tell if data collection blinded. Not clear how exercise intervention was delivered or supervised.</p>

Table 3A: Included Studies, Diet & Exercise (n = 11)

Study Identification	Design and Participants	Intervention	Results/Outcomes	Comments/Limitations
<p><i>McNabb et al. (1997)</i> United States</p>	<p>Mean weight for men was 98.4 kg \pm 9.8 with BMI 30.6 \pm 2.1; mean weight for women 74.9 kg \pm 7.5 with BMI 28.0 \pm 2.3. The average age was 38.5 \pm 6.4 years, most were married (67.5%) and white (88.7%) with educational level of 16.5 \pm 2.6 years. Funded by: The National Heart, Lung and Blood Institute of the National Institutes of Health.</p>	<p><i>Diet-plus-exercise program:</i> attended separate but identical diet classes and supervised program of aerobic exercise that met 3 days per week; duration of exercise increased to 45 minutes per session at 4 months. Control group had no intervention, only assessment. Integrity of intervention: Good level of attendance throughout duration of study. Duration of intervention: 1 year.</p>	<p>Results: <i>Men</i> – main effect of program type was significant ($p < 0.01$); with men in diet or diet-plus-exercise groups losing more weight than controls and diet-plus-exercise more than diet alone. <i>Women</i> – program type was effective ($p < 0.01$) but no difference between diet only and diet-plus-exercise.</p>	<p>Study also examined effect of interventions on anxiety, depression and perceived stress and found no effect of program on these outcomes in either men or women. Men in the exercise-plus-diet group reported greater restraint, less disinhibition and less hunger.</p>
<p><i>McNabb et al. (1997)</i> United States</p>	<p>RCT English 39 women recruited from three urban African-American churches and randomized to receive 14-week weight loss program (PATHWAYS) or to control group (wait-listed for the program); mean weight of 198 lb. \pm 27.9 and mean BMI of 33.5 \pm 3.28. Funded by: the National Institutes of Diabetes, Digestive and Kidney Diseases.</p>	<p>Intervention: The PATHWAYS program: weekly meeting of 1 1/2 hours in small group format with limited lecturing; sessions took place in the churches the women attended since it was a familiar setting and provided a stable peer group; adult learning principles used and content addressed behavioural and socio-cultural issues relevant to urban African-American women; goal setting and problem-setting; women were taught to analyze dietary practices and were expected to lose 0.5-1.0 lbs/week, although each woman set her own individual goals; they were instructed to begin an at-home exercise program like walking.</p>	<p>Outcomes: <i>Primary outcomes</i> were weight and BMI, also waist circumference and PATHWAYS Weight Loss Behaviour Index. Results: Subjects in PATHWAYS program lost significantly more weight than controls [from 199.0 to 189.0 lbs; ($p < 0.0001$)] and BMI significantly lower [33.9 to 32.5; ($p < 0.0001$)]; PATHWAYS subjects reported changing eating behaviours and increasing exercise more than control group.</p>	<p>No intention-to-treat analysis; subjects with missing data post-treatment (n = 6) were excluded from analysis. Can't tell if data collection blinded. Results for initial weight loss at completion of intervention; longer term follow-up recommended. Study supports the use of active learning mode of delivery with support from peers and facilitators.</p>

Table 3A: Included Studies, Diet & Exercise (n = 11)

Study Identification	Design and Participants	Intervention	Results/Outcomes	Comments/Limitations
<p><i>Poston et al. (2001)</i> United States</p>	<p>RCT English 379 non-diabetic Mexican-American women with mean BMI 33.8 ± 6.0; mean age 39.6 ± 8.5. Participants were recruited in pre-existing social networks; then randomized by block to treatment (17 blocks; n = 194) or control (16 blocks; n = 185) groups. Funded by: National Heart, Lung and Blood Institute; Minority Scientist Development Award from American Heart Association and Puerto Rico Affiliate of AHA.</p>	<p>Integrity of intervention: Lay facilitators in their own churches delivered the program after 9 hours of training in the PATHWAYS program; research staff attended sessions to provide feedback to the facilitators. Food diaries and exercise diaries kept by participants. Duration of intervention: 14 weeks.</p>	<p>Outcomes: Included BMI as well as physical activity measures and psychosocial questionnaires of social support and health locus of control. Results: No differences in BMI between treatment and control groups at 6 or 12 months.</p>	<p>Primary outcome was physical activity, in which there was little change between groups over time. Weight loss diet was not a focus of the intervention. Dropout rates similar at 6 months (30% vs. 29%) but higher in treatment group at 12 months compared to control group (47% vs. 28%). Suggests the use of culturally appropriate instructions and materials and the social support provided by use of social networks were not sufficient to increase activity or lead to weight loss.</p>

Table 3A: Included Studies, Diet & Exercise (n = 11)

Study Identification	Design and Participants	Intervention	Results/Outcomes	Comments/Limitations
<p>Tanco, Linden & Earle (1998) Canada</p>	<p>RCT English 62 women with a mean weight of 109.7 kg; all subjects had a history of weight loss treatment failures. Subjects randomized to 1 of 3 treatment groups: standard behavioural weight management program aimed at adopting a fat-reduced diet and increased exercise (BT); cognitive treatment program aimed at enhancing emotional well-being and decreasing disordered eating (CT); and wait-list control group. Funding: source not reported.</p>	<p>Integrity of intervention: Same counsellors and dieticians conducted all the sessions. Duration of intervention: Initial intervention was 6 months; followed by 6 month follow-up where subjects participated in weekly peer-led maintenance groups. Intervention was based on social support and social cognitive theory.</p>	<p>Outcomes: Included weight. Primary outcomes were depression, anxiety, self-control and disordered eating. Results: GroupXtime interaction showed significant but modest weight loss in CT and BT groups compared to control group. 6 month follow-up data available for 58% of subjects revealed continued weight loss of both BT and CT subjects.</p>	<p>Results may be confounded by individual therapist approach, as BT and CT were conducted by different therapists. Weight losses were statistically significant but of limited clinical significance. Long term follow-up limited to 58% of subjects. No intention-to-treat analysis conducted. Can't tell if data collection personnel blinded. Contamination occurred in that the BT group received 4 weeks of CT group intervention.</p>

Table 3A: Included Studies, Diet & Exercise (n = 11)

Study Identification	Design and Participants	Intervention	Results/Outcomes	Comments/Limitations
<p>Tate et al. (2001) United States</p>	<p>RCT English 91 healthy adults with mean weight 78.1 kg ± 10.5; mean BMI 29.0 ± 3.05; mean age 40.9 ± 10.6. Randomly assigned to: internet education (n = 45) or internet behaviour therapy (n = 46). Funded by: Weight Risk Investigators Study Council, a research division of Knoll Pharmaceutical.</p>	<p>Integrity of intervention: One clinical psychology graduate student conducted BT and another conducted the CT sessions; supervised by same senior therapist. Duration of intervention: 8 weeks in BT or CT with an additional 4 weeks CT for both groups – total 12 weeks. Cognitive and behavioural theoretical frameworks.</p>	<p>Outcomes: Weight and waist circumference. Results: Significantly greater weight loss in IBT group compared to IE group (p = .001), with loss in IE group of 1.7 (SD 2.7) kg at 3 months and 1.6 (SD 3.3) kg at 6 months and loss in IBT group of 4.0 (SD 2.8) kg at 3 months and 4.1 (SD 4.5) kg at 6 months.</p>	<p>Study included power analysis to determine sample size. Intention-to-treat analysis conducted and same result obtained. Paid \$10.00 and \$25.00 for attending the 3 and 6 month follow up appointments, respectively. Can't tell if data collection blinded. Instruction in use of internet was provided, but inclusion in study required access to a computer and ability to read and understand English.</p>

Table 3A: Included Studies, Diet & Exercise (n = 11)

Study Identification	Design and Participants	Intervention	Results/Outcomes	Comments/Limitations
<p>Tate, et al. (2003) United States</p>	<p>RCT English 92 overweight/obese individuals at risk for type 2 diabetes randomized into 2 groups. Funded by: Clinical Research Award from the American Diabetes Association.</p>	<p>Integrity of intervention: Same therapist conducted the one-hour introductory session and sent the weekly e-mails. Duration of intervention: 24 weeks.</p> <p>Intervention: <i>Internet Education (IE)</i>; one-hour group weight loss session; 1200-1500 calories per day and increased physical activity recommended; basic education on diet, exercise, self-monitoring made available on the web study site; <i>Internet Behaviour Therapy (IBT)</i>; IE plus behavioural e-counselling consisting of e-communication 5 times a week from their counsellor and then weekly for the remaining 11 months.</p> <p>Integrity of Intervention: IBT group Was instructed to use a website diary to record food intake and exercise expenditure. IE group was encouraged to use provided resources to monitor intake and exercise.</p>	<p>Outcomes: Change in body weight. Results: IBT had greater reduction in weight than IE group ($p = .04$) at 3, 6 and 12 months.</p>	<p>Results for weight loss only while intervention in progress; longer term follow-up post-intervention recommended.</p> <p>Intention-to-treat analysis completed. Electronic therapist contact improved one year outcomes.</p>

Table 3A: Included Studies, Diet & Exercise (n = 11)

Study Identification	Design and Participants	Intervention	Results/Outcomes	Comments/Limitations
<p><i>Utter et al. (1998)</i> United States</p>	<p>RCT English 102 adult females 25-75 years old with BMI between 25 and 65 with no known diseases; Sample were Caucasian. Randomized to Controls (n = 22); Exercise (n = 21); Diet (n = 26); Exercise & Diet (n = 22). Funding by: Cybex Grant from American College of Sports Medicine.</p>	<p>Intervention <i>Diet only (D):</i> 1200-1300 calorie diet based on dietary exchanges plus weekly instruction on weight loss principles, nutrition guidelines, importance of compliance with diet; stretching and range of motion exercise for 45 minutes 4 days per week under supervision. <i>Exercise only (E):</i> walk for 45 minutes 5 times weekly at 60-80% maximum heart rate (MHR) exercise was supervised 4 of 5 days. <i>Diet plus exercise (D+E):</i> both the exercise and the diet interventions. Controls: Stretching and range of motion exercise under supervision for 45 minutes 4 days per week. Integrity of intervention: Dietary compliance measured by random weekly 24-hour recalls; nutrient intake analysed using computerized dietary analysis system. Duration of intervention: 12 weeks.</p>	<p>Outcomes: Weight, BMI. Results: <i>Weight and BMI</i> of diet and diet plus exercise groups were significantly lower after 12 weeks compared to controls and exercise alone (group x time $p < .001$); there was no significant change for exercise alone relative to control. Conclusion: Moderate aerobic exercise training alone has no discernible effect on weight or BMI.</p>	<p>Lack of clarity regarding recruitment procedure; population not described aside from gender, age and weight. Can't tell if data collection blinded.</p>

Table 3A: Included Studies, Diet & Exercise (n = 11)

Study Identification	Design and Participants	Intervention	Results/Outcomes	Comments/Limitations
<p><i>Wing et al. (1998)</i> United States</p>	<p>RCT English 154 overweight and non-diabetic adults had one or both parents with diabetes; 79% women; 45.7 ± 4.4 years of age with BMI 35.9 ± 4.3. Funded by: National Institutes of Health, Obesity/Nutrition Research Center and General Clinical Research Center.</p>	<p>Intervention: <i>Diet Group</i> (n = 37): weekly group meetings first 6 months then biweekly; two 6-week refresher courses during year 2; 800-1000 calorie diet for 8 weeks, then 1200-1500 by week 16; meal plans and shopping lists provided; behavioural or nutrition topic presented at each meeting <i>Exercise Group</i> (n = 37): same schedule as diet group; topics related to changing exercise behaviour at each session; 50-60 minute supervised walk at each weekly meeting, with second walk available first 10 weeks. <i>Diet Plus Exercise Group:</i> received both exercise and diet interventions described above and encouraged to participate in walks (n = 40). Control Group: given a copy of the LEARN Manual, a self-help behavioural manual and encouraged to lose weight and exercise on their own (n = 40). Integrity of intervention: Same teams of therapists conducted all diet sessions and another team conducted all exercise sessions. Duration of intervention and follow-up: 2 years. Behavioural theoretical framework used in LEARN manual.</p>	<p>Outcomes: were weight as well as glucose and cholesterol levels, exercise and diet self-reports. Results: At six months diet and diet plus exercise groups lost greatest amounts of weight and were significantly different from exercise alone or control groups (p < 0.001). At 12 months diet group maintained 60% of weight loss and diet plus exercise maintained 72%, significantly better than exercise or control groups. At 24 months weight loss did not differ by treatment condition and only diet plus exercise group maintained a significant decrease in body weight.</p>	<p>Can't tell if data collection blinded. No intention-to-treat analysis. Strengths included long term follow-up. The three interventions differed in initial effectiveness but not in long term impact. In relation to risk of developing Type2 Diabetes, a weight loss of 4.5 kg at 2 years reduced the risk by 30%.</p>

3B: Included Studies, Exercise Only (n = 4)

Study Identification	Design and Participants	Intervention	Results/Outcomes	Comments/Limitations
<p><i>Bond-Brill et al. (2002)</i> United States</p>	<p>RCT English Participants were 88 women, mostly Hispanic, with mean BMI 34.3 ± 6.61 and mean age 39.5 ± 7.34; they were randomly assigned to diet only (D0), diet plus walking 30 minutes, 5 times per week (DEx1) or diet plus walking 60 minutes, 5 times per week (DEx2) Funding: source not reported.</p>	<p>Intervention: D0: modified version of calorie exchange program of American Dietetic Association; 1200-1400 calories per day; considered <i>ad libitum</i> since participants had unlimited access to high-fibre, low-fat and low-calorie foods; asked to refrain from exercise. DEx1 – Diet as above plus exercise sessions consisting of warm-up, pre-exercise stretches, 30 minutes of walking, cool-down and post-exercise stretches supervised by exercise physiologists; walking took place in a park, at self-regulated intensity 5 days/week DEx2 – Diet as above plus exercise as above except walking time was 60 minutes 5 days/week Integrity of intervention: The exercise component of the intervention was supervised by the same exercise physiologists. Duration of intervention: 12 weeks.</p>	<p>Outcomes: weight, BMI, waist circumference, BP and lipids. BP and lipids not reported here. Results: All groups showed similar and significant declines in body weight and BMI ($p < 0.001$) from baseline to post-test. There was significantly greater decrease in waist circumference in exercise groups compared to diet only.</p>	<p>No intention-to-treat analysis reported. Only those who attended at least 85% of exercise sessions and were compliant with diet were included in analysis (63.6%). There were no differences in baseline data among those who dropped out and those who completed the study. 30 minutes of walking was as effective as 60 minutes. Walking as exercise did not significantly increase weight loss over diet alone but reduced central fat distribution. Longer term follow-up recommended.</p>
<p><i>Dicken-Kano & Bell (2006)</i> United States</p>	<p>RCT English</p>	<p>Intervention: Intervention (n = 23) and control (n = 16) groups received handouts promoting exercise, advice to increase walking and help control weight.</p>	<p>Outcomes: BMI and walking for exercise.</p>	<p>Limited detail in this report; sample size selection and data analysis not described.</p>

3B: Included Studies, Exercise Only (n = 4)

Study Identification	Design and Participants	Intervention	Results/Outcomes	Comments/Limitations
<p><i>Jeffrey et al (2003)</i> <i>Tate et al (2007)</i> United States</p>	<p>39 adults aged 18-69 years with BMI ≥ 25. All reported physical activity of < 1 hour per week. Funding: source not reported.</p>	<p>Intervention group also received a pedometer and instructions to work up to a daily goal of 10,000 steps daily or twice their baseline steps. Integrity of intervention: Not described. Duration of intervention: 6 months.</p>	<p>Results: There was no significant change in BMI of participants in either group. Participants using a pedometer increased their walking for exercise from 39% at baseline to 79% at 6 months, while control group increased from 50% to 62% at final visit. Not a statistically different increase between the 2 groups but both groups did increase walking.</p>	<p>Can't tell if data collection blinded. Minimal intervention – only the use of a pedometer. No weight loss in either group, suggesting exercise alone does not lead to weight loss.</p>
	<p>RCT English 202 adults (BMI 26-44), 43% college graduates, 80% white, 58% female. Funding: source not reported.</p>	<p>Intervention: <i>Intervention group</i> received Standard Behavioural Therapy for obesity plus high physical activity treatment (HPA) consisting of a goal of energy expenditure (EE) of 2500 kcal/week. <i>Comparison group</i> received the SBT for obesity plus EE of 1000 kcal/week. <i>Both groups</i> received SBT in small group meetings weekly for the first 6 months, biweekly from 6-12 months and monthly from 12-18 months. <i>Intervention group</i> had 3 additional aspects: encouraged to enlist friends to join in exercise. Coaches met with them after group meetings to review exercise progress,</p>	<p>SBT with HPA group had statistically significantly increased their EE vs. control group (EE 2399 vs. EE 334, p < .04) at 18 months. No statistically significant between group difference in weight loss at 6 or 12 months. However found at 18 months (4.1 kg vs. 6.7 kg, p = .04). Energy intake remained similar for both groups throughout the study. Follow-up at 30 months from baseline indicates no significant between group differences in BMI or physical activity.</p>	<p>Over 80% retention rates over the study period. Adherence during the intervention to HPA was very high. Unknown which of the 3 strategies or a combination of them led to such high levels. Between 18-30 months many of the HPA group reduced their duration/ intensity of physical activity. Results support the need for high levels of physical activity to maintain weight loss.</p>

3B: Included Studies, Exercise Only (n = 4)

Study Identification	Design and Participants	Intervention	Results/Outcomes	Comments/Limitations
<p><i>Schmitz et al. (2007)</i> United States</p>	<p>RCT English 164 women with mean age 36 ± 5.5; mean weight 81.2 kg ± 1.3; 47% married; 60% white, 28% black and remainder "other"; 69% college degree. Randomised to treatment of twice weekly strength training or comparison group who received brochures recommending aerobic exercise.</p>	<p>provide support and assist in problem solving; financial incentive for meeting/exceeding EE goal. Integrity of intervention: Diet and exercise recorded daily for the first 6 months and then 1 week per month. Duration: 18 months.</p>	<p>Association of magnitude of physical activity and weight loss determined by comparisons of 3 EE groups (by level of intensity) at 30 months: Weight loss in those with highest EE was significantly greater (7.0 kg vs. 0.4 and 0.6 kg). Also significantly greater weight loss seen in men than in women. Significantly less weight regain in group with > 2500 kcal of EE compared to the other 2 groups (2.9 kg vs. > 6 kg).</p>	
		<p>Intervention: <i>Treatment group:</i> twice-weekly strengthening exercise sessions for 16 weeks which were supervised by certified fitness instructors; followed by booster sessions every 12 weeks; otherwise expected to do unsupervised exercise with weekly reminder calls, free childcare was provided, a study website, semi-annual social gatherings and a monthly newsletter. <i>Comparison group:</i> received by mail American Heart Association brochures recommending 30 minutes of moderate intensity activity most days of the week; no social support components provided.</p>	<p>Outcomes: Weight, as well as body composition, muscle, physical activity. Results: No change in body weight or BMI; differences between treatment and comparison group. Decreases in body fat were greater in year 1 than year 2, reflecting change from intervention in first year to maintenance in second year.</p>	<p>Study included power analysis to determine sample size, required number of women completed the study; no intention-to-treat analysis conducted. Can't tell if data collection blinded. Primary focus of research was not weight loss but rather avoidance of increases in percentage body fat and intra-abdominal fat and strength training marginally successful in achieving this aim.</p>

3B: Included Studies, Exercise Only (n = 4)

Study Identification	Design and Participants	Intervention	Results/Outcomes	Comments/Limitations
	<p>Funded by: National Institute of Digestive and Kidney Disease and University of Minnesota's general Clinical Research Center.</p>	<p>Both groups were asked not to make significant changes to diet.</p> <p>Integrity of intervention: Same instructors supervised the exercise which took place in the same location, YWCA.</p> <p>Duration of intervention: 2 years in total.</p> <p>Social Cognitive Theory.</p>		

Table 3C: Included Studies, Diet Only (n = 8)

Study Identification	Design and Participants	Intervention	Results/Outcomes	Comments/Limitations
<p><i>Heshka, et al. (2000)</i> <i>Heshka, et al. (2005)</i> United States</p>	<p>Multi-centre RCT 423 participants, male and female overweight/obese (BMI 27-40) aged 18-65 years. Funded by: the Weight Watchers Foundation.</p>	<p>Intervention: <i>Intervention group</i> (n = 211) received a free commercial program consisting of a nutritionally balanced, moderately energy deficit food plan, an activity plan and weekly one hour group meetings that provide educational materials, weigh-in and social support (i.e. Weight Watchers). <i>The control group</i> (self-help) had 20 minute consultations with a dietitian at weeks 0 and 12. Integrity of the Intervention: Attendance at weekly meetings. Duration of intervention: Two years.</p>	<p>Outcomes: At 26 weeks, the commercial program participants had lost statistically significantly more weight (BMI -1.7 vs. -.05, p0.001) than the control group. At two years these results continued (BMI -1.1 vs. -0.2, p < .001).</p>	<p>Analysis by intention-to-treat. Results of analysis using a modified intention-to-treat and just completers had more positive results among the intervention group. Weight loss was modest.</p>
<p><i>Jeffery et al. (1993)</i> United States</p>	<p>RCT English 202 healthy adults (101 men and 101 women), average age 40 years, predominately white, well-educated with mean weight of 89 kg and BMI of 31. Funded by: National Institutes of Health grants.</p>	<p>Interventions: Standard behavioural therapy (SBT) consisted of information and group discussion about diet and exercise in groups of 20 along with behaviour interventions such as stimulus control techniques, problem-solving strategies and social support; 1000 or 1500 calories per day depending on baseline weight, and exercise program equivalent to 50 calories per day for 5 days per week. <i>Group 1:</i> SBT alone (n = 40).</p>	<p>Outcomes: Weight; additional outcomes included knowledge, Eating Behaviour Inventory. Results: The two groups provided with food had the largest weight loss at all time points (p < .0002); no effect for monetary incentives or interaction between incentives and food provision; attendance at sessions greatest also in food provision groups.</p>	<p>SBT alone resulted in weight loss, but significant increase when food was provided; weight loss and behavioural adherence deteriorated from 6 months in all groups so provision of food did not facilitate weight-loss maintenance. Food provision was more effective than financial incentives in improving weight loss. Need for further research to determine strategies for long term weight maintenance.</p>

Table 3C: Included Studies, Diet Only (n = 8)

Study Identification	Design and Participants	Intervention	Results/Outcomes	Comments/Limitations
<p><i>Kalochner & DeLucia (1991)</i> United States</p>	<p>RCT English 60 women and 9 men with mean age of 40.68 years, weight of 84.3 kg.</p>	<p><i>Group 2:</i> SBT plus pre-packaged meals for five breakfasts and dinners free of charge per week and a meal plan for other meals (n = 40) <i>Group 3:</i> SBT plus monetary incentives based on amount of weight lost in relation to weight loss goal, maximum payment \$25.00 for reached and maintained goals (n = 41). <i>Group 4:</i> SBT food provision and incentives above (n = 41). <i>Group 5:</i> Control group who were told to lose weight on their own and attend evaluations (n = 40). Integrity of intervention: Daily food intake diary Duration of intervention. Weekly meetings for 20 weeks, then monthly meetings; evaluations at 6, 12, 18 months. Behavioural theory for SBT.</p>	<p>Outcomes: Weight, behavioural, cognitive and nutritional measures. Results: Participants lost statistically significant amounts of weight at post-test, 3-month; slight increase in weight at 6-month follow-up.</p>	<p>Although weight loss data from the 4 groups combined was statistically significant, it was moderate and may be of little clinical significance. No intention-to-treat analysis, or other approach to missing data.</p>

Table 3C: Included Studies, Diet Only (n = 8)

Study Identification	Design and Participants	Intervention	Results/Outcomes	Comments/Limitations
<p><i>McMillan-Price et al. (2006)</i> Australia</p>	<p>Blocked by gender and percentage overweight and randomly assigned within stratified blocks to 1 of 4 intervention groups which included combinations of Behaviour Therapy (BT), Cognitive Therapy (CT) and Nutrition Education (NE).</p>	<p>weekly computer analysis of daily diet and two meetings with registered dietitians to discuss nutrition patterns. Integrity of intervention: BT provided by female master's students; CT by female doctoral students; NE by registered dietitians; all sessions led by same individuals throughout the intervention. Duration of intervention: 10 weekly 2-hour sessions; eight participants per group. Theoretical frameworks related to cognitive and behavioural therapy.</p>	<p>No between group differences in weight reduction among the intervention groups, although only combined data were presented rather than weight by intervention.</p>	<p>No detail of the various interventions was provided; would not be able to use the suggested approaches or replicate the research. Although subjects placed \$50,00 deposit refundable contingent on attendance at follow-up assessments, 64% completed all assessments.</p>
<p>RCT English 129 young adults (18-40 years) were randomized to 1 of 4 groups. Funded in part by: The National Heart Foundation of Australia and Meat and Livestock Australia.</p>	<p>Intervention: Diets in all groups were reduced-energy, reduced fat, moderate fibre, with between group differences in quantity and quality of carbohydrates. All participants were given eating plans of approximately 1400 calories for women and 1900 calories for men. Participants were provided with all carbohydrates and protein foods and some prepared meals. Weekly meetings for all groups with a dietician to encourage compliance and answer questions.</p>	<p>Outcomes: Body weight. Results: All groups lost weight but there were no between group differences. Significant differences on the proportion of participants in each group who lost > 5% of their body weight: Diet 1 31% Diet 2 56% Diet 3 66% Diet 4 33%</p>	<p>Sample size was calculated to allow adequate power to detect results. Intention-to-treat analysis was used.</p>	

Table 3C: Included Studies, Diet Only (n = 8)

Study Identification	Design and Participants	Intervention	Results/Outcomes	Comments/Limitations
<i>Meckling, et al. (2004)</i> Canada	RCT 9 males and 31 females who were overweight/ obese. Funded in part by: the Natural Sciences and Engineering Research Council of Canada.	Integrity of the Intervention: Food dairies kept for three days in weeks 4 and 8. Duration of the Intervention: 12 weeks. Intervention: Assigned to either a low-fat diet group or a low-carbohydrate group. Intake of groups resulted in the same energy restriction. Participants were encouraged not to change physical activity levels. Weekly meetings with study coordinators for weight check and diet consultation.	Outcomes: BMI. Results: BMI decreased in both groups from pre- to post-test. No statistically significant between group. BMI differences were found after the intervention. Other outcomes (i.e. blood pressure, lipids, glucose, insulin and PAI-1) are not reported here.	The small sample size (n = 20 per group) and 23% drop-out may have produced a Type II error.
<i>Petersen et al. (2006)</i> Seven European Countries: England, The Netherlands, France (two centres), Spain, Czech Republic, Sweden and Denmark.	RCT English 771 individuals (579 females; 192 males) with mean weight 104 kg \pm 15.9 and mean age 37.5 years \pm 8.	Intervention: Assignment to either a diet that provided 600 calories less than individually estimated energy requirements with 20-25% of total energy from fat (low fat; n = 382) OR lower calorie diet as above with 40-45% of total energy from fat (high fat; n = 389).	Outcomes: Primary outcome was weight; secondary outcomes were body composition and blood lipids; insulin and lipid levels are not reported here.	Intention-to-treat analysis conducted and similar result obtained. Can't tell if data collection blinded.

Table 3C: Included Studies, Diet Only (n = 8)

Study Identification	Design and Participants	Intervention	Results/Outcomes	Comments/Limitations
<p><i>Skov et al. (1999)</i> <i>Due et al. (2004)</i> Denmark</p>	<p>Stratified block randomization with centre, gender and three age groups (20-29; 30-39 and 40-50 years) as strata and block size 12. Funded by: European Community</p>	<p>Weekly meeting with dietician to provide and reinforce dietary instructions. Integrity of intervention: All sessions provided by same dietician who received training to standardize presentations. Duration of intervention: 10 weeks.</p>	<p>Results: Mean weight loss was 6.9 kg in low and 6.6 kg in high-fat group with no between group difference. The proportion of subjects who lost 10% or more was greater in low (20.8%, n = 70) than in high-fat group (14%, n = 46) (p = 0.02).</p>	<p>Both diets led to weight loss during the study duration which was only ten weeks; need for longer term follow-up.</p>
	<p>RCT Danish 65 healthy, overweight/ obese (BMI 25-35) men and women aged 18-55 years. Funded by: Danish Research and Development Program for Food Technology, Federation of Danish Pig Producers and Slaughter House, Danish Dairy Research Foundation and Danish Livestock and Meat Board.</p>	<p>Intervention: Both intervention groups consumed diets low in fat (30% of total energy). <i>High Carbohydrate (HC) group</i> consumed a diet of 58% carbohydrates and 12% protein. <i>High Protein (HP) group</i> consumed a diet of 25% protein and 45% carbohydrates. <i>Control group</i> continued to consume their "normal" diet. For the first 6 months, participants in both intervention groups received free food twice a week from a shop set up for the purpose. In months 6-12 participants provided their own food, guided by group specific behaviour therapy sessions every second week. Integrity of intervention: 7 day dietary records.</p>	<p>Outcomes: Weight loss and other outcomes not reported here. Results: At both 3 and 6 months, the HP group lost statistically significantly more weight than the HC group (6 months: 8.7 kg vs. 5.0 kg p = 0.0002). At 12 and 24 months the weight loss difference between the 2 intervention groups was no longer statistically significant.</p>	<p>Maintaining adherence to the diets after the free food shop was a challenge. The authors suggest several possible reasons for this non-adherence. Authors conclude that a high-protein and low-fat diet is effective in inducing weight loss in the short term. As well, they provide evidence of no other deleterious effects as reported/suspected by others.</p>

Table 3C: Included Studies, Diet Only (n = 8)

Study Identification	Design and Participants	Intervention	Results/Outcomes	Comments/Limitations
<p>Wing et al. (1996) United States</p>	<p>RCT English 163 overweight women with mean weight 84.6 kg ± 5.9; mean age 41.3 ± 7.4. Randomly assigned to 1 of 4 groups Funded by: National Institutes of Health, USA.</p>	<p>Intervention: Standard Behavioural Treatment (SBT) was provided for all four groups. Subjects assigned a 1000-1500 calorie diet, depending on initial body weight; behavioural strategies included self-monitoring, stimulus control, pre planning, problem-solving and social support. <i>Group 1:</i> SBT and basic principles of healthy eating; no specific instructions about what foods to eat. <i>Group 2:</i> SBT plus written meal plans and grocery lists. <i>Group 3:</i> SBT plus meal plans as above plus box of food each week containing the correct food to be eaten, for which they paid \$25.00. <i>Group 4:</i> SBT plus meal plans and the same box of food but it was provided free of charge. Integrity of intervention: Same therapists conducted SBT sessions; there were approx. 20 participants per group. Duration of intervention: 26 weeks. No community involvement with design; no theoretical framework stated.</p>	<p>Outcomes: Weight; other measures included questionnaires related to barriers to adherence, dietary intake, food stored in the home, eating patterns, knowledge and physical activity. Results: Significantly greater weight loss in Groups 2, 3 and 4 compared to Group 1 with no difference between those three groups. One year follow-up showed SBT alone produced significantly poorer long-term weight losses than the three treatment groups which did not differ from each other.</p>	<p>Study included power analysis to determine sample size, intention-to-treat analysis conducted and same result obtained. Can't tell if data collection blinded. Received instruction in use of internet, but inclusion in study required access to a computer and ability to read and understand English.</p>

Appendices & Figures:

Appendices

Appendix 1: Search Strategy

Appendix 2: Hand-Searched Journals

Appendix 3: Relevance Tool

Appendix 4: Quality Assessment Tool

Figures

Figure 1: Search Results

Appendix 1: Search Strategy

Population	Intervention/Treatment	Setting: Community	Setting: Primary Care	Study Design Limits
obesity*	diet therapy*	delivery of health care*	primary health care*	controlled clinical trial
body weight	counselling*	community health services*	physicians*	randomized controlled trial
overweight*	exercise therapy	community health nursing*	physicians' offices*	cohort studies*
	exercise*	community health centers*	dietician\$ dietitian\$	quasi-experimental
	relaxation	community health planning*	nutritionist\$	longitudinal studies*
	relaxation techniques	workplace*	psychologist\$	
	walking		psychiatrist\$	
	yoga		public health*	
	health education*			

The above search strategy is from Medline (MeSH) with search terms expanded. Keyword searches and their derivatives were performed on CINAHL, Clinical Trials.gov, Cochrane, EMBASE, HealthStar, PsycINFO as well.

Date Parameters: 1990-2007

Languages: English

*terms expanded

Appendix 2: Hand-searched Journals

Searched from January 2007 – February 2008:

American Journal of Epidemiology

American Journal of Health Promotion

American Journal of Public Health

Canadian Journal of Public Health

Canadian Medical Association Journal

Health Education and Behavior

Health Promotion International

Journal of Epidemiology and Community Health

Journal of Nutrition Education and Behavior

Journal of School Health

Appendix 3 – Relevance Tool

Relevance Criteria

1.	The study involves an intervention relevant to public health/health promotion practice consistent with the Ontario Public Health Standards.	Y	N
2.	The study reports on an intervention targeted at changing behaviour (therapies, strategies, counselling, education, skill building, or supportive environment) in the workplace relating to substance misuse (alcohol or drugs). Tobacco is not relevant.	Y	N
3.	The study implements the intervention in a population of adults in the workplace.	Y	N
4.	The intervention takes place in countries where workplace practices and standards are similar to those in Ontario: Canada, the United States, Australia, New Zealand, or Northwestern Europe (United Kingdom, Ireland, Norway, Sweden, Denmark, France, Belgium, Netherlands, Germany, Switzerland, and Austria).	Y	N
5.	The study reports a behaviour outcome related to substance use behaviours that related to reduction of substance misuse (Reduction, elimination, abstinence, “early identification”, “self-management”, relapse prevention and/or rehabilitation	Y	N
	Reviewer Decision		
	Include in critical appraisal (only if answer ‘yes’ to all 5 relevance criteria)	Y	N
	If Discrepancy in Inclusion Decision:		
	Reason for discrepancy		
	Oversight		
	Difference in interpretation of criteria	Y	N
	Difference in interpretation of study	Y	N
	Additional Comments:	Y	N
	FINAL DECISION: INCLUDE IN STUDY	Y	N

Appendix 4



EFFECTIVE PUBLIC HEALTH PRACTICE PROJECT (EPHPP)

QUALITY ASSESSMENT TOOL FOR QUANTITATIVE STUDIES

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 See dictionary	STRONG 1	MODERATE 2	WEAK 3
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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? If NO, go to Component C.

No Yes

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 See dictionary	STRONG 1	MODERATE 2	WEAK 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/or 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 individual

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

community organization/institution practice/office individual

(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 1-4 onto this page.

A	SELECTION BIAS	RATE THIS SECTION See dictionary	STRONG 1	MODERATE 2	WEAK 3
B	STUDY DESIGN	RATE THIS SECTION See dictionary	STRONG 1	MODERATE 2	WEAK 3
C	CONFOUNDERS	RATE THIS SECTION See dictionary	STRONG 1	MODERATE 2	WEAK 3
D	BLINDING	RATE THIS SECTION See dictionary	STRONG 1	MODERATE 2	WEAK 3
E	DATA COLLECTION METHODS	RATE THIS SECTION See dictionary	STRONG 1	MODERATE 2	WEAK 3
F	WITHDRAWALS AND DROPOUTS	RATE THIS SECTION See dictionary	STRONG 1	MODERATE 2	WEAK 3

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 |

Figure 1: Search Results

