Interventions to enhance adherence to dietary advice for preventing and managing chronic diseases in adults (Review)

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[Intervention Review]

Interventions to enhance adherence to dietary advice for preventing and managing chronic diseases in adults

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Editorial group: Cochrane Consumers and Communication Group.
Publication status and date: New, published in Issue 2, 2013.
Review content assessed as up-to-date: 20 December 2011.

Citation: Desroches S, Lapointe A, Ratté S, Gravel K, Légaré F, Turcotte S. Interventions to enhance adherence to dietary advice for preventing and managing chronic diseases in adults. *Cochrane Database of Systematic Reviews* 2013, Issue 2. Art. No.: CD008722. DOI: 10.1002/14651858.CD008722.pub2.

ABSTRACT

Background

It has been recognized that poor adherence can be a serious risk to the health and wellbeing of patients, and greater adherence to dietary advice is a critical component in preventing and managing chronic diseases.

Objectives

To assess the effects of interventions for enhancing adherence to dietary advice for preventing and managing chronic diseases in adults.

Search methods

We searched the following electronic databases up to 29 September 2010: *The Cochrane Library* (issue 9 2010), PubMed, EMBASE (Embase.com), CINAHL (Ebsco) and PsycINFO (PsycNET) with no language restrictions. We also reviewed: a) recent years of relevant conferences, symposium and colloquium proceedings and abstracts; b) web-based registries of clinical trials; and c) the bibliographies of included studies.

Selection criteria

We included randomized controlled trials that evaluated interventions enhancing adherence to dietary advice for preventing and managing chronic diseases in adults. Studies were eligible if the primary outcome was the client's adherence to dietary advice. We defined 'client' as an adult participating in a chronic disease prevention or chronic disease management study involving dietary advice.

Data collection and analysis

Two review authors independently assessed the eligibility of the studies. They also assessed the risk of bias and extracted data using a modified version of the Cochrane Consumers and Communication Review Group data extraction template. Any discrepancies in judgement were resolved by discussion and consensus, or with a third review author. Because the studies differed widely with respect to interventions, measures of diet adherence, dietary advice, nature of the chronic diseases and duration of interventions and follow-up, we conducted a qualitative analysis. We classified included studies according to the function of the intervention and present results in a narrative table using vote counting for each category of intervention.

Main results

We included 38 studies involving 9445 participants. Among studies that measured diet adherence outcomes between an intervention group and a control/usual care group, 32 out of 123 diet adherence outcomes favoured the intervention group, 4 favoured the control group whereas 62 had no significant difference between groups (assessment was impossible for 25 diet adherence outcomes since data and/or statistical analyses needed for comparison between groups were not provided). Interventions shown to improve at least one diet adherence outcome are: telephone follow-up, video, contract, feedback, nutritional tools and more complex interventions including multiple interventions. However, these interventions also shown no difference in some diet adherence outcomes compared to a control/usual care group making inconclusive results about the most effective intervention to enhance dietary advice. The majority of studies reporting a diet adherence outcome favouring the intervention group compared to the control/usual care group in the short-term also reported no significant effect at later time points. Studies investigating interventions such as a group session, individual session, reminders, restriction and behaviour change techniques reported no diet adherence outcome showing a statistically significant difference favouring the intervention group. Finally, studies were generally of short duration and low quality, and adherence measures varied widely.

Authors' conclusions

There is a need for further, long-term, good-quality studies using more standardized and validated measures of adherence to identify the interventions that should be used in practice to enhance adherence to dietary advice in the context of a variety of chronic diseases.

PLAIN LANGUAGE SUMMARY

Interventions to enhance adherence to dietary advice for preventing and managing chronic diseases in adults

Chronic diseases are the leading cause of mortality worldwide. Although the adoption of a healthy diet is recognized as an important component for their prevention and management, many individuals at risk of or having chronic diseases do not adhere to recommended dietary advice. The methods used to facilitate changes in dietary habits through dietary advice (defined in this review as 'interventions') could improve adherence of clients to dietary advice. Therefore, we reviewed trials of interventions aiming to enhance adherence to dietary advice for preventing and managing chronic diseases in adults.

We identified 38 studies involving 9445 participants examining several types of interventions for enhancing adherence to dietary advice for preventing and managing many chronic diseases. The main chronic diseases involved were cardiovascular diseases, diabetes, hypertension, and renal diseases. Interventions shown to improve at least one diet adherence outcome are: telephone follow-up, video, contract, feedback, nutritional tools and more complex interventions including multiple interventions. However, these interventions also showed no difference in some diet adherence outcomes compared to a control/usual care group making the results inconclusive about the most effective intervention to enhance dietary advice. Interestingly, all studies including clients with renal diseases reported at least one diet adherence outcome showing a statistically significant difference favouring the intervention group, no matter which intervention was provided. The majority of studies reporting a diet adherence outcome favouring the intervention group compared to the control/usual care group in the short-term also reported no significant effect at later time points. Studies investigating interventions such as a group session, individual session, reminders, restriction and behaviour change techniques reported no diet adherence outcome showing a statistically significant difference favouring the intervention group. Finally, interventions were generally of short duration, studies used different methods for measuring adherence and the quality of the studies was generally low.

BACKGROUND

Description of the condition

Chronic diseases are defined as diseases of long duration that have generally a slow progression (WHO 2008). The most common chronic diseases include diabetes, cardiovascular diseases (CVD), cancers, asthma, chronic obstructive pulmonary diseases (COPD),

arthritis, obesity and renal failure. Considering that chronic diseases are the leading cause of death and disability and account for 60% of all deaths worldwide (WHO 2008), the Department of Chronic Disease and Health Promotion of the World Health Organization (WHO) emphasizes the importance of preventing and managing chronic diseases and their risk factors (WHO 2010). Some health conditions have been found to be risk factors, for example, patients with the metabolic syndrome have an increased risk of developing CVD (Mottillo 2010). Similarly, women with a previous history of gestational diabetes have an increased risk of developing type II diabetes (Bellamy 2009). These risk factors may be targeted in interventions aiming to prevent chronic diseases.

Evidence from epidemiologic, experimental and clinical studies has demonstrated a strong relationship between dietary patterns or nutrient intakes, and prevention and management of chronic diseases including diabetes (Champagne 2009), CVD (Lavie 2009), and obesity (Kennedy 2004). Several authoritative health agencies have recommended the adoption of a healthy diet as the cornerstone in preventing and/or managing chronic diseases such as CVD (Lichtenstein 2006), diabetes (Bantle 2008) and cancer (Kushi 2006). For example, lifestyle interventions including dietary changes were shown to reduce the incidence of diabetes by 58% compared to a control group in individuals at high risk in two large randomized controlled trials (RCTs): the Finnish Diabetes Prevention study (Lindstrom 2003) and the Diabetes Prevention Program (Knowler 2002). In line with this, dietitians and other health professionals provide people with dietary advice designed to improve their nutritional intake (Baldwin 2011).

The concept of 'adherence' recognizes the patient's right to choose whether or not to follow advice, and implies a patient's active participation in the treatment regimen (Cohen 2009). For chronic disease management including medication and lifestyle changes, non-adherence rates are estimated to be between 50% and 80% (WHO 2003). Thus, poor adherence can be a serious threat to patients' health and wellbeing (DiMatteo 2002), and also carries an economic burden (DiMatteo 2004a). Adherence is particularly important in the context of chronic diseases requiring long-term therapy and a number of permanent rather than temporary changes in lifestyle behaviours, such as diet, physical activity and smoking (WHO 2003). The extent to which risk-reduction interventions proved to be as effective in research settings as in individuals' real-life settings depends on the patient's adherence to treatment advice. In that regard, results from an RCT assessing adherence to and effectiveness of four popular diets (Atkins, Zone, Weight Watchers, and Ornish) revealed that level of adherence to dietary advice, rather than the type of diet, was the key determinant of greater weight loss and CVD risk factor reductions (Dansinger 2005). Whether the number of intervention goals that an individual has to reach influences adherence was also addressed in a secondary analysis of the PREMIER study (Young 2009). In this RCT that tested the effects of two multicomponent lifestyle interventions on blood pressure control, the authors reported that individuals with the most physical activity and dietary behaviour goals to achieve reached the most goals (Young 2009).

Measurement of adherence to prescribed dietary advice typically involves: 1) assessment of what the client eats through self-reported methods (e.g. 24-hour recall, food records, food frequency questionnaires, diet history); and 2) determination of the degree to which the diet approximates the recommended dietary plan (e.g. difference between clients' recommended macronutrient goals and their self-reported intake). Although sparsely used, more objective measures of adherence to diets also exist (e.g. 24-hour urinary sodium excretion to assess adherence to a low sodium diet (Chung 2008)). However, there is no gold standard for the accurate determination of dietary intake. Self-report of energy intake is a characteristic inherent to nutrition-related topics and is found to be underestimated compared to objective measures such as resting energy expenditure assessed by indirect calorimetry (Asbeck 2002). Underreporting energy intake has been observed more frequently in women versus men, (Johnson 1994), in older versus young (Huang 2005), and in obese versus normal weight individuals (Briefel 1997). Although self-report measures are often regarded as susceptible to bias (e.g. over reliance on memory; report error related to meal composition or portion sizes; daily dietary variability; social desirability) (Kumanyika 2000; Wilson 2005) they are a direct, simple and inexpensive method (DiMatteo 2004b), and are readily available for use in practice. Self-report measures can be improved and validated by using multiple measures of adherence and controlling statistically for bias or by using constructs such as body weight, blood pressure or plasma cholesterol concentrations (Hebert 2001; DiMatteo 2004b).

Description of the intervention

Adherence to dietary advice has been shown to vary according to gender (Chung 2006), socio-economic status (Reid 1984) and ethnicity (Natarajan 2009). Moreover, numerous barriers to client adherence in health care have been identified. Among them are complexity of treatment plan, and clients' knowledge of disease and understanding of the importance of treatment in its control and in preventing adverse outcomes (Makaryus 2005 ;Harmon 2006; Robinson 2008). According to a WHO report, "interventions for removing barriers to adherence must become a central component of efforts to improve population health worldwide" (WHO 2003). Although non-adherence is often attributed to clients who are viewed as "non cooperative", "non compliant" and "unable to follow instructions" (Kapur 2008), it is increasingly recognized that health professionals may help their clients overcome barriers to adherence (Harmon 2006) by improving how they approach their clients' problems, how they provide advice, and how they involve their clients in treatment decision making. Although there is a wide diversity of interventions for enhancing adherence to dietary advice, their underlying aim is to prompt change to facilitate the adoption of recommended dietary behaviours.

How the intervention might work

Behaviour change theories have proved useful for explaining health-related behaviours, including dietary behaviours. They attempt to identify the determinants that will contribute to predict the adoption of a specific behaviour, and which should be taken into account when developing a behaviour change intervention, such as a method for providing dietary advice. Several models or theories to predict behaviour change can be used in health-related interventions, such as the Health Belief Model (Rosenstock 1974), the Theory of Planned Behaviour (Ajzen 1991), the Theory of Reasoned Action (Fishbein 1981) and the Social Cognitive Theory (Bandura 1986). More recently, Michie 2011 proposed a framework, the COM-B system, which includes three principal interrelated components of the determination of a behaviour: 1) the motivation (the direct brain process leading to a behaviour), 2) the capability (the individual's psychological and physical capacity to engage a behaviour) and 3) the opportunity (the factors that lie outside the individual that make the behaviour possible or not) (Michie 2011).The authors also developed a system for characterizing behaviour change interventions and their components in order to facilitate the identification of the effective behaviour change interventions and the implementation of evidence-based practice in this area. According to this system, behaviour change interventions can be classified as nine intervention functions: education, persuasion, incentivisation, coercion, training, restriction, environmental restructuring, modelling and enablement (Michie 2011). These theories or models focus on different determinants or combinations of determinants of the behaviours which could be helpful for developing interventions for enhancing adherence to dietary advice.

Why it is important to do this review

As greater adherence to dietary advice is a critical component in preventing and managing chronic diseases, research is needed to identify the characteristics of interventions that will result in a better agreement between health professionals' evidence-based dietary advice, and their clients' eating patterns. Despite growing recognition that non-adherence to dietary advice is a barrier to getting new nutrition knowledge into practice, previous knowledge syntheses have provided decision makers and knowledge users with little practical guidance on the development of useable interventions for enhancing adherence to dietary advice. Studies have reported on interventions designed to enhance adherence to dietary advice by overcoming barriers to adherence. Although some studies have reported positive effects of interventions to enhance adherence to dietary advice, no systematic review specifically assesses dietary interventions that lead to sustained dietary changes or that refer to a wide array of chronic diseases. Haynes 2008 summarized the results of RCTs of interventions to help clients adhere to prescriptions for medications for medical problems, and excluded interventions targeting dietary advice. Bosch-Capblanch 2007 systematically reviewed the effects of contracts between clients and health professionals for improving clients' adherence to treatment, prevention and health promotion activities. Although this review is relevant to our review, it reported only the effect of contracts (as opposed to other interventions), and was not specific to dietary advice. Several non-Cochrane reviews may overlap with our review, but these are not systematic (Brownell 1995b; Brownell 1995a; Burke 1997; Newell 2000; Fappa 2008) and/or are related to only one health condition and not specifically targeting dietary advice (Burke 1997; Newell 2000; Fappa 2008).

This review will improve the knowledge base for adherence to dietary advice; a topic of immense importance for dietetics practice that will also be relevant to clients, and other health professionals.

OBJECTIVES

To assess the effects of interventions for enhancing adherence to dietary advice for preventing and managing chronic diseases in adults.

METHODS

Criteria for considering studies for this review

Types of studies

Randomized controlled trials (RCTs) including cluster RCTs. Because interventions for enhancing adherence to dietary advice aim to initiate dietary changes, a cross-over design in which each client received all interventions could induce a carry-over effect. Therefore, we excluded studies including a cross-over design.

Types of participants

Clients, aged 18 years and over, in real-life settings. We define 'client' as an adult participating in a chronic disease prevention or chronic disease management study involving dietary advice. We included clients who had a diet related-chronic disease (e.g. obesity, cardiovascular disease, renal failure, hypertension) or at least one risk factor for a chronic disease (e.g. overweight, hyperlipidaemia). We included family or non-family caregivers such as wife/husband or individual living with the client and involved in meal planning and preparation. We also included studies involving health professionals delivering dietary advice.

Types of interventions

We included studies assessing the effects of a single intervention or multiple interventions involving chronic disease prevention and management, on adherence to dietary advice. 'Intervention' was defined as the method used to facilitate changes in dietary habits through dietary advice. To structure the presentation of results, we grouped interventions according to the intervention functions of the behaviour change wheel developed by Michie and colleagues (Michie 2011). Therefore, we classified interventions to enhance adherence to dietary advice as:

- Education (increasing knowledge or understanding);
- Persuasion (using communication to induce positive or negative feelings or stimulate action);
- Incentivisation (creating expectation of reward);
- Coercion (creating expectation of punishment or cost);
- Training (imparting skills);
- Restriction (using rules to reduce the opportunity to engage in the target behaviour);
- Environmental restructuring (changing the physical or social context);
- Modelling (providing an example for people to aspire to or imitate) ;
- Enablement (increasing means/reducing barriers to increase capability or opportunity);
- Multiple (combination of two or more different interventions).

We included studies making the following comparisons:

- Single intervention for enhancing adherence to dietary advice versus no intervention (control) or a reference standard of care (usual care);
- Single intervention for enhancing adherence to dietary advice versus single or multiple interventions with a similar purpose (to enhance adherence to dietary advice);
- Multiple interventions for enhancing adherence to dietary advice versus no intervention (control) or a reference standard of care (usual care);
- Multiple interventions for enhancing adherence to dietary advice versus single or multiple interventions for enhancing adherence to dietary advice.

The term 'reference standard of care' refers to the usual dietary intervention performed to address a specific health condition. For example, in Amato 1990 two approaches were used with patients who were severely obese using the same dietary advice: 1) weight loss advice versus 2) weight loss advice combined with psychotherapy. The approach with weight loss advice was the reference standard of care while the approach with weight loss advice combined with psychotherapy was the intervention for enhancing adherence to dietary advice. Furthermore, only studies comparing interventions with the same dietary advice component (e.g. increase consumption of fruits and vegetables, decrease fat intake) but differing in terms of the method for changing dietary habits through dietary advice (e.g. education (counselling and follow-up with health professional, educational tools)) were included. We excluded studies assessing adherence to dietary advice for which interventions were not a method for facilitating changes in dietary habits through dietary advice (e.g. medication for weight loss, exercise, etc.). We excluded studies that aimed primarily to evaluate the effects of an experimental diet or a food plan on health outcomes, and for which adherence was monitored as a secondary outcome to justify, for example, the validity of the results, as these interventions were not designed for enhancing adherence to dietary advice. We only included studies including food-based dietary advice and representing real-life conditions. Therefore, we excluded studies involving the provision of meals, food items or dietary supplements (e.g. vitamin, mineral, omega-3 fatty acid).

Types of outcome measures

Primary outcomes

- Client adherence to dietary advice (e.g. biochemical measures within acceptable limits, mean dietary intake, proportion of clients achieving the dietary advice). We included studies reporting adherence to dietary advice as a primary outcome, namely those clearly mentioning a measurement of diet adherence in the title or the objective of the study and/or those reporting the proportion of patients adhering to dietary advice. We excluded studies reporting mean dietary intake without specifically assessing adherence to dietary advice.

Secondary outcomes

- Process measures: e.g. attendance at or participation in individual counselling or group sessions, number of completed food records returned to research coordinators, client or family or non-family caregivers' satisfaction with the dietary or counselling approaches, health professionals' skills in performing the experimental interventions or their satisfaction with the counselling approach.
- Client-based health or behaviour outcomes: e.g. blood pressure; plasma cholesterol concentration; plasma glucose concentration; body weight; relief of symptoms; smoking; physical activity; blood glucose monitoring.
- Organisational outcomes: e.g. cost; time; resources required by client, family or non-family caregivers, or healthcare professionals.
- Harms or secondary effects: e.g. confusion regarding new eating patterns; feelings of lack of confidence or skills in preparing meals; unhappiness at loss of traditional meals.

Search methods for identification of studies

Electronic searches

We conducted a systematic search, using 29 September 2010 as the cut-off date, in the following electronic databases:

- *The Cochrane Library*, issue 9 2010 (via Wiley);
- PubMed;
- EMBASE (Embase.com);
- CINAHL (Ebsco);
- PsycINFO (PsycNet).

We present detailed search strategies in Appendix 1; Appendix 2; Appendix 3; Appendix 4; Appendix 5. There were no language restrictions and all databases were searched from their start date.

Searching other resources

We conducted additional searches for unpublished studies through grey literature:

- Recent years of relevant conference, symposium and colloquium proceedings and abstracts:
  - 2009-10 Scientific sessions of the American Diabetes Association;
  - 2009-10 Scientific sessions of the American Heart Association;
  - 2009-10 Food and Nutrition Conference and Expo of the American Dietetic Association;
  - 2010 Canadian Diabetes Association/Canadian Society of Endocrinology and Metabolism Professional Conference and Annual Meeting;
  - 2009 International Diabetes Federation World Diabetes Congress North America;
  - 2009-10 Dietitians of Canada National Conference;
  - 2009-10 Obesity Society Annual Scientific Meeting;
  - 2009-10 Experimental Biology Meeting;
  - 2009-10 Canadian Nutrition Society;
- Web-based registries of clinical trials (US National Institutes of Health, The National Library of Medicine, Current Controlled Trials);
- Bibliographies of included studies;
- Contact with experts in the field to request details of any other known studies.

Data collection and analysis

Selection of studies

Two review authors independently assessed the eligibility of papers identified by the search strategy. All titles and abstracts were screened according to pre-established inclusion criteria (see Criteria for considering studies for this review). We retrieved full text copies of papers judged to be potentially relevant to the review. Disagreements were resolved by discussion between the two review authors, and when consensus was not reached, with a third review author. We attempted to contact authors to obtain further details of papers containing insufficient information to make a decision about eligibility. If no response was provided, we sent up to two reminders and, when possible, also contacted one co-author. We contacted 81 authors of whom 67 provided a response.

Data extraction and management

Two review authors performed the data extraction independently from all included studies using a modified version of the Cochrane Consumers and Communication Review Group data extraction template (CCCRG 2010). In addition to the standard form derived from the data extraction template of the Cochrane Consumers and Communication Review Group, other relevant information was extracted including:

- Food-based dietary advice;
- Rationale underlying the dietary advice (e.g. clinical practice guidelines, other evidence-based sources);
- Adherence assessment method (proportion of clients achieving the dietary advice, biochemical measures);
- Description of the intervention (eg. education, persuasion, training).

Any discrepancies in judgement were resolved by discussion and consensus, or with a third review author. Where information was missing, we contacted the corresponding author. If no answer was provided, we sent up to two reminders and, when possible, also contacted one co-author. We contacted 38 authors of included studies, of whom 22 provided a response.

Assessment of risk of bias in included studies

Two review authors assessed and reported on the risk of bias of included RCTs in terms of the following individual elements that affect risk of bias:

- Random sequence generation;
- Allocation concealment;
- Blinding - clients, providers and outcome assessors;
- Incomplete outcome data;
- Selective reporting;
- Other bias.

Each of the risk of bias items was assessed as 'low risk of bias', 'high risk of bias' and 'unclear risk' based on the study reports and/or additional information provided by the study authors. Any discrepancies in judgement were resolved by discussion and consensus, or with a third review author.

Measures of treatment effect

The table Characteristics of included studies includes descriptions of study design, setting, country, chronic disease, type of participants (age, sex, ethnicity), sample size, intervention(s) and/or control/usual care, measurement of diet adherence, dietary advice, drop-out rate and providers. Sample size is presented as the number of randomized clients, or when the authors did not report it, as the number of completers. Drop-out rate is presented as reported or as calculated when the authors did not report it.

Since the included studies addressed a wide range of interventions, measures of diet adherence, dietary advice, nature of chronic diseases, and duration of interventions and follow-up, it was impossible to perform meta-analyses. For this reason, we could not apply all the methods outlined in the protocol (Desroches 2010) but present these in Appendix 6 for application in future updates of the review. To facilitate the presentation of results, two authors independently classified included studies according to the function of the intervention (Michie 2011). Any discrepancies in judgement were resolved by discussion and consensus, or with a third review author. The method(s) for facilitating changes in dietary habits through dietary advice used in the intervention group and differing from the method(s) used in the comparative group (control, usual care or other intervention group) was (were) defined as the intervention and was (were) classified according to different categories of interventions (education, persuasion, incentivisation, coercion, training, restriction, environmental restructuring, modelling, enablement and multiple). Representing each category of interventions, eight additional tables (Additional tables) summarize narratively the number of studies and participants per intervention, the effect on diet adherence and the quality of evidence (GRADE) (Higgins 2011). In case of discrepancies between the results provided by the authors and the risk ratio (RR) or the standardized mean difference (SMD) calculated using Review Manager 5 ('RevMan') software (RevMan 2012), we selected the results provided by RevMan to complete the Additional tables. Some studies assessed and therefore reported multiple diet adherence outcomes (e.g. adherence to fiber intake and adherence to cholesterol-restricted diet) and/or evaluated diet adherence outcome(s) at different times (e.g. one month, three months, six months). Consequently, we used vote counting, that is we reported the number of diet adherence outcomes favouring the intervention out of the total number of diet adherence outcomes reported, regardless of the statistical significance or size of their results (Higgins 2011), to assess studies that reported diet adherence outcomes between an intervention group and a control/usual care group. Studies are described in more than one category of intervention if they investigated more than one intervention (Baraz 2010; Cummings 1981; Hsueh 2007; Jones 1986; Kendall 1987; Logan 2010; Mahler 1999; McCulloch 1983). Only studies that compared an intervention with a control/usual care group were included in these Additional tables.

We used RevMan to create forest plots when diet adherence outcomes provided raw and complete data (means and standard deviations for continuous data, and number of events and number of total observations for dichotomous data). We analyzed dichotomous data by determining the RR and 95% confidence intervals. We analyzed continuous data by determining the SMD of the intervention and the control groups in each study with 95% confidence intervals. Only studies comparing a single or multiple intervention group with a control/usual care group were included in forest plots. We used mean differences between pre-post intervention to calculate SMD. When these data were not known, and that baseline data were available for the two groups, we corrected the standard effect size by calculating the difference between pre- and post-intervention values. The pooled estimates standard deviation was used to calculate the standard deviation of this difference. When no baseline data were reported, groups were considered to be similar before the intervention. Outcomes with data including covariate-adjusted means or imputed means were not analysed with forest plots. For these studies, we presented the qualitative data as reported by the study authors. Some elevated SMDs could represent a high diet adherence (e.g. fruit, vegetable and fiber intakes) whereas some elevated SMDs could represent a low diet adherence (e.g. energy, fat and sodium intakes). Therefore, to correct for difference in the direction of the scale in forest plots, means of the intervention and the control groups were multiplied by -1 for outcomes where elevated SMD represented a high diet adherence (e.g. fruit, vegetable and fiber intakes). When authors did not report statistical analyses, we used data to calculate the SMD or the RR in RevMan in order to compare differences in outcomes between groups.

Assessment of heterogeneity

We did not explore heterogeneity due to the wide range of interventions, measures of diet adherence, dietary advice, nature of chronic diseases, and duration of interventions and follow-up addressed in included studies.

Consumer participation

The Cochrane Consumers and Communication Review Group's editorial process for the protocol (Desroches 2010) and the review involved two anonymous consumer referees. We also sought additional feedback throughout the review process from representatives of the Dietitians of Canada to ensure that important issues for health professionals were addressed.

RESULTS

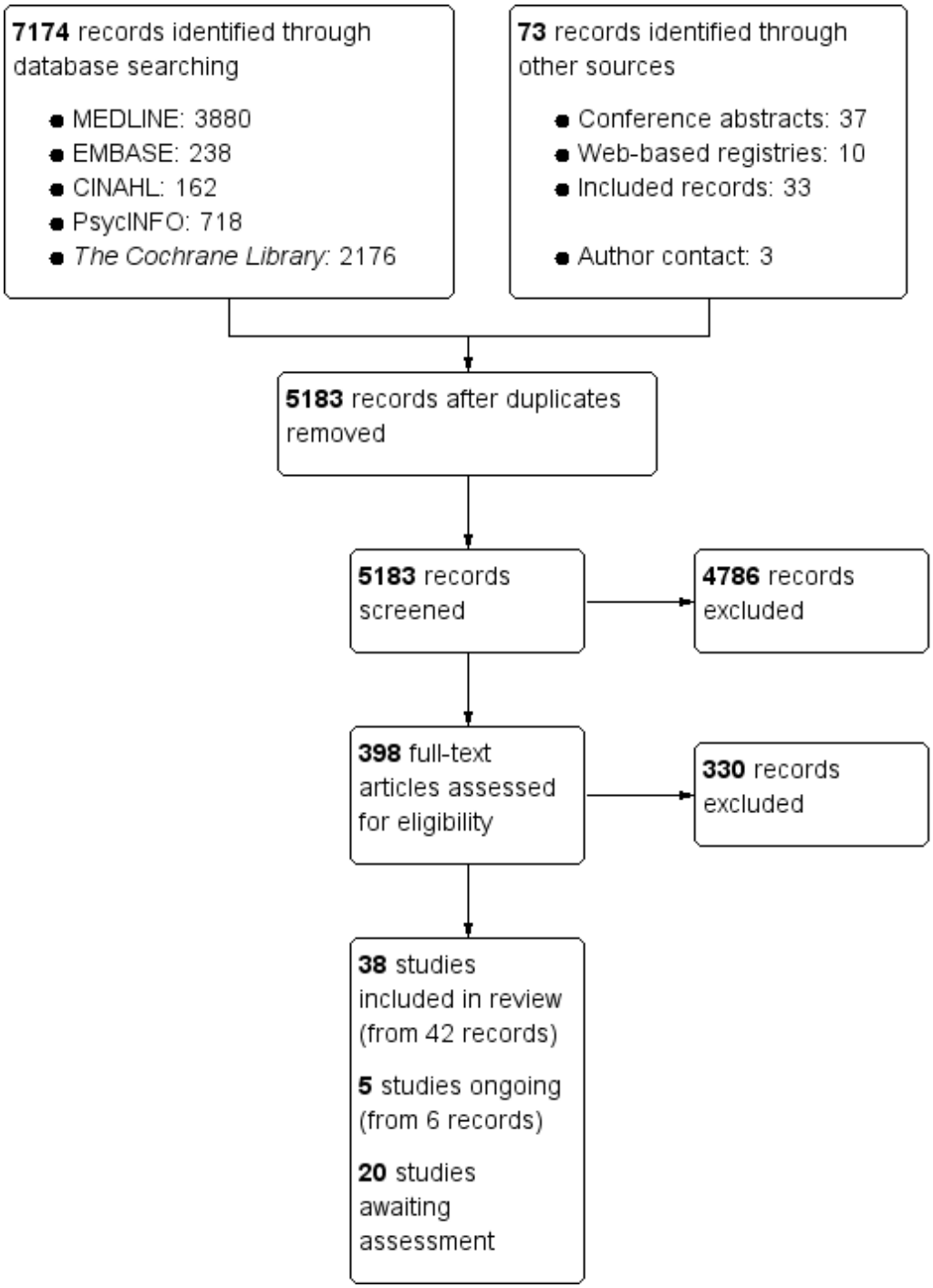
Description of studies

See: Characteristics of included studies; Characteristics of excluded studies; Characteristics of studies awaiting classification; Characteristics of ongoing studies.

Results of the search

From the searches, we identified 5183 potentially-relevant publications after duplicates were removed. From these, we excluded 4786 publications after examining the titles and abstracts, and we retrieved 398 full-texts of potentially-relevant publications. From these, 42 publications (describing 38 unique studies) met our inclusion criteria and were considered as eligible. We classified a further 5 publications (describing 6 studies) as ongoing studies (see Characteristics of ongoing studies), and 20 publications as studies awaiting classification (See Characteristics of studies awaiting classification) (see Figure 1, Study Flow Diagram).

Figure 1. Study flow diagram.



Included studies

Three included studies were described in more than one publication. First, Jiang's PhD thesis was published later in an electronic journal (Jiang 2004). Similarly, Chow's PhD thesis was published later in an electronic journal (Wong 2010). Miller 1988, Miller 1989 and Miller 1990 (Miller 1988) all described the same study and reported results for diet adherence at 30 and 60 days, 1 year and 2 years, respectively. We refer to this study as Miller 1988. Therefore we included 38 studies reported in 42 publications (See Characteristics of included studies).

All included studies were RCTs. Only one of them used cluster randomisation (Wood 2008).

Location, setting and duration

Studies were conducted in the following countries:

Country	Number of studies	Studies
United States of America	14	Aldarondo 1999; Beasley 2008; Becker 1998; Cummings 1981; Gans 1994; Gill 2010; Hsueh 2007; Hyman 2007; Kendall 1987; Mahler 1999; Micco 2007; Miller 1988; Racelis 1998; Scisney-Matlock 2006
United Kingdom	7	Bennett 1986; French 2008; Grace 1996; Jones 1986; Logan 2010; McCulloch 1983; Morey 2008
China	5	Chen 2006; Chiu 2010; Jiang 2004; Wong 2010; Zhao 2004
Canada	4	Arcand 2005; Conrad 2000; Gucciardi 2007; Ryan 2002
Brazil	1	Assuncao 2010
Iran	1	Baraz 2010
The Netherlands	1	Blanson 2009
Finland	1	Laitinen 1993
Norway	1	Meland 1994
South Africa	1	Stewart 2005
Taiwan	1	Tsay 2003
Multiple (France, Italy, Poland, Spain, Sweden, United Kingdom, Denmark and the Netherlands)	1	Wood 2008

All included studies were directed towards clients and none of them was directed towards family or non-family caregivers or health professionals.

An outpatient setting was reported in the majority of the included studies (n = 31). Four studies were carried out in a research center setting (Beasley 2008; Blanson 2009; Hsueh 2007; Micco 2007) while one study (Gans 1994) included two settings (workplace and community). In two studies, the setting could not be identified (Aldarondo 1999; Bennett 1986).

Nineteen studies evaluated diet adherence to dietary advice over a period of less than 6 months (Aldarondo 1999; Arcand 2005; Baraz 2010; Beasley 2008; Bennett 1986; Blanson 2009; Chen 2006; Chiu 2010; Cummings 1981; Gans 1994; Gill 2010; Grace 1996; Gucciardi 2007; Jones 1986; Mahler 1999; Meland 1994; Scisney-Matlock 2006; Wong 2010; Zhao 2004), nine studies had a duration between 6 and 12 months (Assuncao 2010; Conrad 2000; Hsueh 2007; Jiang 2004; Kendall 1987; McCulloch 1983; Ryan 2002; Stewart 2005; Tsay 2003), while only 10 studies evaluated diet adherence to dietary advice over a 12-month period or more (Becker 1998; French 2008; Hyman 2007; Laitinen 1993; Logan 2010; Micco 2007; Miller 1988; Morey 2008; Racelis 1998; Wood 2008).

Clients

The 38 studies included in this review involved 9445 clients. The range in the number of clients in each study varied from 7 to 5405 (median = 83). Only 13 of the 38 studies provided a power calculation (Aldarondo 1999; Assuncao 2010; Beasley 2008; Chiu 2010; French 2008; Hyman 2007; Jiang 2004; Meland 1994; Stewart 2005; Tsay 2003; Wong 2010; Wood 2008; Zhao 2004) and among them, 10 studies recruited the number of clients according to their power analysis (Aldarondo 1999; Assuncao 2010; Beasley 2008; French 2008; Jiang 2004; Meland 1994; Stewart 2005; Tsay 2003; Wong 2010; Zhao 2004).

Prevention of chronic diseases

Five studies included clients receiving dietary advice for the prevention of chronic diseases, such as clients with a high risk of CVD (clients having dyslipidaemia (Gans 1994; Grace 1996), siblings of individuals with coronary heart diseases (Becker 1998)) and overweight clients (Blanson 2009; Jones 1986).

Management of chronic diseases

Twenty-seven included studies addressed dietary advice for chronic disease management. Eight studies included clients receiving dietary advice for the management of CVD (heart failure (Arcand 2005), coronary heart disease (Logan 2010; Zhao 2004), coronary artery disease (Conrad 2000; Mahler 1999), peripheral artery disease (Racelis 1998), angina pectoris and myocardial infarction (Jiang 2004; Miller 1988)); six studies involved the management of diabetes (French 2008; Gucciardi 2007; Kendall 1987; Laitinen 1993; McCulloch 1983; Ryan 2002); five studies involved the management of hypertension (Chiu 2010; Hyman 2007; Meland 1994; Scisney-Matlock 2006; Stewart 2005); six studies addressed the management of renal failure (Baraz 2010; Chen 2006; Cummings 1981; Morey 2008; Tsay 2003; Wong 2010); one study addressed the management of obesity (Aldarondo 1999): and one study addressed the management of irritable bowel syndrome (Hsueh 2007).

Prevention and management of chronic diseases

Six studies included clients receiving dietary advice for both the prevention and the management of chronic diseases. One study was conducted with clients with coronary heart disease and clients with a high risk of developing CVD (Wood 2008). The remaining five studies included overweight and obese clients (Assuncao 2010; Beasley 2008; Bennett 1986; Gill 2010; Micco 2007).

Interventions

Included studies assessed interventions in the following categories:

Education

Nine studies offered nutrition counselling and follow-up with a health professional through telephone follow-up (Chiu 2010; Cummings 1981; Racelis 1998; Stewart 2005), group sessions (Gill 2010; Jones 1986) or individual sessions with a dietitian (Jones 1986; Micco 2007) or a nurse (Hsueh 2007). Moreover, four studies used educational tools to provide dietary advice such as video (Baraz 2010; Mahler 1999; McCulloch 1983) or booklet (Kendall 1987).

Persuasion

Two studies used reminders (Gans 1994; Ryan 2002).

Incentivisation

One study used contracts with rewards (Cummings 1981).

Training

Three studies used feedback (Beasley 2008; French 2008; Meland 1994).

Restriction

Only one study compared an immediate versus an incremental reduction of fat intake (Conrad 2000).

Modelling

Seven studies used nutritional tools such as menus, exchange list and portion size examples in order to enhance diet adherence (Assuncao 2010; Chen 2006; Grace 1996; Kendall 1987; Logan 2010; McCulloch 1983; Scisney-Matlock 2006).

Enablement

Three studies used one or more behaviour change techniques, including barrier identification/problem solving (Aldarondo 1999; Bennett 1986; Logan 2010), goal setting (Logan 2010), self-talk (defined as use of self-instruction and self-encouragement to support action by Abraham and Michie (Abraham 2008)) (Aldarondo 1999; Bennett 1986) and teaching to use prompts/cues (defined as teaching the person to identify environmental cues that can be used to remind them to perform a dietary behaviour by Abraham and Michie (Abraham 2008)) (Bennett 1986).

Multiple

This category includes 18 studies using a combination of two or more different interventions (Arcand 2005; Baraz 2010; Becker 1998; Blanson 2009; Cummings 1981; Gucciardi 2007; Hsueh 2007; Hyman 2007; Jiang 2004; Jones 1986; Laitinen 1993; Mahler 1999; Miller 1988; Morey 2008; Tsay 2003; Wong 2010; Wood 2008; Zhao 2004).

Outcomes

Twenty-eight studies compared two groups (Aldarondo 1999; Arcand 2005; Assuncao 2010; Baraz 2010; Beasley 2008; Becker 1998; Blanson 2009; Chen 2006; Chiu 2010; Conrad 2000; Gill 2010; Grace 1996; Gucciardi 2007; Hsueh 2007; Kendall 1987; Jiang 2004; Laitinen 1993; Logan 2010; Meland 1994; Micco 2007; Miller 1988; Morey 2008; Racelis 1998; Scisney-Matlock 2006; Stewart 2005; Tsay 2003; Wong 2010; Zhao 2004), six studies compared three groups (Bennett 1986; French 2008; Hyman 2007; Mahler 1999; McCulloch 1983; Ryan 2002) and four studies compared four groups (Cummings 1981; Gans 1994; Jones 1986; Wood 2008). Twenty-five studies assessed a single diet adherence outcome (Arcand 2005; Beasley 2008; Becker 1998; Bennett 1986; Blanson 2009; Chen 2006; Chiu 2010; Conrad 2000; Gans 1994; Gill 2010; Gucciardi 2007; Hyman 2007; Jiang 2004; Jones 1986; Logan 2010; Mahler 1999; McCulloch 1983; Meland 1994; Micco 2007; Miller 1988; Morey 2008; Racelis 1998; Scisney-Matlock 2006; Tsay 2003; Zhao 2004) while 13 studies assessed multiple diet adherence outcomes (Aldarondo 1999; Assuncao 2010; Baraz 2010; Cummings 1981; French 2008; Grace 1996; Hsueh 2007; Kendall 1987; Laitinen 1993; Ryan 2002; Stewart 2005; Wong 2010; Wood 2008). Twenty studies assessed diet adherence outcome(s) once (Aldarondo 1999; Arcand 2005; Assuncao 2010; Baraz 2010; Beasley 2008; Becker 1998; Bennett 1986; Blanson 2009; Chen 2006; Chiu 2010; Conrad 2000; French 2008; Gans 1994; Gill 2010; Grace 1996; Gucciardi 2007; Jones 1986; McCulloch 1983; Racelis 1998; Wood 2008), 13 studies assessed diet adherence outcome (s) twice (Cummings 1981; Hsueh 2007; Hyman 2007; Jiang 2004; Kendall 1987; Laitinen 1993; Logan 2010; Mahler 1999; Meland 1994; Micco 2007; Stewart 2005; Wong 2010; Zhao 2004) while 5 studies assessed diet adherence outcome (s) 3 or more times (Miller 1988; Morey 2008; Ryan 2002; Scisney-Matlock 2006; Tsay 2003). Consequently, 32 studies compared diet adherence outcomes between an intervention group and a control/usual care group, and 9 studies compared two intervention groups.

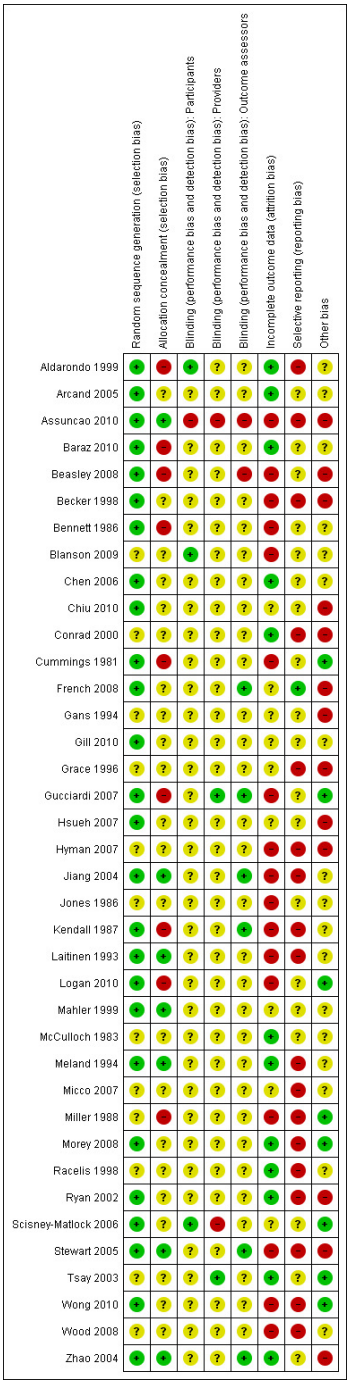
Excluded studies

As described in the Characteristics of excluded studies table, reasons for exclusion included: no measure of adherence outcome; not the same dietary advice component in groups; not a randomized controlled trial; provision of meals, food, items or dietary supplements; not involving clients with or at risk of chronic diseases; intervention not intended to improve diet adherence; not a real-life setting; clients were under the age of 18; and study did not involve a nutritional intervention.

Risk of bias in included studies

As described in the Characteristics of included studies, eight risk of bias criteria were applied to each study (random sequence generation, allocation concealment, blinding: clients, providers and outcome assessors, incomplete outcome data, selective reporting and other bias). Two studies were rated as low risk on 4 of the 8 criteria (Gucciardi 2007; Zhao 2004), 8 studies were low risk on 3 criteria (Aldarondo 1999; French 2008; Jiang 2004; Meland 1994; Morey 2008; Scisney-Matlock 2006; Stewart 2005; Tsay 2003), 11 studies were rated as low risk on 2 criteria (Arcand 2005; Assuncao 2010; Baraz 2010; Chen 2006; Cummings 1981; Kendall 1987; Laitinen 1993; Logan 2010; Mahler 1999; Ryan 2002; Wong 2010), 11 studies were rated as low risk on one criterion (Beasley 2008; Becker 1998; Bennett 1986; Blanson 2009; Chiu 2010; Conrad 2000; Gill 2010, Hsueh 2007; McCulloch 1983; Miller 1988; Racelis 1998) and six studies were not rated low risk for any criteria (Gans 1994; Grace 1996; Hyman 2007; Jones 1986; Micco 2007; Wood 2008) (see Figure 2).

Figure 2. Risk of bias summary: review authors' judgements about each risk of bias item for each included study.



Allocation

The allocation sequence was adequately generated in the majority of studies (n = 26). Twelve studies did not report sufficient information to determine this risk of bias (Blanson 2009; Conrad 2000; Gans 1994; Grace 1996; Hyman 2007; Jones 1986; McCulloch 1983; Micco 2007; Miller 1988; Racelis 1998; Tsay 2003; Wood 2008).

The allocation was adequately concealed only in seven studies (Assuncao 2010; Jiang 2004; Laitinen 1993; Mahler 1999; Meland 1994; Stewart 2005; Zhao 2004) while nine studies reported an inadequate allocation (Aldarondo 1999; Baraz 2010; Beasley 2008; Bennett 1986; Cummings 1981; Gucciardi 2007; Kendall 1987; Logan 2010; Miller 1988). The majority of the studies (n = 22) did not describe the allocation concealment in sufficient detail to permit evaluation.

Blinding

The majority of the interventions provided to clients were difficult to blind for clients, providers and outcomes assessors. Therefore, only three studies (Aldarondo 1999; Blanson 2009; Scisney-Matlock 2006), two studies (Gucciardi 2007; Tsay 2003) and six studies (French 2008; Gucciardi 2007; Jiang 2004; Kendall 1987; Stewart 2005; Zhao 2004) respectively blinded clients, providers and outcome assessors.

Incomplete outcome data

Twelve studies adequately addressed incomplete outcome data (Aldarondo 1999; Arcand 2005; Baraz 2010; Chen 2006; Conrad 2000; McCulloch 1983; Meland 1994; Morey 2008; Racelis 1998; Ryan 2002; Tsay 2003; Zhao 2004) whereas 17 studies did not (Assuncao 2010; Beasley 2008; Becker 1998; Bennett 1986; Blanson 2009; Cummings 1981; Gucciardi 2007; Hyman 2007; Jiang 2004; Jones 1986; Kendall 1987; Laitinen 1993; Logan 2010; Miller 1988; Stewart 2005; Wong 2010; Wood 2008). The principal reason for the incomplete outcome data bias was that missing outcomes are enough to induce clinically-relevant bias in the observed effect estimate. Nine studies reported insufficient information to permit an evaluation of this criterion (Chiu 2010; French 2008; Gans 1994; Gill 2010, Grace 1996; Hsueh 2007; Mahler 1999; Micco 2007; Scisney-Matlock 2006).

Selective reporting

Study protocols were available for only one study and all of the study's pre-specified outcomes that were of interest in the study were reported in the pre-specified way. Therefore, only this study (French 2008) was free of suggestion of selective outcome reporting. Eighteen studies incompletely reported some outcomes of interest (Aldarondo 1999; Assuncao 2010; Becker 1998; Conrad 2000; Grace 1996; Hyman 2007; Jiang 2004; Kendall 1987; Laitinen 1993; Meland 1994; Micco 2007; Miller 1988; Morey 2008; Racelis 1998; Ryan 2002; Stewart 2005; Wong 2010; Wood 2008) whereas others provided insufficient information to address this criterion (n = 19).

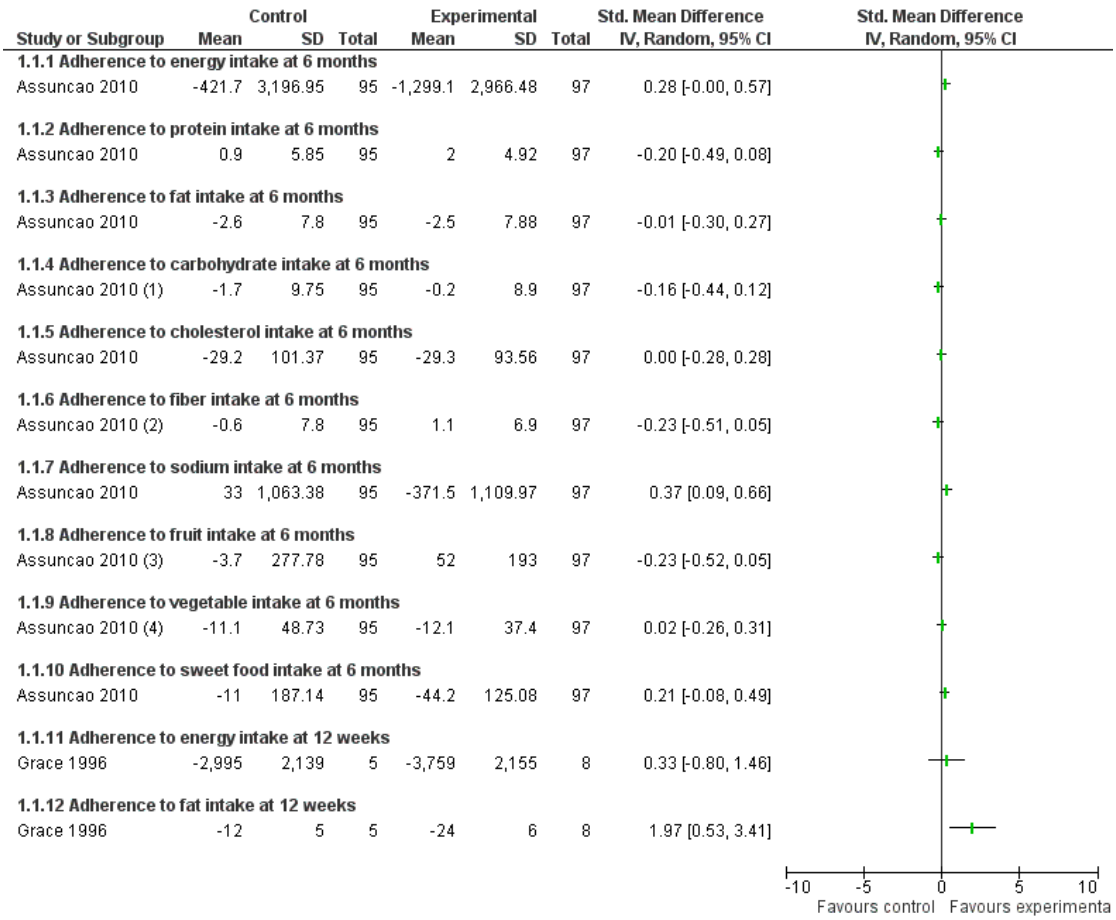
Other potential sources of bias

Eight studies (Cummings 1981; Gucciardi 2007; Logan 2010; Miller 1988; Morey 2008; Scisney-Matlock 2006; Tsay 2003; Wong 2010) appeared free of other potential sources of bias, whereas 13 studies had at least one important risk of bias such as a baseline imbalance between groups which was not taken into consideration in statistical analyses, a diet adherence not clearly defined, a diet adherence assessed by a non-validated self-reporting method, a potential conflict of interest or a potential intervener effect (Assuncao 2010; Beasley 2008; Becker 1998; Chiu 2010; Conrad 2000; French 2008; Gans 1994; Grace 1996; Hsueh 2007; Hyman 2007; Ryan 2002; Stewart 2005; Zhao 2004). Other studies did not report sufficient information to assess other potential sources of bias (n = 17).

Effects of interventions

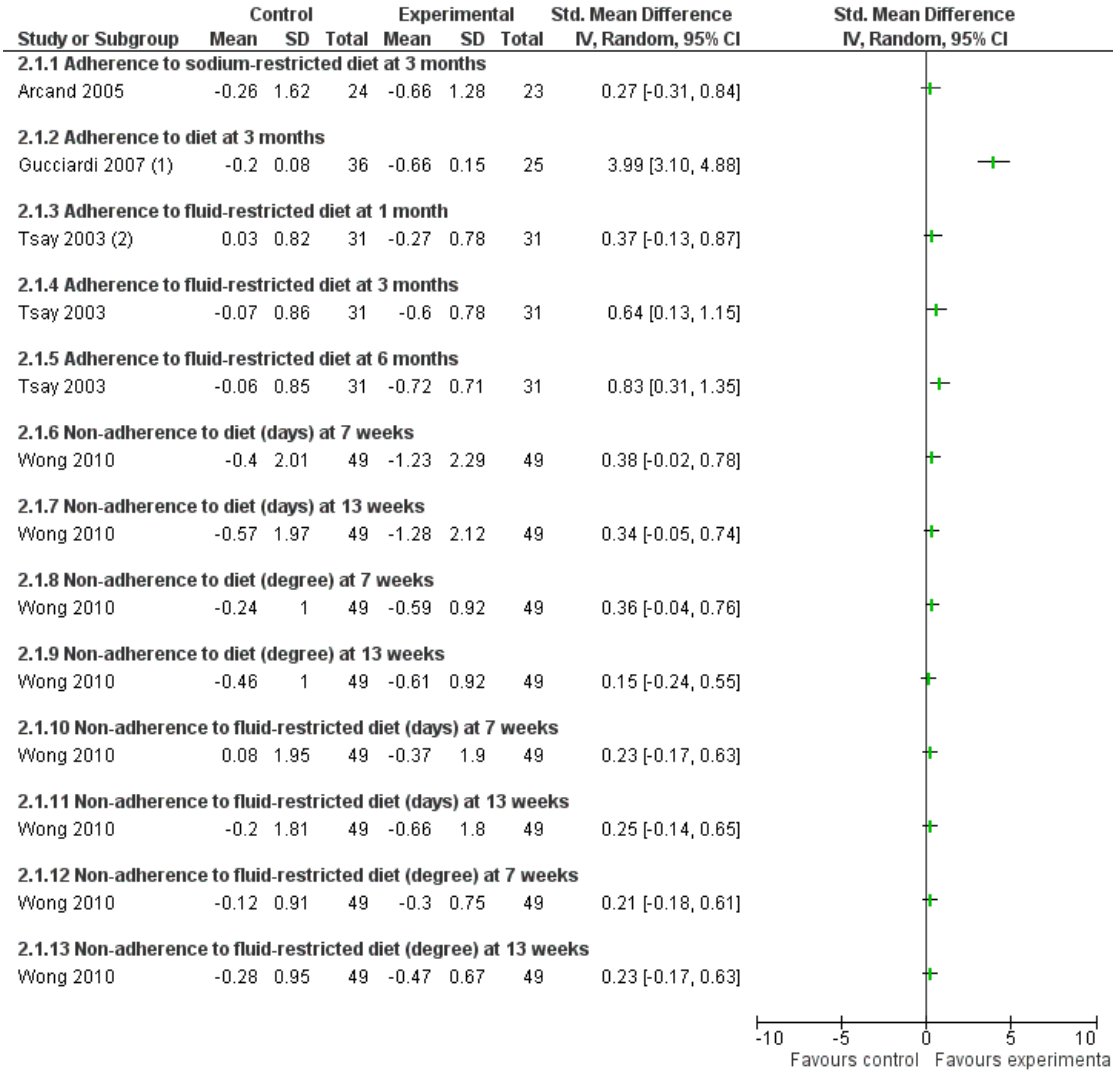
Included studies differed widely according to interventions provided, measures of diet adherence, dietary advice, nature of the chronic diseases and duration of interventions and follow-up. Therefore, data were not pooled statistically. Instead, we present a qualitative analysis described in a narrative table using vote counting for each category of interventions (see Additional tables). We also created forest plots for outcomes from studies comparing a single or multiple intervention group with a control/usual care group (see Figure 3; Figure 4; Figure 5). Among the 32 studies that measured diet adherence outcomes between an intervention group and a control/usual care group, 32 out of 123 diet adherence outcomes favoured the intervention group, 4 favoured the control group whereas 62 had no significant difference between groups. This result was impossible to assess for 25 diet adherence outcomes as data and/or statistical analyses needed for comparison between groups were not provided (Additional tables).

Figure 3. Forest plot of comparison: 6 Nutritional tools versus control in diet adherence, outcome: 6.1 Continuous data. *Means represent the difference between pre-and post- intervention.



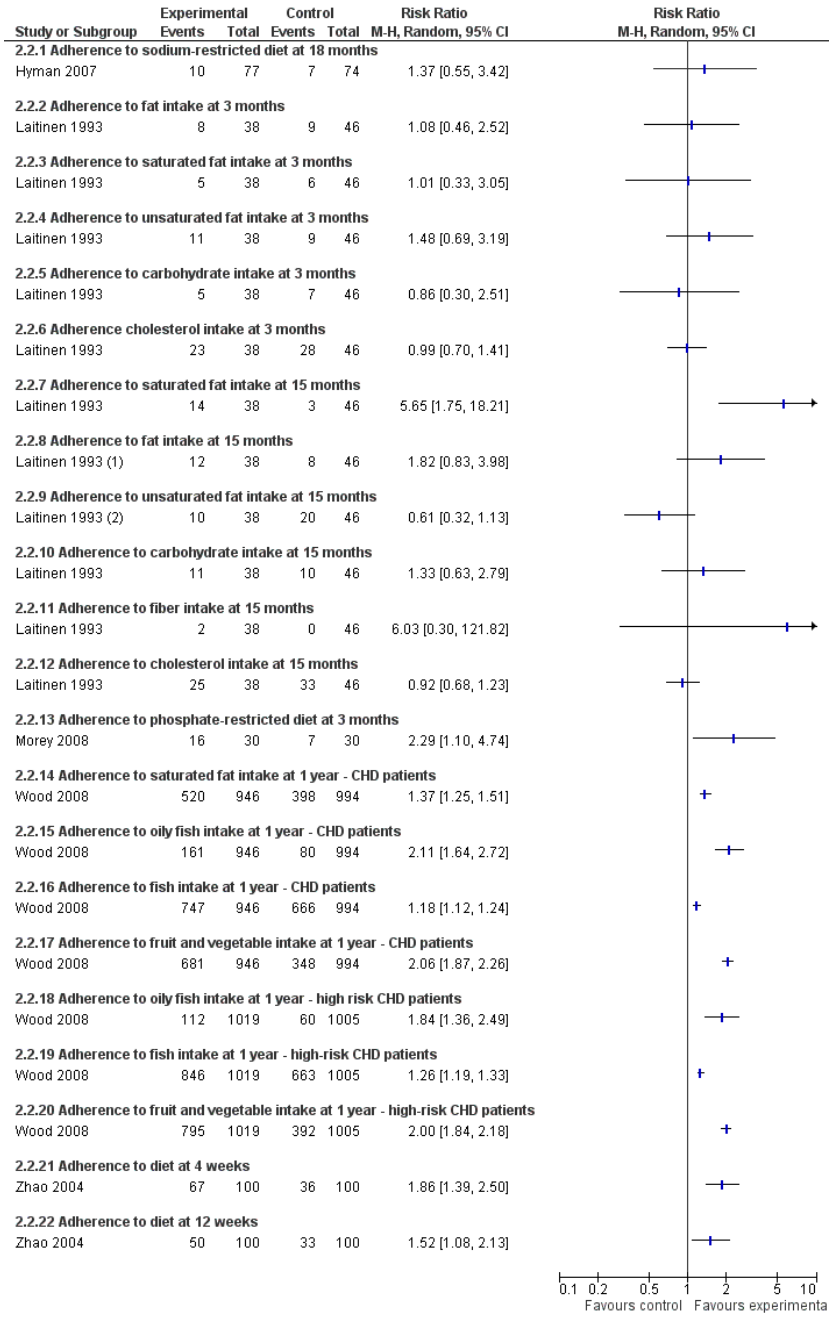
(1) To correct for differences in the direction of the scale, means of both groups were multiplied by -1.
(2) To correct for differences in the direction of the scale, means of both groups were multiplied by -1.
(3) To correct for differences in the direction of the scale, means of both groups were multiplied by -1.
(4) To correct for differences in the direction of the scale, means of both groups were multiplied by -1.

Figure 4. Forest plot of comparison: 8 Multiple interventions versus control in diet adherence, outcome: 8.1 Continuous data. *Means represent the difference between pre-and post- intervention.



(1) To correct for differences in the direction of the scale, means of both groups were multiplied by -1.
(2) In the article, the authors reported a significant group main effect when analysed with baseline mean weight gains as covariate

Figure 5. Forest plot of comparison: 8 Multiple interventions versus control in diet adherence, outcome: 8.2 Dichotomous data. *Means represent the difference between pre-and post- intervention.



(1) In article, the authors reported a significant difference between groups.
(2) In article, the authors reported a significant difference between groups.

Education

See Table 1.

Counselling and follow-up with health professional

Telephone follow-up

Chiu 2010 assessed the effects of telephone follow-up on: adherence to a sodium-restricted diet; fat intake and fruit and vegetable intake, in clients with hypertension. The authors reported no differences in diet adherence between the intervention group and the control group at eight weeks. However, a greater decrease in systolic and diastolic blood pressure was observed in the intervention group compared to the control group as well as a greater increase in exercise adherence.

One study (Cummings 1981) reported significantly higher adherence to a potassium-restricted diet and fluid-restricted diet at six weeks in clients with renal failure who received telephone follow-up, compared to clients in the control group. However, these differences were no longer significant at three months. This study also compared clients with renal failure receiving telephone follow-up with clients writing a formal agreement (contract) and with clients writing a contract with the involvement of a family member or friend, but found no differences in adherence to a potassium- and fluid-restricted diet at three months between groups.

Racelis 1998 assessed the effects of telephone follow-up on adherence to diet in clients with peripheral artery disease. The authors indicated that no significant difference was noted between the intervention and the control groups.

Stewart 2005 also evaluated the effects of telephone follow-up on adherence to a sodium-restricted diet in clients with hypertension. The authors reported that a higher proportion of clients adhered to the sodium-restricted diet at 24 weeks in the intervention group compared to the control group, but the difference was no longer significant at 36 weeks. No differences were found in systolic and diastolic blood pressure between groups. The authors also noted no difference in non-adherence to alcohol intake at 24 and 36 weeks between groups.

Among studies using a control/usual care group, three out of ten diet adherence outcomes favoured the intervention group compared to control group and seven diet adherence outcomes had no significant difference between groups (see Table 1). However, these three diet adherence outcomes favouring the intervention group were no longer significant at a later time point.

Group sessions

Gill 2010 evaluated the effects of group sessions in overweight-obese college women on adherence to the *Dietary Approaches to Stop Hypertension* (DASH) diet. However, the authors did not report measures of diet adherence for the intervention and the control groups, making comparison between groups impossible.

Jones 1986 compared an intervention using group sessions (GS) with three other groups for overweight clients: group sessions with a dietitian combined with a leaflet providing advice to reduce exposure to food cues (GS + cues); individual sessions with a dietitian (IS); individual sessions with a dietitian combined with a leaflet providing advice to reduce exposure to food cues (IS + cues). Adherence to diet at 16 weeks was assessed but no significant difference between groups was found. The SMD for weight loss was calculated using RevMan software (RevMan 2012) and no significant difference was found between groups at 16 weeks (vs 1 SMD -0.24 (95% CI -1.22 to 0.75); vs 2 SMD -0.03 (95% CI - 0.94 to 0.88); vs 3 SMD -0.55 (95% CI -1.55 to 0.46).

Overall, these studies did not allow us to draw conclusions on the effect of group sessions on diet adherence outcomes (see Table 1).

Individual sessions with a dietitian

To assess the effects of a 16-week intervention promoting individual sessions with a dietitian (IS), Jones 1986 compared this intervention in overweight clients with three others: group sessions with a dietitian (GS); 2) group sessions with a dietitian combined with a leaflet providing advice to reduce exposure to food cues (GS + cues); 3) individual sessions with a dietitian combined with a leaflet providing advice to reduce exposure to food cues (IS + cues). Adherence to diet at 16 weeks was assessed but no significant difference was found between groups. The SMD for weight loss was calculated using RevMan 2012 and no significant difference between groups was found at 16 weeks (vs 1 SMD 0.23 (95% CI -0.46 to 0.93); vs 2 = SMD 0.30 (95% CI-0.69 to 1.08); vs 3 SMD 0.59 (95% CI -0.35 to 1.52).

Another study (Micco 2007) evaluated the effects of individual sessions with a dietitian in overweight-obese clients on diet adherence. The authors assessed diet adherence but they did not report measures for the intervention and the control groups, making the comparison between groups impossible. The authors reported no weight loss difference between groups at 12 months.

Overall, these studies did not allow us to draw conclusions on the effect of individual sessions with a dietitian on diet adherence outcomes (see Table 1).

Individual sessions with a nurse

Hsueh 2007 compared a single intervention comprising individual sessions with a nurse, on adherence to dietary advice to increase fiber, vegetable and fruit intakes in clients with irritable bowel syndrome, with a multiple intervention comprised of individual sessions with a nurse alternating with telephone follow-up. The authors reported no difference in the proportion of high-compliant clients for fiber, vegetable and fruit intakes between groups at three months and six months.

Educational tools

Video

One study (Baraz 2010) compared a single intervention using a video as an educational tool with a multiple intervention using

a booklet as educational tool, combined with group sessions in clients with chronic end-stage renal disease. The authors did not report the proportion of clients classified as adherent to diet for both groups, making a comparison between groups impossible. The risk ratio (RR) for the proportion of clients who adhered to the diet and fluid-restricted diet was calculated using RevMan and no difference was found between groups at two months for diet (RR 0.48 (95% CI 0.17 to 1.35)) and fluid-restricted diet (RR 0.81 (95% CI 0.25 to 2.57)).

Mahler 1999 evaluated the effects of a video as an educational tool on adherence to a cholesterol and saturated fat-restricted diet in clients with coronary artery disease. Adherence to a cholesterol and saturated fat-restricted diet was significantly higher in the intervention group compared to the control group at one month but this difference was no longer significant at three months. The authors also compared the intervention with another intervention using a video as an educational tool combined with relapse prevention/coping planning, and found no difference between groups.

Another study (McCulloch 1983) reported a significant difference in day-to-day consistency in carbohydrate intake in clients with insulin dependent diabetes receiving an intervention using a video as an educational tool, compared to the usual care group at six months. Moreover, glycated haemoglobin (HbA_{1c}) was significantly lower in the intervention group than in the usual care group at six months. The authors also compared the intervention with another intervention using nutritional tool and no difference between groups was noted.

Among studies using a control/usual care group, two out of three diet adherence outcomes favoured the intervention group compared to the control/usual care group and one diet adherence outcome had no significant difference between groups (see Table 1). However, one out of two diet adherence outcomes favouring the intervention group was no longer significant at a later time point.

Booklet

Kendall 1987 compared an intervention using a booklet as an educational tool with an intervention using exchange lists as a nutritional tool in clients with non-insulin-dependent diabetes. No difference between groups was reported for adherence to energy, protein, vitamin A, vitamin C, thiamine, riboflavin, niacin, calcium, phosphorus, iron and zinc intakes at three and six months. Moreover, there was no difference between groups for health outcomes such as systolic and diastolic blood pressure, weight, plasma glucose, HbA_{1c}, serum cholesterol, low-density lipoprotein (LDL)-cholesterol, high-density lipoprotein (HDL)-cholesterol and serum triglycerides at six months.

Persuasion

See Table 2.

Reminders

Gans 1994 compared three interventions using reminders with a usual care group in clients with elevated blood cholesterol: 1) clients received the reminder, 2) physicians received a reminder postcard which they could mail to the clients, 3) clients received the reminder in addition to the physicians who received a reminder postcard which they could mail to the clients. The authors reported no difference in the proportion of clients that adhered to diet in any of these groups compared to the usual care group at three months, and no difference between groups for the compliance to lifestyle recommendations at three months.

Another study (Ryan 2002) compared two interventions using knowledge and self-care practices as reminders with a control group in clients with type II diabetes: 1) reminders provided to clients at two weeks, three months and six months, 2) reminders provided to clients at three months and six months. The authors reported adherence to frequency of meals and snacks combined for all three groups, making comparison between groups impossible.

Overall, the studies used reminders for patients and physicians (Gans 1994) or for patients (Ryan 2002) to enhance adherence to dietary advice. Among studies using a control/usual care group, three out of 19 diet adherence outcomes had no significant difference between groups. It was impossible to assess this result for 16 diet adherence outcomes since data and/or statistical analyses needed for comparison between groups were not provided (see Table 2).

Incentivisation

See Table 3.

Contracts with rewards

One study (Cummings 1981) reported significantly higher adherence to a potassium-restricted diet and to a fluid-restricted diet at six weeks in clients with renal failure who wrote a behavioural contract, compared to clients in the control group (see Table 3). However, these differences were no longer significant at three months (see Table 3). This study also compared clients with renal failure writing a contract with clients receiving telephone follow-up and with clients writing a contract with the involvement of a family member or friend but no difference was noted in adherence to the potassium-restricted diet and fluid-restricted diet at six weeks and three months between groups.

Training

See Table 4.

Feedback

Beasley 2008 reported a higher adherence to energy, fat, saturated fat and cholesterol intakes in overweight-obese clients in the intervention group using feedback based on self-monitoring using

an electronic food diary compared to the control group. However, no difference in weight loss was observed between groups.

French 2008 compared two interventions using feedback based on self-monitoring of blood glucose with a usual care group in clients with type II diabetes: 1) less intensive intervention, 2) most intensive intervention. Adherence to general and specific diet at 12 months was greater in the control group compared to both intervention groups.

Another study (Meland 1994) assessed the effects of feedback using self-monitoring of urine chloride concentration on adherence to a sodium-restricted diet in clients with hypertension. No difference was reported in adherence to the sodium-restricted diet or in blood pressure between the intervention group and the control group at one and three months.

In this category, three studies used feedback based on self-monitoring using an electronic food diary (Beasley 2008), blood glucose (French 2008) and urine chloride concentration (Meland 1994). Among studies using a control/usual care group, one out of seven diet adherence outcomes favoured the intervention group compared to the control/usual care group, four favoured the control group whereas two had no significant difference between groups (see Table 4).

Restriction

See Table 5.

Conrad 2000 assessed the effects of an intervention proposing an incremental reduction in fat to a goal of 10% of energy intake compared to an intervention proposing an immediate reduction in fat to a goal of 10% of energy intake in clients with coronary artery disease. The authors did not compare adherence to fat intake advice between groups. Therefore, we calculated the SMD for adherence to the very low fat diet using RevMan 2012 and found no differences between groups at seven months (SMD -1.88 (95% CI -4.00 to 0.23)) (see also Table 5).

Modelling

See Table 6.

Nutritional tools

Assuncao 2010 assessed the effects of nutritional tools such as portion size examples and food lists on diet adherence in overweight-obese clients using an intention-to-treat analysis. Authors reported a significant enhancement of adherence to sodium and sweet food intake goals at six months in clients in the intervention group compared with those receiving usual care. However, a discrepancy was found between the results provided by the authors and the SMD calculated using RevMan which showed no difference for adherence to sweet food intake at six months between groups. No difference was found between groups for adherence to recommended energy, protein, fat, carbohydrate, cholesterol, fiber, fruit and vegetable intakes (see Analysis 1.1). An increase in physical leisure activity as well as a decrease in fasting glucose were reported in the intervention compared to the usual care group at six months, whereas no difference between groups was observed for weight loss, blood pressure and lipid profile.

Chen 2006 reported a higher proportion of intervention-group clients with renal failure reaching the target for protein intake at one month using menu suggestions, exchange lists and portion sizes as nutritional tools compared to the control group.

Grace 1996 evaluated the effects of nutritional tools such as an additional package containing low-fat cooking methods and low-fat recipe adaptation on adherence to energy and fat intakes in clients with hyperlipidaemia. The authors reported a higher reduction in percentage of fat intake in the intervention group compared to the control group. However, they reported no difference for energy change between the intervention and the control groups at 12 weeks (see also Analysis 1.1).

Kendall 1987 compared an intervention using exchange lists as a nutritional tool with an intervention using a booklet as an educational tool in clients with non-insulin-dependent diabetes. No difference between groups was reported for adherence to energy, protein, vitamin A, vitamin C, thiamine, riboflavin, niacin, calcium, phosphorus, iron and zinc intakes at three and six months. Moreover, there was no difference between groups for health outcomes such as systolic and diastolic blood pressure, weight, plasma glucose, HbA_{1c}, serum cholesterol, LDL-cholesterol, HDL-cholesterol and serum triglycerides at six months.

One study (Logan 2010) compared an intervention using recipes and meal plans with an intervention using barrier identification/problem solving and goal setting in clients with coronary heart disease. The authors reported no difference between groups for adherence to the Mediterranean diet at 6 and 12 months.

Another study (McCulloch 1983) reported no difference in day-to-day consistency in carbohydrate intake in clients with insulin-dependent diabetes following an intervention using exchange lists and lunch time with health professionals as nutritional tools, compared to usual care group. However, HbA_{1c} was significantly lower in the intervention group at 9 months compared to the control group. The authors also compared the intervention with another intervention using a video as an educational tool and found no difference between groups.

Scisney-Matlock 2006 evaluated the effects of wheels and bar charts displaying Cognitive Representations of the DASH diet as a nutritional tool on adherence to the DASH diet in clients with hypertension compared to a control group. The authors reported results grouped for both groups, making comparison between groups impossible.

To summarize the interventions in this category: two studies included portion sizes (Assuncao 2010; Chen 2006), three studies used menu suggestions and recipes (Chen 2006; Grace 1996; Logan 2010), three studies included exchange lists (Chen 2006;

Kendall 1987; McCulloch 1983), one study used an additional package containing low-fat cooking methods (Grace 1996), one study used lunch time with health professionals (McCulloch 1983), and one study used wheels and bar charts displaying Cognitive Representations of the DASH diet (Scisney-Matlock 2006) as nutritional tools in their intervention.

Among studies using a control/usual care group, 3 out of 17 diet adherence outcomes favoured the intervention group and 11 diet adherence outcomes had no significant difference between groups. It was impossible to assess this result for three diet adherence outcomes as data and/or statistical analyses needed for comparison between groups were not provided (Table 6).

Enablement

See Table 7.

Behaviour change techniques

Aldarondo 1999 reported no difference in adherence to energy, fat and saturated fat intake at 14 weeks between the intervention group using barrier identification/problem solving and self-talk compared to the control group in obese clients.

Another study (Bennett 1986) compared three interventions using behavioural change techniques in overweight-obese clients: 1) teaching clients to use prompts/cues, 2) self-talk, 3) barrier identification/problem solving. The authors reported that clients in the intervention group using food cues adhered more closely to energy intake goals than those in the two other groups between baseline and 15 weeks.

One study (Logan 2010) compared an intervention using barrier identification/problem solving and goal setting with an intervention using recipes and meal plans as nutritional tools in clients with coronary heart disease. The authors reported no difference between groups for adherence to the Mediterranean diet at 6 and 12 months.

Overall, in this category: three studies used behavioural change techniques such as barrier identification/problem solving and self-talk (Aldarondo 1999), teaching clients to use prompts/cues, self-talk and barrier identification/problem solving (Bennett 1986) and barrier identification/problem solving and goal setting (Logan 2010).

Only one study used a control group and three out of three diet adherence outcomes had no difference between groups (see Table 7).

Multiple interventions

See Table 8.

Arcand 2005 evaluated the effects of individual sessions with a dietitian combined with goal setting, on adherence to a sodium-restricted diet in clients with heart failure. The authors did not compare adherence to the sodium-restricted diet nor blood pressure between groups. Therefore, we calculated the SMD for adherence to the sodium-restricted diet and blood pressure using RevMan, and found no difference between groups for sodium-restricted diet (see also Analysis 2.1), systolic blood pressure (SMD-0.30 (95% CI -0.88 to 0.27)) and diastolic blood pressure (SMD-0.53 (95% CI -1.11 to 0.05)).

One study (Baraz 2010) compared a multiple intervention using a booklet as educational tool combined with group sessions, with a single intervention using a video as an educational tool, in clients with chronic end-stage renal disease. The authors did not report the proportion of clients classified as adherent to diet for both groups, making comparison between groups impossible. Therefore, we calculated the RR for the proportion of clients who adhered to the diet and fluid-restricted diet at two months, using RevMan, and found no difference between groups.

Using an intention-to-treat analysis, Becker 1998 reported no difference in the proportion of clients at risk of coronary heart disease who received telephone follow-up combined with a barrier identification/problem solving intervention for adherence to a fat-restricted diet at two years, compared to clients in the usual care group. Moreover, no difference was found for LDL-cholesterol, HDL-cholesterol and triglyceride levels at two years between groups.

Blanson 2009 evaluated the effects of self-monitoring using a computer assistant combined with feedback using motivational interviewing in overweight clients. They reported no significant difference in adherence to diet at 28 days between the intervention and the control groups.

Cummings 1981 reported a significantly higher adherence to a fluid-restricted diet at six weeks in clients with renal failure asked to write a formal agreement (contract) with the involvement of a family member or friend, compared to clients in the control group. However, these differences were no longer significant at three months. This study also compared clients writing a formal agreement (contract) with the involvement of a family member or friend, with clients writing a contract, and with clients who received telephone follow-up, but no differences in adherence to a potassium- and fluid-restricted diet at three months were found between groups.

In type II diabetes clients, the comparison of an intervention using group sessions and nutritional tools combined with barrier identification/problem solving versus control (Gucciardi 2007) showed a higher adherence to dietary advice in the intervention group at three months. However, the authors reported no difference in HbA_{1c} between the groups at three months (see also Analysis 2.1).

Hsueh 2007 compared a multiple intervention comprising individual sessions with a nurse alternating with telephone follow-up on adherence to fiber, vegetable and fruit intakes in clients with irritable bowel syndrome, with a single intervention comprising individual sessions with a nurse. The authors reported no differ-

ence in the proportion of high-compliant clients for fiber, vegetable and fruit intakes between groups at three and six months.

To assess the effectiveness of an intervention using telephone follow-up combined with motivational interviewing, Hyman 2007 compared two interventions in clients with hypertension with a usual care group: 1) simultaneous behaviour change (stop smoking, reduce dietary sodium level and increase physical activity); 2) sequential behaviour change (stop smoking, then reduce dietary sodium levels and finally increase physical activity). A higher proportion of clients adhered to the sodium-restricted diet in the simultaneous group, compared to the sequential intervention and the usual care group at six months, but no difference was observed at 18 months. No difference was reported for blood pressure between groups (see also Analysis 2.2).

Jiang 2004 assessed the effects of an intervention using individual sessions with a nurse and telephone follow-up combined with goal setting, on adherence to the Adult Treatment Panel (ATP) step II diet (hypocholesteraemic diet) in clients with angina pectoris or myocardial infarction. Using an intention-to-treat analysis, the authors reported better adherence to the step II diet in the intervention group compared to the usual care group at three and six months. At three months, triglyceride, total cholesterol, LDL-cholesterol levels and blood pressure decreased significantly more in the intervention group than the usual care group, while no difference was noted for HDL-cholesterol and body weight. At six months, only the differences in triglyceride, total cholesterol and LDL-cholesterol levels remained significant.

Jones 1986 compared four interventions in overweight clients: group sessions with a dietitian (GS); group sessions with a dietitian combined with a leaflet providing advice to reduce exposure to food cues (GS + cues); individual sessions with a dietitian (IS); individual sessions with a dietitian combined with a leaflet providing advice to reduce exposure to food cues (IS + cues). The authors found no significant difference between groups for adherence to diet, as well as for weight loss, at 16 weeks.

Laitinen 1993 evaluated the effects of individual sessions with a dietitian and nutritional tools combined with goal setting, on adherence to total fat, saturated fat, unsaturated fat, carbohydrate, fiber and cholesterol advice in clients with non-insulin-dependent diabetes. Although the authors reported no differences for total, saturated and unsaturated fat intake at three months, there was a higher proportion of clients who adhered to total and saturated fat intake recommendations in the intervention group compared to the usual care group at 15 months, whereas a higher proportion of clients adhered to unsaturated fat in the usual care group at 15 months. However, a discrepancy was found between the results provided by the authors and the RR calculated using RevMan which revealed no difference for adherence in total fat and unsaturated fat at 15 months between groups. Fasting blood glucose and HbA_{1c} decreased significantly more in the intervention group at 15 months than in the control group, while no difference was noted for body weight, total cholesterol and HDL-cholesterol levels. From data provided by the authors, we used RevMan to calculate the SMD for the proportion of clients who adhered to carbohydrate, fiber and cholesterol intakes, and found no differences between groups at 3 and 15 months (see also Analysis 2.2).

Mahler 1999 assessed the effects of a video as educational tool combined with relapse prevention/coping planning on adherence to a cholesterol- and saturated fat-restricted diet in clients with coronary artery disease. Adherence to a cholesterol- and saturated fat-restricted diet was significantly higher in the intervention group compared to the control group at one month, but this difference was no longer significant at three months. The authors also compared the intervention with another intervention using a video as an educational tool, and found no difference between groups.

Miller 1988 evaluated the effects of individual sessions with a dietitian combined with barrier identification/problem solving and goal setting in clients with myocardial infarction. While no difference was found at 30 days, 60 days and 1 year, the authors reported a significant difference in adherence to diet at 2 years between the intervention and the control groups.

Morey 2008 compared an intervention including individual sessions with a nurse, a booklet as educational tool and reminders combined with motivational interviewing intervention with a control group. They reported a higher proportion of clients with end-stage kidney disease adhering to a phosphate-restricted diet at three months in the intervention group compared to the control group. Data for adherence to the phosphate-restricted diet at 6 and 12 months were not reported (see also Analysis 2.2).

A multiple intervention (Tsay 2003) including self-monitoring in a diary and feedback combined with stress management and goal setting in clients with end-stage renal disease showed a significant group main effect in adherence to a fluid-restricted diet when baseline mean weight gains were applied as covariate. From data provided by the authors, we used RevMan to calculate the SMD for adherence to a fluid-restricted diet at 1 month, 3 months and 6 months, respectively. No difference was found between groups at one month but adherence to a fluid-restricted diet at three months and six months was significantly higher in the intervention group compared to the control group (see also Analysis 2.1).

Wong 2010 reported a difference in the degree of non-adherence to diet at seven weeks in clients with renal failure who received telephone follow-up combined with goal setting compared to clients in the control group. However, a discrepancy was found between the results provided by the authors and the SMD calculated using RevMan which revealed no difference for the degree of non-adherence to diet at seven weeks between groups. No difference was found between groups for the degree of non-adherence to diet at 13 weeks and for the number of days of non-adherence to diet, as well as non-adherence to fluid restriction (degree and days) at 7 and 13 weeks (see also Analysis 2.1).

Wood 2008 studied two populations: clients with coronary heart disease and clients at high risk of the disease. In clients with coronary heart disease, the authors reported a higher proportion of

clients achieving the target for saturated fat, oily fish and fruit and vegetable intakes at one year in the intervention group (individual sessions with a nurse combined with motivational interviewing) compared to the usual care group. No difference was observed in adherence to fish consumption advice between groups. However, a discrepancy was found between the results provided by the authors and the RR calculated using RevMan which revealed a higher proportion of clients achieving the target for fish intake in the intervention group. A higher proportion of clients achieved the target for blood pressure in the intervention group compared to the usual care group, while no difference was found for body weight, and total and LDL-cholesterol levels. In clients at high risk of coronary heart disease, a higher proportion of clients achieving the target of fruit and vegetable intakes was reported at one year in the intervention group, while no difference was observed in adherence to recommended fish and oily fish intakes between groups. However, a discrepancy was found between the results provided by the authors and the RR calculated using RevMan which revealed a higher proportion of clients achieving the target for oily fish and fish intake in the intervention group. A higher proportion of clients also achieved the target for blood pressure and body weight in the intervention group compared to the usual care group while no difference was found for total and LDL-cholesterol levels (see also Analysis 2.2).

One study (Zhao 2004) evaluating the effects of telephone follow-up as well as individual sessions with a dietitian combined with goal setting in clients with coronary heart disease reported a higher proportion of clients with high adherence to diet in the intervention group compared to the usual care group at 4 and 12 weeks (see also Analysis 2.2).

Overall, in this category, 13 studies combined an educational intervention with another intervention such as an enablement intervention (Arcand 2005; Becker 1998; Gucciardi 2007; Hyman 2007; Jones 1986, Mahler 1999; Miller 1988; Wong 2010; Wood 2008; Zhao 2004), modelling and enablement interventions (Laitinen 1993), persuasion and enablement interventions (Morey 2008), and two educational interventions with enablement interventions (Jiang 2004). Two studies combined two different educational interventions (Baraz 2010; Hsueh 2007). One study combined a training intervention with an enablement intervention (Blanson 2009) and one study combined two enablement interventions and a training intervention (Tsay 2003). One study combined an incentivisation with a persuasion intervention (Cummings 1981).

In this category, among studies using a control/usual care group, 21 out of 56 diet adherence outcomes favoured the intervention group whereas 32 diet adherence outcomes had no significant difference between groups. It was impossible to assess this result for three diet adherence outcomes as data and/or statistical analyses needed for comparison between groups were not provided (Table 8). However, 4 out of 21 diet adherence outcomes favouring the intervention group was no longer significant at a later time point.

DISCUSSION

Summary of main results

This review included 38 studies investigating the effects of interventions enhancing adherence to dietary advice for preventing and managing chronic diseases in adults. Studies reporting at least one diet adherence outcome showing statistically significant differences favouring the intervention group included the following interventions: telephone follow-up, video, contract, feedback, nutritional tools and multiple interventions. However, these interventions also showed no difference in some diet adherence outcomes compared to a control/usual care group. Moreover, the included studies differed widely according to interventions provided, measures of diet adherence, dietary advice, nature of the chronic diseases and duration of interventions and follow-up.

The majority of these studies were conducted in United States of America. Cardiovascular disease, diabetes, hypertension, and renal diseases were the most frequently studied chronic diseases. The adoption of a healthy diet is recommended as a prevention or management strategy for each of these chronic diseases (Lichtenstein 2006; Bantle 2008; Kopple 2001). Interestingly, all studies including clients with renal diseases reported at least one diet adherence outcome showing a statistically significant difference favouring the intervention group, no matter which intervention was provided.

Only 10 of the 38 included studies evaluated diet adherence to dietary advice over a 12-month period (Becker 1998; French 2008; Hyman 2007; Laitinen 1993; Logan 2010; Micco 2007; Miller 1988; Morey 2008; Racelis 1998; Wood 2008). Among those 10 studies, only three studies showed at least one statistically significant difference in diet adherence outcomes favouring the intervention group over a 12-month period.

A broad range of interventions, all related to the method for changing dietary habits through dietary advice, was covered in this review, including education (telephone follow-up, group sessions, individual sessions with a dietitian or a nurse, and educational tools (video or booklet)), persuasion (reminders), incentivisation (contracts with rewards), training (feedback), restriction, modelling (nutritional tools) and enablement (behaviour change techniques). However, the majority of studies included a combination of two or more different interventions.

This review included studies comparing one or more intervention group(s) with one control/usual care group, but also studies comparing two or more intervention groups to each other. However, only comparisons made between an intervention group and a control/usual care group allowed the evaluation of the effect of the intervention alone on adherence to dietary advice. Therefore, among studies that measured diet adherence outcomes between an intervention group and a control/usual care group, 32 out of 123 diet adherence outcomes favoured the intervention group. More specifically, studies reporting at least one diet adherence outcome showing statistically significant differences favouring the intervention group included the following interventions: telephone fol-

low-up (3 out of 10 diet adherence outcomes), video (2 out of 3 diet adherence outcomes), contract (2 out of 4 diet adherence outcomes), feedback (1 out of 7 diet adherence outcomes), nutritional tools (3 out of 17 diet adherence outcomes) and multiple interventions (21 out of 56 diet adherence outcomes). Studies investigating interventions such as a group session, individual session, reminders, restriction and behaviour change techniques reported no diet adherence outcome showing a statistically significant difference favouring the intervention group. However, these results should be interpreted with caution as several studies evaluated two or more diet adherence outcomes. Among those, most of the studies showing a statistically significant difference favouring the intervention group for diet adherence outcome(s) also showed no significant differences between groups for other diet adherence outcome(s) (Assuncao 2010; Cummings 1981; Grace 1996; Hyman 2007; Laitinen 1993; Mahler 1999; McCulloch 1983; Miller 1988; Stewart 2005; Tsay 2003). For example, Laitinen 1993 assessed the effects of a multiple intervention and reported better adherence to saturated fat intake at 15 months in the intervention group whereas no differences were observed for adherence to intake of total, saturated or unsaturated fat carbohydrate, fiber or cholesterol between the intervention group and the control group at either 3 or 15 months. In addition, where studies measured outcomes at multiple time points, the majority of studies reporting a diet adherence outcome favouring the intervention group compared to the control/usual care group in the short-term also reported no significant effect at later time points. Interestingly, the majority of studies involving multiple interventions reported positive results on adherence to dietary advice. However, because multiple components within these interventions acted as co-interventions, it may have introduced confounding effects. Therefore, drawing conclusions about whether the interventions enhanced adherence to dietary advice is very difficult.

Overall completeness and applicability of evidence

Although we included a substantial number of studies covering a broad range of chronic diseases and interventions, very few studies assessing a specific chronic disease condition evaluated the same intervention. In addition, measures of adherence and dietary advice varied widely across studies.

This review assessed the effects on adherence related to the intervention alone since only the intervention, related to the method for facilitating changes in dietary habits through dietary advice, differed between the intervention group and the control/usual care group. Comparisons between two or more intervention groups were also reported. However, comparisons between multiple interventions were all different. In order to isolate the effects of the intervention, both clients in the intervention group and the control/usual care group received the same dietary advice related to their chronic disease condition. This situation could explain why adherence to dietary advice in the control/usual care group increased in some studies. However, factors other than the intervention provided could have affected adherence to dietary advice. For example, clients' intrinsic characteristics such as an elevated level of self-efficacy (Mishali 2011; Aljasem 2001) as well as few perceived barriers (Walsh 2011) are associated with better dietary adherence in clients with chronic diseases. Some studies also reported that the client's stage of change based on the Transtheoretical Model predicted long-term changes in dietary behaviours (Mochari 2010; Blissmer 2010). Therefore, confounding factors should be taken into consideration in studies evaluating adherence to dietary advice.

In this review, secondary outcomes related directly to the chronic disease condition (e.g. HbA_{1c} and/or blood glucose in clients with diabetes, weight for clients with obesity) were reported. Few studies reported other secondary outcomes such as process measures, services outcomes and harms or secondary effects, making interpretation about these secondary outcomes impossible. Fourteen studies comparing an intervention group with a control/usual care group also reported clinical and/or biochemical outcome(s) in addition to adherence to dietary advice. Among those, six reported improvement in at least one chronic disease-related clinical or biochemical outcome in the intervention group. As mentioned earlier, these results should be interpreted with caution as several studies evaluated two or more clinical and/or biochemical outcomes.

Seventeen studies provided advice in order to induce changes other than diet such as physical activity, medication compliance, smoking cessation and blood glucose monitoring. All of these studies independently assessed adherence to dietary advice, but because those studies varied widely according to interventions provided and nature of the chronic diseases, we cannot conclude that adherence to dietary advice is improved when multifaceted interventions are provided.

Quality of the evidence

Despite a high number of included studies (n = 38), these studies varied widely according to interventions provided, measures of diet adherence, dietary advice, nature of the chronic diseases and duration of interventions and follow-up. The numbers of clients included in the review is impressive (9445), but the range of number of clients in each study was wide, varying from 7 to 5405 clients. Only 13 of the 38 included studies provided a power calculation (Aldarondo 1999; Assuncao 2010; Beasley 2008; Chiu 2010; French 2008; Hyman 2007; Jiang 2004; Meland 1994; Stewart 2005; Tsay 2003; Wong 2010; Wood 2008; Zhao 2004) and among them, 10 studies recruited the number of clients according to their power analysis (Aldarondo 1999; Assuncao 2010; Beasley 2008; French 2008; Jiang 2004; Meland 1994; Stewart 2005; Tsay 2003; Wong 2010; Zhao 2004).

While an elevated drop-out rate could be considered as an indirect measure of non-adherence, such as in studies of pharmaceutical

interventions where participants who withdraw no longer have access to medication, it cannot be assumed that clients dropping out of dietary intervention studies are non-adherent to dietary advice. Most studies included in this review had a low drop-out rate. In fact, 19 studies reported a drop-out rate lower than 20% (9 of those had no drop-out). Nine studies had a drop-out rate of between 20% and 30% and only five studies had a drop-out rate over 30%. It was impossible to calculate the drop-out rate for six studies (Gans 1994; Gill 2010; Hsueh 2007; Jones 1986; Mahler 1999; McCulloch 1983). One study (Wood 2008) reported adherence for two populations, which explains why the total number of included studies adds up to 39, and not 38.

The majority of included studies were of poor methodological quality and/or poorly reported risk of bias elements. All included studies met less than five of the eight criteria of risk of bias (see Assessment of risk of bias in included studies). Among those eight criteria, three of them evaluated respectively the blinding of clients, providers and outcome assessors. Very few included studies met these criteria because blinding in the context of delivering a nutritional intervention is very difficult to achieve, even impossible in some designs. Unlike most pharmaceutical designs using placebo, both clients and providers from nutritional studies usually know which intervention is delivered.

A major challenge in the measurement of diet adherence is the correct estimation of dietary intake, as no method for accurate determination of dietary intake has been developed yet. In this review, 31 studies used self-reported measures of diet adherence while 6 studies assessed diet adherence using objective measures. Objective measures included serum micronutrients (e.g. potassium, sodium, phosphate) and interdialytic weight gain to evaluate respectively adherence to diet and to fluid-restricted diet in clients with renal diseases, and urinary electrolytes excretion (sodium, chloride) to evaluate adherence to a sodium-restricted diet in clients with hypertension. Those methods have been validated and are usually more reliable than self-reported measures. However, the assessment of many food and nutrient intakes cannot always be performed by objective measures, especially when dietary advice targets food groups (e.g. fruit and vegetables) rather than a specific nutrient (e.g. sodium). The *Academy of Nutrition and Dietetics* states that "total diet or overall pattern of food eaten is the most important focus of a healthful eating style" (JADA 2007). Consequently, most studies providing dietary advice focusing on a global healthy diet rather than a specific nutrient used self-reported methods such as dietary tools (e.g. food records, food frequency questionnaires and validated diet questionnaires or scales). Misreporting of dietary intake is a major issue and has been related to body mass index, age, sex, socio-economic status and education (Poslusna 2009). In addition, other sources of misreporting have been identified such as memory relapses, misrepresentation of portion size consumed, social desirability and daily dietary variability (Kumanyika 2000; Wilson 2005). Therefore, establishing validity and reliability of dietary tools is crucial in order to avoid inconsistent estimates of dietary intake leading to a high risk of bias. In this review, only 14 studies of 32 stated that the self-reported measures of diet adherence had been validated and/or shown to be reliable, suggesting that adherence to dietary advice in those studies could be biased. To gain a thorough understanding of adherence to dietary advice, both self-report and objective measures of adherence are needed. While objective measures provide information on food intake only, self-report measures also provide useful information on the circumstances of non-adherence. The latter is important for clinicians to understand the reasons why the client is non-adherent (which may include the clinicians' lack of behavioral skills) and to promote a collaborative relationship that considers clients' values and preferences. More research is therefore needed to both develop standardized and validated self-report adherence measures and to identify more robust and objective measures of adherence to dietary advice.

Potential biases in the review process

Strengths of this review include the fact that we contacted many study authors during the data extraction process to gather additional information. The main reason was that some authors did not adequately describe the intervention provided in the intervention group and/or in the control/usual care group, in the published report. Additional information we received allowed us to better classify the included studies according to the intervention provided.

As expected, a limitation of this review is the definition of adherence to dietary advice. Adherence to dietary advice is a wide concept and includes many different measures including self-reported measures which are not always comparable. Accordingly, in this review, some included studies assessed adherence to dietary advice by reporting the proportion of clients achieving the dietary recommendations. However, the majority of included studies evaluated adherence to dietary advice by comparing the mean dietary intake between groups. These different ways to measure adherence to dietary advice suggest that there is a need to develop standardized and validated tools to assess adherence to dietary advice.

In this review, we only included studies clearly mentioning a measure of adherence to dietary advice in the title or the objective of the study and/or those reporting the proportion of clients adhering to dietary advice. Therefore, we excluded all studies reporting mean dietary intake between groups without specifically assessing adherence to dietary advice as a primary outcome. Despite an extensive search in standard databases as well as in the grey literature, we cannot exclude the possibility that we missed some studies measuring adherence to dietary advice if those studies were not indexed in bibliographic databases as reporting adherence or compliance.

We categorized interventions according to Michie et al (Michie 2011) intervention functions to simplify and structure the presentation of results and not to provide insights about which in-

tervention function was most effective for enhancing adherence to dietary advice. Although two review authors assigned the interventions to the categories through consensus, the assignment was arbitrary and we cannot exclude the fact that others may have assigned interventions to other categories. However, it must be emphasized that the process did not interfere with the interpretation of results.

Agreements and disagreements with other studies or reviews

Few systematic reviews evaluated clients' adherence to recommendations in the context of preventing and/or managing chronic diseases. Among systematic reviews reporting the effectiveness of interventions to enhance adherence to dietary advice, none assessed the same criteria as this review, making comparisons difficult. For example, two systematic reviews included other components in the assessment of adherence in addition to diet, such as physical activity and medication (Matteson 2010; Greaves 2011). The evaluation of diet adherence alone for those studies was therefore impossible. Fappa et al (Fappa 2008) performed a non-systematic review on lifestyle interventions for enhancing adherence to diet and exercise in the management of the metabolic syndrome. However, dietary advice provided in the majority of included studies differed between the intervention and the control groups. Consequently, the effects of the intervention could not be isolated.

Burke 1997 conducted a non-systematic review of successful strategies to increase adherence to dietary advice in the context of CVD prevention. Among eleven included studies, interventions found to be effective to improve adherence to nutritional therapy were behavioural skill training, spouse support and self-efficacy enhancement.

Our results are consistent with those of Brownell and colleagues (Brownell 1995b) who performed an overview of studies with diet adherence data. They reported inconsistencies in methods and had difficulty interpreting results because of the broad variation of diseases covered and interventions provided. Similarly, Newell et al (Newell 2000) performed a non-systematic review of strategies for improving cardiovascular client compliance to non-pharmacologic treatments. No strong evidence was reported for the enhancement of dietary regime, and studies included were assessed as fair quality in term of study design. Those conclusions underline the fact that further good-quality studies assessing adherence to dietary advice for preventing and managing chronic diseases should be performed.

AUTHORS' CONCLUSIONS

Implications for practice

Non-adherence to dietary advice represents one of the barriers to getting nutrition knowledge into practice, thereby potentially hampering the prevention of the onset or progression of many chronic diseases and ultimately, improved population well-being and health. This Cochrane review aimed to summarize, categorize and compare the effects of interventions for enhancing adherence to dietary advice for preventing and managing chronic diseases in adults. Some interventions such as telephone follow-up, video, contract, feedback and nutritional tools demonstrated a mixed effect on diet adherence as they showed some diet adherence outcomes favouring the intervention group compared to the control/usual care group but also no difference in some diet adherence outcomes between groups. Moreover, included studies differed widely according to interventions provided, measures of diet adherence, dietary advice, nature of the chronic diseases and duration of interventions and follow-up, making assessment of intervention versus intervention rather challenging. Therefore, this systematic review cannot draw firm conclusions from comparisons between interventions, but rather identifies a number of potentially-beneficial interventions that can be used in practice (telephone follow-up, video, contract, feedback and nutritional tools). Also, while the majority of multiple interventions have demonstrated a positive effect on diet adherence compared to a control/usual care group, none of the included studies assessed the same combination of interventions, making impossible the identification of the optimal combination of interventions to enhance adherence to dietary advice. Consequently, researchers, decision makers, health professionals and consumers remain with little practical guidance with regard to the best intervention for enhancing adherence to dietary advice. However, it may be argued that in health care, there is often no unique best option for either treatment or process of care, as these options may be influenced by clients' preferences and values. Although longer-term, well-designed RCTs using improved methods for measuring diet adherence are needed, results of this systematic review provide options for both health professionals and consumers that may be used in practice. Interventions shown to be beneficial compared to a control/usual care group could be used depending on clients' preferences, lifestyle and values, health professionals' communication skills, and organisational context.

Implications for research

Evidence of the role of a healthy diet and/or specific nutrient intakes on the prevention and management of chronic diseases is well recognized. Further studies are now essential to refine methods for providing dietary advice and improve diet adherence in the context of chronic diseases. Several gaps in knowledge have been identified in this review regarding the effectiveness of interventions to enhance adherence to dietary advice for preventing and managing chronic diseases in adults:

- Further good quality studies should be designed to minimize bias and to have an adequate sample size to detect significant differences between groups;

- Further studies with a long-term duration, namely more than 12 months, and a follow-up evaluation are needed;

- Further research should be designed with a comparison between an intervention group and a control/usual care group both providing the same dietary advice to capture the effect of the intervention only, without confounding factors;

- Further studies need to define clearly the term 'adherence' and describe the intervention in detail. Moreover, there is a need to develop standardized and validated self-report tools and robust objective measures (e.g. biomarkers) to assess adherence to dietary advice;

- Further studies should investigate the factors contributing to clients' non-adherence to dietary advice in order to develop interventions to overcome barriers. These factors include psychosocial and environmental determinants, but also biological factors affecting food intake;

- Moreover, perspectives from health professionals and clients about the interventions enhancing adherence to dietary advice should be studied with the aim of identifying those that are most implementable in practice and adaptable to local contexts (Desroches 2011).

ACKNOWLEDGEMENTS

We thank the staff and editors of the Cochrane Consumers and Communication Review Group, especially Professor Adrian Edwards (Contact Editor for this review), Dr Megan Prictor (Managing Editor), Dr Sophie Hill (Coordinating Editor) and Mr John Kis-Rigo (Trials Search Coordinator). We also thank Dr Anik Giguere for her assistance with systematic review methods, Jayne Thirsk for her comments on the review and Narimane Toureche, Sarah-Maude Deschênes, Catherine Laramée, Vincent Hao May, Annabelle Fortier and Nadine Tremblay for their assistance with the selection of studies and/or data extraction and/or tables conception. Finally, we thank XiaoQiang Wang, Sumi Ross, Annette Bluemle, Amélie Trépanier, Sonia Pomerleau, Claire Glenton and Docent Suzana Nikolovska who assisted with translating publications from languages other than English (Chinese, Japanese, German, Spanish, Danish and Norwegian and Serbian).

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* *Indicates the major publication for the study*

CHARACTERISTICS OF STUDIES

Characteristics of included studies *[ordered by study ID]*

Aldarondo 1999

Methods	Study design: randomized controlled trial with one intervention group and one control group
Participants	Setting: not known Country: United States Chronic disease: obesity (management) Type of participants: clients (n = 43) Mean age: intervention and control groups (44) Sex: intervention and control groups (F: 86%, M: 14%) Ethnicity: intervention and control groups (37 White, 3 African American, 1 Latino-Hispanique, 1 Native-American, 1 Asian American)
Interventions	Group 1: single intervention: enablement (behaviour change techniques: barrier identification/problem solving, self-talk); 14 weeks; (n = 22) Bi-weekly, the intervention took place in small groups during which clients talked about their specific problems and concerns and created their problem-solving self-instructions with the help of the group and the therapist. Homework assignments were given to clients to apply problem-solving self-instruction form regarding eating Group 2: control (unstructured support group); 14 weeks; (n = 21)
Outcomes	Measurement of diet adherence: adherence to energy, fat and saturated fat intakes assessed by a three-day food record (baseline, 14 weeks)
Notes	Dietary advice: energy and fat-restricted diet Drop-out rate: 0% (calculated) Providers: doctoral students in counselling psychology

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	"Randomization was carried out by drawing names from a hat"
Allocation concealment (selection bias)	High risk	"Randomization was carried out by drawing names from a hat"
Blinding (performance bias and detection bias) Participants	Low risk	"During the orientation meeting participants were given detailed information about the study except for the fact that

Aldarondo 1999 (*Continued*)

		there would be more than one type of 'healthy lifestyle group' (the CBT group and the control group) with no further details given"
Blinding (performance bias and detection bias) Providers	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Outcome assessors	Unclear risk	This study did not assess this item.
Incomplete outcome data (attrition bias) All outcomes	Low risk	No missing data.
Selective reporting (reporting bias)	High risk	No protocol. Some outcomes are reported incompletely (diet adherence, weight)
Other bias	Unclear risk	Baseline balance between groups. Diet adherence is assessed by self-reported measure. Validation and reliability of self-reported diet adherence are not reported

Arcand 2005

Methods	Study design: randomized controlled trial with one intervention group and one usual care group
Participants	Setting: outpatient Country: Canada Chronic disease: heart failure (management) Type of participants: clients (n = 50) Mean age: intervention (56 ± 3), usual care (61 ± 3) Sex: intervention (F: 28%, M: 72%) and usual care (F: 32%, M: 68%) Ethnicity: not known
Interventions	Group 1: multiple intervention: individual session with a dietitian + goal setting; 3 months; (n = 25) An individualized nutrition care plans and goals were developed during a first counselling session with a dietitian and a second counseling session occurred 4 to 6 weeks later Group 2: usual care (no goal setting and no follow-up counselling session); once; (n = 25)
Outcomes	Measurement of diet adherence: adherence to sodium-restricted diet assessed by a three-day food record (baseline, 3 months)

Notes	Dietary advice: sodium-restricted diet (2 g/day) Drop-out rate: 6% (calculated) Providers: intervention: dietitian; usual care: clinic nurse

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Sequence generation using a computer random number generator
Allocation concealment (selection bias)	Unclear risk	Allocation concealment is not described explicitly in the paper
Blinding (performance bias and detection bias) Participants	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Providers	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Outcome assessors	Unclear risk	This study did not assess this item.
Incomplete outcome data (attrition bias) All outcomes	Low risk	Plausible effect size among missing outcomes not enough to have a clinically-relevant impact on observed effect size
Selective reporting (reporting bias)	Unclear risk	No protocol.
Other bias	Unclear risk	Baseline balance between groups. Diet adherence is assessed by self-reported measure. Validation and reliability of self-reported diet adherence are not reported

Assuncao 2010

Methods	Study design: randomized controlled trial with one intervention group and one usual care group
Participants	Setting : outpatient Country : Brazil Chronic disease: overweight and obesity (prevention/management) Type of participants: clients (n = 241) Mean age: intervention (41.1), usual care (39.6) Sex: intervention (F: 90%, M: 10%) and usual care (F: 87.6%, M: 12.4%)

Assuncao 2010 (*Continued*)

	Ethnicity: intervention (82.5% White, 17.5 % non-White), usual care (87.6% White, 12.4% non-White)
Interventions	Group 1: single intervention: modelling (nutritional tools); 6 months; (n = 120) A manual was provided to clients containing photographs illustrating the portion sizes of the prescribed foods in addition to nutritionally balanced food lists, with calorically equivalent alternatives, in 100-cal portions. During monthly follow-up sessions, additional explanations were provided regarding the menu and alternative foods Group 2: usual care (no nutritional tools); 6 months; (n = 121)
Outcomes	Measurement of diet adherence: adherence to advice regarding total energy, protein, fat, carbohydrate, cholesterol, fiber, sodium, fruit, vegetable and sweet food intakes assessed by a weekly food consumption questionnaire (baseline, 6 months)
Notes	Dietary advice: energy controlled diet, 15 to 30% of energy from total fat; 55 to 75% of energy from total carbohydrate; 10 to 15% of energy from protein; up to 300 mg/day of cholesterol; up to 5 g/day of salt; up to 25 g/day of fiber; at least 400 g/day of fruit and vegetables Drop-out rate: 20.3% (calculated) Providers: dietitians

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Sequence generation referring to a random number table.
Allocation concealment (selection bias)	Low risk	Allocation concealment using sequentially numbered, opaque, sealed envelopes
Blinding (performance bias and detection bias) Participants	High risk	"An unblind, randomised, controlled clinical trial was (…)"
Blinding (performance bias and detection bias) Providers	High risk	"An unblind, randomised, controlled clinical trial was (…)"
Blinding (performance bias and detection bias) Outcome assessors	High risk	"Except for laboratory tests, all other outcome indicators were assessed by observers that were unblind of the status of the study participants"
Incomplete outcome data (attrition bias) All outcomes	High risk	Plausible effect size among missing outcomes enough to have a clinically-relevant impact on observed effect size

Assuncao 2010 (*Continued*)

Selective reporting (reporting bias)	High risk	No protocol. Diet adherence is reported incompletely.
Other bias	High risk	Baseline imbalance between groups (fasting glucose). Diet adherence is assessed by self-reported measure (validated food frequency questionnaire)

Baraz 2010

Methods	Study design: randomized controlled trial with two intervention groups
Participants	Setting: outpatient Country: Iran Chronic disease: chronic end-stage renal disease (management) Type of participants: clients (n = 63) Mean age: intervention group 1 (35.9 ± 10.1), intervention group 2 (33.8 ± 8.9) Sex: intervention group 1 (F: 46.9%, M: 53.1%) and intervention group 2 (F: 48.4%, M: 51.6%) Ethnicity: intervention groups (100% Asian)
Interventions	Group 1: multiple intervention: group session + educational tools-booklet; 2 weeks; (n = 32) Clients attended two educational sessions. An interactive portion of teaching program was held at the end of class and clients were encouraged to offer support to each other. Clients also received a teaching booklet to take home Group 2: single intervention: education (educational tools-video); 1 week; (n = 31) An educational film on a video disc system was shown to each client during two consecutive dialysis sessions in a week
Outcomes	Measurement of diet adherence: adherence to dietary restriction assessed by bimonthly average values of serum sodium, potassium, calcium, phosphate, albumin, creatinine, uric acid and blood urea nitrogen (baseline, 2 months); adherence to fluid-restricted diet assessed by bimonthly interdialytic weight gain (baseline, 2 months)
Notes	Dietary advice: 55 g/day of oil; 1.2 to 1.5 g/kg/day of protein; 2 g/day of sodium; 0.5 to 2 g/day of potassium; 1 g/day of phosphorus; restricted water intake (output 24h + 10 ml/kg/day) Drop-out rate: 0% (calculated) Provider: renal nurse expert

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"The random allocation was performed using computer-generated random numbers

Baraz 2010 (*Continued*)

		from 0 to 99."
Allocation concealment (selection bias)	High risk	"For an equal allocation to the two groups, we took odd numbers to indicate group 1 (oral education) and even numbers to indicate group 2 (video education)."
Blinding (performance bias and detection bias) Participants	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Providers	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Outcome assessors	Unclear risk	This study did not assess this item.
Incomplete outcome data (attrition bias) All outcomes	Low risk	No missing data.
Selective reporting (reporting bias)	Unclear risk	No protocol.
Other bias	Unclear risk	Baseline comparisons between groups are not reported. Diet adherence is assessed by objective measures

Beasley 2008

Methods	Study design: randomized controlled trial with one intervention group and one control group
Participants	Setting: research center Country: United States Chronic disease: overweight and obesity (prevention/management) Type of participants: clients (n = 174) Mean age: intervention (52 ± 12), control (54 ± 10) Sex: intervention (F: 83%, M: 17%) and control (F: 77%, M: 23%) Ethnicity: intervention (85% Caucasian, 10% Black, 5 % Asian), control (83.3% Caucasian, 16.7% Black, 0% Asian)
Interventions	Group 1: single intervention: training (feedback); 4 weeks; (n = 89) Clients received a *Palm Zire 21* loaded with the *DietMatePro* program that displayed personalized target values for energy based on the Harris-Benedict calculation using *National Institutes of Health* (NIH) guidelines for weight loss as well as fat, saturated fat, and cholesterol goals based on Ornish Prevention Diet recommendations. Additional *DietMatePro* program features to assist in adhering to the dietary regimen included

	feedback of comparisons between actual and target intake by meal and by day as well as recipes and meal plans consistent with the assigned diet Group 2: control (no feedback); 4 weeks; (n = 85).
Outcomes	Measurement of diet adherence: adherence to energy, fat, saturated fat and cholesterol intakes assessed by a three-day *DietMatePro* (intervention) or paper-based (control) food diaries and 24-hr recall (4 weeks)
Notes	Dietary advice: Ornish Diet (individualized target of energy level based on the Harris-Benedict calculation using NIH guidelines for weight loss, 10 to 15% of energy from fat, up to 7% of energy from saturated fat and cholesterol less than 200 mg/day) Drop-out rate: 8.6% (calculated) Provider: research assistant

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"Participants were then randomly assigned to receive either the DietMatePro program or the paper-based food diary as their food recording method based on a randomization table generated by the first author."
Allocation concealment (selection bias)	High risk	Allocation concealment using an open random allocation schedule (list of random numbers)
Blinding (performance bias and detection bias) Participants	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Providers	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Outcome assessors	High risk	"Research assistants were aware of the participant's randomization assignment during the assessment."
Incomplete outcome data (attrition bias) All outcomes	High risk	The proportion of missing outcomes compared with observed risk enough to induce clinically relevant bias in intervention effect estimate
Selective reporting (reporting bias)	Unclear risk	No protocol.

Other bias	High risk	Baseline imbalance between groups (body mass index). Diet adherence is assessed by self-reported measures. Validation of DietMatePro diary with paper based diary is reported. Potential conflict of interest ("All authors were employed at PICS at the time of the study and PICS is the developer of DietMatePro")

Becker 1998

Methods	Study design: randomized controlled trial with one intervention group and one usual care group
Participants	Setting: outpatient Country: United States Chronic disease: risk of coronary heart disease (prevention) Type of participants: clients (n = 156) Mean age: intervention (46.1 ± 7.7), usual care (46.9 ± 6.8) Sex: intervention (F: 47.6%, M: 52.4%) and usual care (F: 51.4%, M: 48.6%) Ethnicity: not known
Interventions	Group 1: multiple intervention: telephone follow-up + barrier identification/problem solving; 2 years; (n = 84) Meetings took place every four months and telephone calls occurred three times a year for lipid therapy compliance and dietary counselling. Barriers to implementation of diet, pharmacotherapy, exercise and smoking cessation were discussed. Encounters used standardized prompts that centered on readiness to change, support systems, and the sociocultural, work, and economic environment. Group 2: usual care; duration not known; (n = 72)
Outcomes	Measurement of diet adherence: adherence to fat-restricted diet assessed by the *Block Health Habits and History Questionnaire food frequency instrument* (2 years)
Notes	Dietary advice: consumption of less than 30% of total energy from fat and less than 300 mg/day of cholesterol Drop-out rate: 23% Providers: nurses and physicians

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"Randomization was done by family using a computerized schema"

Becker 1998 (*Continued*)

Allocation concealment (selection bias)	Unclear risk	"Each family had a number with a corresponding sealed envelope containing the assignment. The envelopes were opened after all siblings from the same family had been screened."
Blinding (performance bias and detection bias) Participants	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Providers	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Outcome assessors	Unclear risk	This study did not assess this item.
Incomplete outcome data (attrition bias) All outcomes	High risk	Imbalance in numbers of missing data between groups and the proportion of missing outcomes compared with observed event risk enough to induce clinically-relevant bias in intervention effect estimate
Selective reporting (reporting bias)	High risk	No protocol. Some outcomes are reported incompletely (weight, total cholesterol, smoking, physical activity and blood pressure)
Other bias	High risk	Baseline imbalance between groups (HDL-cholesterol). Diet adherence is assessed by self-reported measures (validated food frequency questionnaire)

Bennett 1986

Methods	Study design: randomized controlled trial with three intervention groups
Participants	Setting: not known Country: United Kingdom Chronic disease: overweight and obesity (prevention/management) Type of participants: clients (n = 53) Mean age: intervention groups (40) Sex: intervention groups (F: 100%) Ethnicity: intervention groups (100% White)
Interventions	Group 1: single intervention: enablement (behaviour change techniques: teach to use prompts/cues); 16 weeks; (n = 18)

	The aim was to reduce exposure to food cues by discussion of changes to make in food storage habits and common target problem. Each session (weeks 5, 6, 7, 8, 9, 11 and 15) followed the same format: a brief review of recent dieting efforts; a central lesson giving specific detailed advice on ways of reducing contact with food and one area of food management; a discussion of a specific problem from the point of view of the program as practice in problem solving and a summary of the content of the session. Group 2: single intervention: enablement (behaviour change techniques: self-talk); 16 weeks; (n = 16) The aim was to resist overeating by practising self-talk. Each session (weeks 5, 6, 7, 8, 9, 11 and 15) followed the same format: a brief review of recent efforts, a long period of imaginal rehearsal and a summary of the content of the session. Group 3: single intervention: enablement (behaviour change techniques: barrier identification/problem solving); 16 weeks; (n = 19) The aim was to improve self-control ability by reviewing problems encountered and discussing about adherence to diet
Outcomes	Measurement of diet adherence: adherence to energy intake assessed by a daily record (baseline - 3 weeks - 6 weeks - 9 weeks - 12 weeks - 15 weeks)
Notes	Dietary advice: specific quotas of exchanges, representing 1000 kCal below expected energy requirements, with a minimum of 1000 kCal Drop-out rate: 24.5% (calculated) Providers: psychologist and dietitian

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Sequence generation referring to a random number table.
Allocation concealment (selection bias)	High risk	Allocation concealment using an open random allocation schedule (list of random numbers)
Blinding (performance bias and detection bias) Participants	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Providers	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Outcome assessors	Unclear risk	This study did not assess this item.

Bennett 1986 (*Continued*)

Incomplete outcome data (attrition bias) All outcomes	High risk	Plausible effect size among missing outcomes enough to have a clinically-relevant impact on observed effect size
Selective reporting (reporting bias)	Unclear risk	No protocol.
Other bias	Unclear risk	Baseline balance between groups. Diet adherence is assessed by self-reported measure. Validation and reliability of self-reported diet adherence are not reported

Blanson 2009

Methods	Study design: randomized controlled trial with one intervention group and one control group
Participants	Setting: research center Country: Netherlands Chronic disease: overweight (prevention) Type of participants: clients (n = 191) Mean age: intervention (44.3 ± 12.2), control (43.0 ± 11.3) Sex: intervention (F: 76.9%, M: 23.1%) and control (F: 88.7%, M: 11.3%) Ethnicity: not known
Interventions	Group 1: multiple intervention: motivational interviewing + feedback; 4 weeks; (n = 97) A computer assistant represented by an animated *iCat* showed different facial expressions and provided cooperative feedback following principles from the motivational interviewing method. Group 2: control (no computer assistant); 4 weeks; (n = 94)
Outcomes	Measurement of diet adherence: adherence to diet goals assessed by a diary (28 days)
Notes	Dietary advice: one of the following goals: 20 to 35% of energy from fat; at least two pieces of fruit and 150 to 200 grams of vegetables/day; eat regularly (breakfast, lunch and dinner and a maximum of two in between snacks) Drop-out rate: 81.7% (calculated) Provider: none

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	Sequence generation is not described explicitly in the paper
Allocation concealment (selection bias)	Unclear risk	Allocation concealment is not described explicitly in the paper

Blanson 2009 (*Continued*)

Blinding (performance bias and detection bias) Participants	Low risk	"The participants were not aware there were two groups"
Blinding (performance bias and detection bias) Providers	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Outcome assessors	Unclear risk	This study did not assess this item.
Incomplete outcome data (attrition bias) All outcomes	High risk	Plausible effect size among missing outcomes enough to have a clinically-relevant impact on observed effect size
Selective reporting (reporting bias)	Unclear risk	No protocol
Other bias	Unclear risk	Baseline comparisons between groups are not reported. Diet adherence is assessed by self-reported measure. Validation and reliability of self-reported diet adherence are not reported

Chen 2006

Methods	Study design: randomized controlled trial with one intervention group and one control group
Participants	Setting: outpatient Country: China Chronic disease: renal failure (management) Type of participants: clients (n = 70) Mean age: intervention (57.6 ± 14.2), control (52.9 ± 14.9) Sex: intervention (F: 57.1%, M: 42.9%) and control (F: 48.6%, M: 51.4%) Ethnicity: not known
Interventions	Group 1: single intervention: modelling (nutritional tools); duration not known; (n = 35) Clients received an individualized menu suggestion based on food preferences and learned how to make food substitution using an exchange list and portion-sized food aids. Group 2: control (no menu suggestion); duration not known; (n = 35)
Outcomes	Measurement of diet adherence: adherence to protein intake assessed by a three-day food record (baseline, 1 month)

Chen 2006 (*Continued*)

Notes	Dietary advice: daily protein intake level 0.8 to 1.2 g/kg/day Drop-out rate: 0% (calculated) Provider: dietitian

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	"(…) all patients were then randomly assigned to 1 of 2 groups using random numbers"
Allocation concealment (selection bias)	Unclear risk	Allocation concealment is not described explicitly in the paper
Blinding (performance bias and detection bias) Participants	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Providers	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Outcome assessors	Unclear risk	This study did not assess this item.
Incomplete outcome data (attrition bias) All outcomes	Low risk	No missing data.
Selective reporting (reporting bias)	Unclear risk	No protocol.
Other bias	Unclear risk	Baseline balance between groups. Diet adherence is assessed by self-reported measure. Validation and reliability of self-reported diet adherence are not reported

Chiu 2010

Methods	Study design: randomized controlled trial with one intervention group and one control group
Participants	Setting: outpatient Country: China Chronic disease: hypertension (management) Type of participants: clients (n = 63) Mean age: intervention (53.3 ± 7.8), control (54.4 ± 7.6) Sex: intervention (F: 77.4%, M: 22.6%) and control (F: 56.2%, M: 43.8%)

	Ethnicity: not known
Interventions	Group 1: single intervention: education (telephone follow-up); 8 weeks; (n = 31) A nurse performed a telephone follow-up every two to three weeks during which she reinforced health self-management behaviours, providing health advice and assessed the need for referrals. Group 2: control (no telephone follow-up); 8 weeks; (n = 32)
Outcomes	Measurement of diet adherence: adherence to sodium-restricted diet, control of fat intake and adequate fruit and vegetable consumption assessed by a score (baseline, 8 weeks)
Notes	Dietary advice: sodium-restricted diet, fat, fruit and vegetable intakes Drop-out rate: 1.6% (calculated) Providers: nurses

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"Patients (…) were randomised to the study or control group using sets of computer-generated random numbers"
Allocation concealment (selection bias)	Unclear risk	Allocation concealment is not described explicitly in the paper
Blinding (performance bias and detection bias) Participants	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Providers	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Outcome assessors	Unclear risk	The outcome assessors were blinded for the satisfaction questionnaire but this study did not address the blinding for other outcomes
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Insufficient reporting of attrition to permit judgement.
Selective reporting (reporting bias)	Unclear risk	No protocol
Other bias	High risk	Baseline balance between groups. Diet adherence is assessed by self-reported measure (validated scale). An effect of intervener could have influenced results

Conrad 2000

Methods	Study design: randomized controlled trial with one intervention group and one control group
Participants	Setting: outpatient Country: Canada Chronic disease: coronary artery disease (management) Type of participants: clients (n = 7) Mean age: not known Sex: not known Ethnicity: not known
Interventions	Group 1: single intervention: restriction; 7 months; (n = 4) INCREMENTAL REDUCTION OF FAT: Meal plan initially targeted intake of 26% to 30% of energy as fat. At two months, patients were given meal plan targeting 20% fat energy intake. Finally, at four months they were given meal plan targeting 10% fat energy intake. Group 2: control; 7 months; (n = 3) IMMEDIATE REDUCTION OF FAT: Meal plan consisted to an immediate reduction of fat energy intake (10%). The meal plan was reinforced two and four months after the program
Outcomes	Measurement of diet adherence: adherence to very low fat diet assessed by a 24-hr recall (7 months)
Notes	Dietary advice: 10% of energy from fat Drop-out rate: 0% (calculated) Provider: dietitian

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Sequence generation is not described explicitly in the paper
Allocation concealment (selection bias)	Unclear risk	Allocation concealment is not described explicitly in the paper
Blinding (performance bias and detection bias) Participants	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Providers	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Outcome assessors	Unclear risk	This study did not assess this item.

Conrad 2000 (*Continued*)

Incomplete outcome data (attrition bias) All outcomes	Low risk	No missing data.
Selective reporting (reporting bias)	High risk	No protocol. Diet adherence is not clearly defined.
Other bias	High risk	Baseline comparisons between groups are not reported. Diet adherence is not clearly defined

Cummings 1981

Methods	Study design: randomized controlled trial with three intervention groups and one control group
Participants	Setting: outpatient Country: United States Chronic disease: renal failure (management) Type of participants: clients (n = 116) Mean age: intervention and control groups (54.8) Sex: intervention and control (F: 46%, M: 54%) Ethnicity: intervention and control groups (50% White)
Interventions	Group 1: single intervention: incentivisation (contract with reward); 6 weeks; (n = 29) A behavioural contract was formulated and consisted of: identifying a behaviour or set of behaviours to be targeted for change in the contract; negotiating with the client a timetable for the accomplishment of the specified behaviours, how should the degree of accomplishment be evaluated, what rewards would be received for appropriate behaviours, when the client would be rewarded; writing out a formal agreement which was subsequently signed by both the nurse and the client; maintaining a record of each client's progress. Group 2: multiple intervention: Incentivisation (contract with reward) and persuasion (involvement of a family member or friend) (n = 29) A behavioural contract was formulated and consisted of: identifying a behaviour or set of behaviours to be targeted for change in the contract; negotiating with the client a timetable for the accomplishment of the specified behaviours, how should the degree of accomplishment be evaluated, what rewards would be received for appropriate behaviours, when the client would be rewarded; writing out a formal agreement which was subsequently signed by both the nurse and the client; maintaining a record of each client's progress. Moreover, a third person selected by the patient participated in the contract agreement along with the patient and the nurse. Group 3:single intervention: education (telephone follow-up); 6 weeks; (n = 29) Weekly, clients were contacted by telephone. Telephone follow-up consisted of: gathering information from clients regarding problems they might be having in following their treatment instructions; providing information to clients about such things as the potential negative health consequences of not adhering to therapy, the benefits to be derived from following treatment instructions, and things the clients could do to achieve better compliance; providing verbal support to clients for maintaining proper adherence to

Cummings 1981 (*Continued*)

	treatment Group 4: control (no contract or telephone follow-up); 6 weeks, (n = 29)
Outcomes	Measurement of diet adherence: adherence to potassium-restricted diet and fluid-restricted diet assessed by serum potassium level and weight gain between dialysis treatments (baseline, 6 weeks, 3 months)
Notes	Dietary advice: potassium-restricted diet and fluid-restricted diet Drop-out rate: 25% (calculated) Providers: nurses

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Sequence generation using a computer random number generator
Allocation concealment (selection bias)	High risk	Allocation concealment using case record number.
Blinding (performance bias and detection bias) Participants	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Providers	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Outcome assessors	Unclear risk	This study did not assess this item.
Incomplete outcome data (attrition bias) All outcomes	High risk	Plausible effect size among missing outcomes enough to have a clinically-relevant impact on observed effect size
Selective reporting (reporting bias)	Unclear risk	No protocol.
Other bias	Low risk	Baseline imbalance between groups but the authors adjusted for initial group differences. Diet adherence is assessed by objective measures

French 2008

Methods	Study design: randomized controlled trial with two intervention groups and one usual care group
Participants	Setting: outpatient Country: United Kingdom Chronic disease: type II diabetes (management) Type of participants: clients (n = 453) Mean age: intervention and usual care groups (65.9 ± 10) Sex: intervention and usual care groups (F: 41.3%, M: 58.7%) Ethnicity: not known
Interventions	Group 1: Single intervention: training (feedback); 1 year; (n = 150) LESS INTENSIVE INTERVENTION: clients were asked to use a blood glucose meter to record three fasting, pre-meal or two hour post meal readings on two days during the week. Treatment targets of fasting and pre-meal levels were given Group 2: Single intervention: training (feedback); 1 year; (n = 151) MOST INTENSIVE INTERVENTION: clients were asked to use a blood glucose meter to record three fasting, pre-meal or two hour post meal readings on two days during the week. Treatment targets of fasting and pre-meal levels were given and clients were trained in interpretation of results. Clients were also asked to view persistently elevated levels as a prompt to set new goals for behaviour change. Group 3: usual care (no feedback); 1 year; (n = 152)
Outcomes	Measurement of diet adherence: adherence to the general diet and the specific diet items concerning fruit and vegetables as well as high-fat foods assessed by the *Summary of Diabetes Self-Care Activities* (baseline, 12 months)
Notes	Dietary advice: not known Drop-out rate: 25.2% Providers: nurses

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"(…) using a partial minimisation procedure to adjust the randomisation probabilities between groups to balance important covariates (…) using a computer programme"
Allocation concealment (selection bias)	Unclear risk	Allocation concealment is not described explicitly in the paper
Blinding (performance bias and detection bias) Participants	Unclear risk	This study did not assess this item.

French 2008 (*Continued*)

Blinding (performance bias and detection bias) Providers	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Outcome assessors	Low risk	Questionnaire responses were entered onto computer by staff unaware of intervention allocation
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Insufficient reporting of attrition to permit judgement.
Selective reporting (reporting bias)	Low risk	The study protocol is available and all of the study's pre-specified outcomes that are of interest in the review have been reported in the pre-specified way
Other bias	High risk	Baseline comparisons between groups are not reported. Diet adherence is assessed by self-reported measure (SDSCA). The Cronbach' s alpha for the Summary of Diabetes Self-Care Activities (SDSCA) (specific diet) was low 0.08

Gans 1994

Methods	Study design: randomized controlled trial with three intervention groups and one usual care group
Participants	Setting: workplace and community Country: United States Chronic disease: elevated blood cholesterol (prevention) Type of participants: clients (n = 173) Mean age: intervention group 1 (51.1 ± 13.5), intervention group 2 (50.1 ± 17.5), intervention group 3 (50.3 ± 14.6), usual care (53.9 ± 14.9) Sex: intervention group 1 (F: 45.2%, M: 54.8%), intervention group 2 (F: 46.7%, M: 53.3%), intervention group 3 (F: 44.1%, M: 55.9%) and usual care (F: 44.4%, M: 55.6%) Ethnicity: intervention group 1 (95.1% White, 26.8% Portuguese), intervention group 2 (94.9% White, 15.4% Portuguese), intervention group 3 (100% White, 26.1% Portuguese), usual care (95.6% White, 29.5% de Portuguese)
Interventions	Group 1: single intervention: persuasion (reminder); once; (completers: n = 42) Clients received a mailed personalized letter including their blood cholesterol level, a reminder to see their physician, a list of the specific lifestyle goals, the subject set at the community-based blood cholesterol *Screening, Counseling, Referral Events* (SCORE) , and a *Pawtucket Heart Health Program* magnet for refrigerator. Group 2: single intervention: persuasion (reminder); once; (completers: n = 39) Physician received a mailed packet including a letter stating that their patient had been

	referred on the basis of their blood cholesterol level and coronary heart disease risk factors. There was a listing of the lifestyle goals the subject set at the SCORE, *National Cholesterol Education Program* (NCEP) guidelines and a reminder postcard (preaddressed to the client) which the physician could mail to the client. Group 3: single intervention: persuasion (reminder); once; (completers: n = 47) Clients received a mailed personalized letter including their blood cholesterol level, a reminder to see their physician, a list of the specific lifestyle goals, the subject set at the SCORE, and a *Pawtucket Heart Health Program* magnet for refrigerator. The physician also received a mailed packet including a letter setting that their patient had been referred on the basis of their blood cholesterol level and coronary heart disease risk factors. There was a listing of the lifestyle goals the subject set at the SCORE, NCEP guidelines and a reminder postcard (preaddressed to the client) which the physician could mail to the client. Group 4: usual care (no reminder); once; (completers: n = 45)
Outcomes	Measurement of diet adherence: adherence to dietary advice assessed by a telephone questionnaire (baseline, 3 months)
Notes	Dietary advice: not known Drop-out rate: not known Providers: physicians

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	Sequence generation is not described explicitly in the paper
Allocation concealment (selection bias)	Unclear risk	Allocation concealment is not described explicitly in the paper
Blinding (performance bias and detection bias) Participants	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Providers	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Outcome assessors	Unclear risk	This study did not assess this item.
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Insufficient reporting of attrition to permit judgement.
Selective reporting (reporting bias)	Unclear risk	No protocol.

Gans 1994 (*Continued*)

Other bias	High risk	Baseline balance between groups. Diet adherence is assessed by self-reported measure. Validation and reliability of self-reported diet adherence are not reported. The time interval between SCORE and survey varied between subject and could influenced results

Gill 2010

Methods	Study design: randomized controlled trial with one intervention group and one control group
Participants	Setting: research center Country: United States Chronic disease: overweight and obesity (prevention/management) Type of participants: clients (n = 64) Mean age: intervention (19.1 ± 1.0), control (19.1 ± 1.0) Sex: intervention and control groups (F: 100%) Ethnicity: intervention (70% White, 10% African American, 10% Latina/Hispanic, 10% Other), control (66% White, 17% African American, 14% Latina/Hispanic, 3% Other)
Interventions	Group 1: single intervention: education (group sessions); 8 weeks; (n = 32) Participants attended a weekly education group sessions run by a dietitian and an exercise physiologist. Group 2: control (no education group sessions); 8 weeks; (n = 32)
Outcomes	Measurement of diet adherence: adherence to *Dietary Approaches to Stop Hypertension* (DASH) diet assessed by the *DASH Diet Index* (baseline, 8 weeks)
Notes	Dietary advice: DASH diet and hypocaloric diet Drop-out rate: not known Providers: dietitian and exercise physiologist

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Sequence generation using a computer random number generator
Allocation concealment (selection bias)	Unclear risk	Allocation concealment is not described explicitly in the paper
Blinding (performance bias and detection bias) Participants	Unclear risk	This study did not assess this item.

Blinding (performance bias and detection bias) Providers	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Outcome assessors	Unclear risk	This study did not assess this item.
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Insufficient reporting of attrition to permit judgement.
Selective reporting (reporting bias)	Unclear risk	No protocol.
Other bias	Unclear risk	Baseline balance between groups not reported. Diet adherence is assessed by self-reported measure. Validation and reliability of self-reported diet adherence are not reported

Grace 1996

Methods	Study design: randomized controlled trial with one intervention group and one control group
Participants	Setting: outpatient Country: United Kingdom Chronic disease: hyperlipidaemia (prevention) Type of participants: clients (n = 13) Mean age: not known Sex: intervention group (F: 25%, M: 75%) and control group (F: 40%, M: 60%) Ethnicity: intervention and control groups (100% Caucasian)
Interventions	Group 1: single intervention: modelling (nutritional tools); once; (n = 8) Clients received standard low-fat dietary advice with an additional package containing details on improving the practical implementation of a low-fat diet, such as low-fat cooking methods, low-fat recipe adaptation and eating out on a low-fat diet. Group 2: control (standard dietary advice with no information package); duration: not known; (n = 5)
Outcomes	Measurement of diet adherence: adherence to total daily energy intake and proportion of energy from fat assessed by a food-frequency questionnaire (baseline, 12 weeks)
Notes	Dietary advice: low-fat diet Drop-out rate: 0% (calculated) Providers: not known
Risk of bias	

Grace 1996 (*Continued*)

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Sequence generation is not described explicitly in the paper
Allocation concealment (selection bias)	Unclear risk	Allocation concealment is not described explicitly in the paper
Blinding (performance bias and detection bias) Participants	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Providers	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Outcome assessors	Unclear risk	This study did not assess this item.
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Insufficient reporting of attrition to permit judgement.
Selective reporting (reporting bias)	High risk	No protocol. Body mass index is reported incompletely. Diet adherence is not clearly defined
Other bias	High risk	Baseline imbalance between groups (% fat) . Diet adherence is not clearly defined

Gucciardi 2007

Methods	Study design: randomized controlled trial with one intervention and one control group
Participants	Setting: outpatient Country: Canada Chronic disease: type II diabetes (management) Type of participants: clients (n = 87) Mean age: intervention (60.4 ± 7.9), control (59.0 ± 12.1) Sex: intervention (F: 68%, M: 32%) and control (F: 69.4%, M: 30.6%) Ethnicity: intervention and control groups (100% Portuguese)
Interventions	Group 1: multiple intervention: group sessions + barrier identification/problem solving + nutritional tools; 3 months; (n = 41) The education intervention lasted 15 hrs over three consecutive weekdays in which didactic methods, mutual goal setting, situational problem solving, cognitive reframing and role-playing methods were used. Some nutritional tools were provided such as food models, kitchen demonstration, real food samples and food product labels.

	Group 2: control; 3 months; (n = 46) Clients met the dietitian individually.
Outcomes	Measurement of diet adherence: adherence to dietary advice assessed by the *Summary of diabetes Self-care activities Questionnaire* (baseline, 3 months)
Notes	Dietary advice: based on an assessment of clients' metabolic profile and on existing comorbidities such as renal nephropathy or gastrointestinal complications: 1) a limited and consistent intake of carbohydrates at each meal; 2) an adequate daily intake of fruit and vegetables; 3) a lower intake of saturated fat; 4) a reduced fat in cooking Drop-out rate: 29.9% (calculated) Providers: dietitian, nurse, pharmacist, physiotherapist

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"Participants were randomly assigned (generated random number list)…"
Allocation concealment (selection bias)	High risk	Allocation concealment using an open random allocation schedule (list of random numbers)
Blinding (performance bias and detection bias) Participants	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Providers	Low risk	"DEC (Diabetes Education Centre) providers were also blinded to patients' research participation status and were caring for all the participants regardless of the intervention assignment"
Blinding (performance bias and detection bias) Outcome assessors	Low risk	"The research assistants were blinded to participants' intervention status."
Incomplete outcome data (attrition bias) All outcomes	High risk	Plausible effect size among missing outcomes enough to have a clinically-relevant impact on observed effect size
Selective reporting (reporting bias)	Unclear risk	No protocol.
Other bias	Low risk	Baseline balance between groups. Diet adherence is assessed by self-reported measure (validated Summary of Diabetes Self-care Activities Questionnaire)

Hsueh 2007

Methods	Study design: randomized controlled trial with two intervention groups
Participants	Setting: research center Country: United States Chronic disease: irritable bowel syndrome (management) Type of participants: clients (n = 81) Mean age: intervention group 1 (45.8 ± 14.1), intervention group 2 (46.1 ± 14.5) Sex: intervention group 1 (F: 82.1%, M: 17.9%) and intervention group 2 (F: 88.1%, M: 11.9%) Ethnicity: intervention group 1 (87.2% White, 0% African American, 5.1% Asian/Indian, 7.7% Native American), intervention group 2 (83.3% White, 4.8% African American, 9.5% Asian/Indian, 0% Native American, 2.4% Unknown)
Interventions	Group 1: single intervention: education (individual sessions with a nurse); 9 weeks; (n = not known) The intervention included 9 hours of face-to-face sessions in which the nurse reviewed the previous homework assignment and discussed how to individualize dietary modifications. Group 2: multiple intervention: individual sessions with a nurse + telephone follow-up; 9 weeks; (n = not known) The intervention included two face-to-face sessions, six telephone sessions and one final face-to-face session in which the nurse reviewed the previous homework assignment and discussed how to individualize dietary modifications
Outcomes	Measurement of diet adherence: adherence to *American Dietetic Association* recommendations for fiber intake (more than 20 g/day) and *Food Guide Pyramid* for fruit intake (more than 2 servings/day) and vegetable intake (more than 3 servings /day) assessed by a food-frequency questionnaire (baseline, 3 months, 6 months)
Notes	Dietary advice: individualized based on the symptoms: 25 g of fiber/day in constipation-predominant and 20 g of fiber/day for diarrhoea-predominant Drop-out rate: not known Providers: research nurses A usual care group was included in this study. Since no active treatment was provided in the usual care group, this group was not described in the Cochrane review

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"(…) participants were randomly assigned using a customized computer program (…) "
Allocation concealment (selection bias)	Unclear risk	Allocation concealment is not described explicitly in the paper
Blinding (performance bias and detection bias) Participants	Unclear risk	This study did not assess this item.

Hsueh 2007 (*Continued*)

Blinding (performance bias and detection bias) Providers	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Outcome assessors	Unclear risk	This study did not assess this item.
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Insufficient reporting of attrition to permit judgement.
Selective reporting (reporting bias)	Unclear risk	No protocol.
Other bias	High risk	Baseline imbalance between groups (fiber, vegetables and fruit). Diet adherence is assessed by self-reported measure (validated food frequency questionnaire)

Hyman 2007

Methods	Study design: randomized controlled trial with two intervention groups and one usual care group
Participants	Setting: outpatient Country: United States Chronic disease: hypertension (management) Type of participants: clients (n = 281) Mean age: intervention group 1 (53.9 ± 5.7), intervention group 2 (53.4 ± 5.7), usual care (52.7 ± 6.5) Sex: intervention group 1 (F: 65.2%, M: 34.8%), intervention group 2 (F: 63.5%, M: 36.5%), usual care (F: 73.1%, M: 26.9%) Ethnicity: intervention and usual care groups (100% African American)
Interventions	Group 1: multiple intervention: telephone follow-up + motivational interviewing; 18 months; (n = 92) SIMULTANEOUS BEHAVIOUR CHANGE: a brief in-clinic session with a health educator was provided to clients every six months to review the benefits of the recommended three behavioural changes (stop smoking, reduce dietary sodium level and increase physical activity), the home-based, self-help (printed manual, motivational videotape), instructional materials developed to facilitate behaviour change and the schedule of telephone counselling session. All three behaviours were reviewed at each clinic session. There were seven telephone follow-ups between each in-clinic session. Group 2: multiple intervention: telephone follow-up + motivational interviewing; 18 months; (n = 96) SEQUENTIAL BEHAVIOUR CHANGE: a brief in-clinic session with a health educator was provided to clients every six months to review the benefits of the recommended behavioural change (stop smoking, reduce dietary sodium level and increase physical activity), the home-based, self-help (printed manual, motivational videotape), instruc-

	tional materials developed to facilitate behaviour change and the schedule of telephone counselling session. The protocol addressed a new behaviour every 6 months. There were seven motivational interviewing telephone follow-ups between each in-clinic session. Group 3: usual care (no telephone follow-up); once; (n = 93) A brief review of educational materials was provided regarding the three targets behaviours (stop smoking, reduce dietary sodium level and increase physical activity)
Outcomes	Measurement of diet adherence: adherence to sodium-restricted diet assessed by 24-hr urine sodium level <100mEq/l/day) (baseline, 6 months, 18 months)
Notes	Dietary advice: sodium-restricted diet (less than 100 mEq/l/day (urinary)) Drop-out rate: 20.4% Provider: health educator

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	Sequence generation is not described explicitly in the paper
Allocation concealment (selection bias)	Unclear risk	Allocation concealment is not described explicitly in the paper
Blinding (performance bias and detection bias) Participants	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Providers	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Outcome assessors	Unclear risk	This study did not assess this item.
Incomplete outcome data (attrition bias) All outcomes	High risk	The proportion of missing outcomes compared with observed event risk enough to have a clinically-relevant impact on the intervention effect estimate
Selective reporting (reporting bias)	High risk	No protocol. Blood glucose is reported incompletely.
Other bias	High risk	Baseline imbalance between groups (diastolic blood pressure). Diet adherence is assessed by objective measure. The order in which the behaviors were introduced to each participant in the sequential group was

		randomized to avoid confounding of outcomes with patient preferences

Jiang 2004

Methods	Study design: randomized controlled trial with one intervention group and one usual care group
Participants	Setting: outpatient Country: China Chronic disease: angina pectoris or myocardial infarction (management) Type of participants: clients (n = 167) Mean age: intervention (62.1 ± 7.4), usual care (61.4 ± 7.6) Sex: intervention (F: 31.3%, M: 68.7%) and usual care (F: 26.2%, M: 73.8%) Ethnicity: intervention and usual care groups (100% Chinese)
Interventions	Group 1: multiple intervention: telephone follow-up + individual session with nurse + goal setting; 12 weeks; (n = 83) After discharge from the hospital, clients received a weekly home visit during the first three weeks and alternating home visit and telephone follow-up every other week from week 4 to 12. The cardiac rehabilitation program consisted of: setting of the goals for walking performance, smoking cessation, *Adult Treatment Panel step II* (ATP step II) diet adherence and medication adherence; setting of the goals for cardiac physiological risk control; clients conducted a goal-directed self-managed rehabilitative care in medication management, angina management, physical exercise, dietary management and smoking cessation according to the recommended guidelines on a daily basis; keeping a log record for tracking progress as well as for self-evaluation and self-reinforcement. Group 2: usual care (no cardiac rehabilitation program); duration: not known; (n = 84)
Outcomes	Measurement of diet adherence: adherence to ATP step II diet assessed by a 3-day food record (baseline, 3 months, 6 months)
Notes	Dietary advice: ATP step II diet (< 8% of total energy from saturated fat and < 250 mg/d of cholesterol) Drop-out rate: 15.6% (calculated) Provider: cardiac nurse

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"(…) randomised assignment of subjects into an intervention group and a control group according to a computer-generalized random table"
Allocation concealment (selection bias)	Low risk	Allocation concealment using central allocation.

Jiang 2004 (*Continued*)

Blinding (performance bias and detection bias) Participants	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Providers	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Outcome assessors	Low risk	"They (research assistants) were blinded to patient group assignment"
Incomplete outcome data (attrition bias) All outcomes	High risk	The proportion of missing outcomes compared with observed event risk enough to have a clinically-relevant impact on the intervention effect estimate
Selective reporting (reporting bias)	High risk	No protocol. Smoking cessation is reported incompletely.
Other bias	Unclear risk	Baseline balance between groups. Diet adherence is assessed by self-reported measure. Validation and reliability of self-reported diet adherence are not reported

Jones 1986

Methods	Study design: randomized controlled trial with four intervention groups
Participants	Setting: outpatient Country: United Kingdom Chronic disease: overweight (prevention) Type of patients: clients (n = 80) Mean age: intervention groups: 50.3 ± 13.5 Sex: intervention groups (F: 100%) Ethnicity: not known
Interventions	Group 1: single intervention: education (group sessions); 16 weeks; (n = 19) Clients met the dietitian every four weeks in small groups of five to seven clients. Group 2: multiple intervention: individual sessions with a dietitian + teach to use prompts/cues; 16 weeks; (n = 20) Clients saw the dietitian every four weeks individually. Clients were provided with one set of leaflets on each of their first four visits. These provided specific detailed advice on how to reduce their exposure to food cues by making a variety of changes in their habits, and were based on the cue avoidance programme and the food management programme. Group 3: multiple intervention: group sessions + teach to use prompts/cues; 16 weeks, (n = 21) Clients met the dietitian every four weeks in small groups of five to seven clients. Clients

	were provided with one set of leaflets on each of their first four visits. These provided specific detailed advice on how to reduce their exposure to food cues by making a variety of changes in their habits, and were based on the cue avoidance programme and the food management programme. Group 4: single intervention: education (individual sessions with a dietitian); 16 weeks; (n = 20) Clients met the dietitian individually every four weeks.
Outcomes	Measurement of diet adherence: adherence to the diet allowance assessed by a diary (16 weeks)
Notes	Dietary advice: energy levels 1000 kCal below expected energy requirements, with a minimum of 1000 kCal/day Drop-out rate: not known Providers: dietitians Four additional groups were included in this study. Since the clients in these groups did not complete a diary to assess adherence to dietary advice, these four groups were not described in the Cochrane review

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	Sequence generation is not described explicitly in the paper
Allocation concealment (selection bias)	Unclear risk	Allocation concealment is not described explicitly in the paper
Blinding (performance bias and detection bias) Participants	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Providers	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Outcome assessors	Unclear risk	This study did not assess this item.
Incomplete outcome data (attrition bias) All outcomes	High risk	Plausible effect size among missing outcomes enough to have a clinically-relevant impact on observed effect size
Selective reporting (reporting bias)	Unclear risk	No protocol.

Jones 1986 (*Continued*)

Other bias	Unclear risk	Baseline comparisons between groups are not reported. Diet adherence is assessed by self-reported measure. Validation and reliability of self-reported diet adherence are not reported

Kendall 1987

Methods	Study design: randomized controlled trial with two intervention groups
Participants	Setting: outpatient Country: United States Chronic disease: non-insulin-dependent diabetes (management) Type of participants: clients (n = 83) Mean age: intervention group 1 (56.2 ± 16.0), intervention group 2 (60.2 ± 13.8) Sex: intervention group 1 (F: 66.7%, M: 33.3%) and intervention group 2 (F: 70.7%, M: 29.3%) Ethnicity: not known
Interventions	Group 1: single intervention: education (educational tools - booklet); 3 weeks; (completers: n = 42) Clients assisted to three workshops at one week intervals during which a *Colorado State University Diet Guide for Planning Prudent Diet*, worksheets for planning and evaluating menus, leader's guide, and three slide-cassette tape programs on diabetes, using the diet guide and expanding the diet guide were provided. Group 2: single intervention: modelling (nutritional tools); 3 weeks; (completers: n = 41) Clients assisted to three workshops at one week intervals during which the exchange lists for meal planning was provided and used as the menu planning and evaluation tool. A slide-cassette tape program was also used to help teach the exchange lists
Outcomes	Measurement of diet adherence: adherence to *Recommended Dietary Allowances of the Food and Nutrition Board* (energy, protein, vitamins (A, C, thiamine, riboflavin, niacin), and minerals (calcium, phosphorus, iron and zinc)) assessed by a three-day food record (baseline, 3 months, 6 months)
Notes	Dietary advice: prudent diet Drop-out rate: not known Providers: dietitian and senior author

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Sequence generation referring to a random number table.

Kendall 1987 (*Continued*)

Allocation concealment (selection bias)	High risk	Allocation concealment using an open random allocation schedule
Blinding (performance bias and detection bias) Participants	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Providers	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Outcome assessors	Low risk	"Food records were reviewed and blind coded for computer processing and analysis so that data analyzers were not aware of treatment group"
Incomplete outcome data (attrition bias) All outcomes	High risk	Plausible effect size among missing outcomes enough to have a clinically-relevant impact on observed effect size
Selective reporting (reporting bias)	High risk	No protocol. Diet adherence is not clearly defined.
Other bias	Unclear risk	Baseline balance between groups. Diet adherence is assessed by self-reported measure. Validation and reliability of self-reported diet adherence are not reported

Laitinen 1993

Methods	Study design: randomized controlled trial with one intervention group and one usual care group
Participants	Setting: outpatient Country: Finland Chronic disease: non-insulin-dependent diabetes (management) Type of participants: clients (n = 86) Mean age: intervention (F: 53.7 ± 6.3, M: 50.7 ± 7.7), usual care (F: 54.4 ± 6.4, M: 54.0 ± 6.6) Sex: intervention (F: 47.5%, M: 52.5%) and usual care (F: 39.1%, M: 60.9%) Ethnicity: intervention and usual care groups (100% white)
Interventions	Group 1: multiple intervention: individual session with a dietitian + nutritional tools + goal setting; 12 months; (n = 40) During each bimonthly visits, the clinical dietitians and the client set one or two clear short-term goals for dietary change and a goal for weight loss. A food preparation practice was also provided. Group 2: usual care; duration: not known; (n = 46)

Outcomes	Measurement of diet adherence: adherence to total fat, saturated fat, unsaturated fat, carbohydrates, fiber and cholesterol intake assessed by a three-day food record (baseline, 3 months, 15 months)
Notes	Dietary advice: restricted energy, fat (especially saturated fatty acid) and dietary cholesterol intakes, increased unsaturated fatty acid and unrefined carbohydrate intakes and avoided large amounts of simple carbohydrates Drop-out rate: 0% (calculated) Providers: intervention: physician, nurse and clinical dietitian; usual care: physician and nurse

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Sequence generation referring to a random number table.
Allocation concealment (selection bias)	Low risk	Allocation concealment using sequentially numbered, opaque, sealed envelopes
Blinding (performance bias and detection bias) Participants	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Providers	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Outcome assessors	Unclear risk	This study did not assess this item.
Incomplete outcome data (attrition bias) All outcomes	High risk	The proportion of missing outcomes compared with observed risk enough to induce clinically-relevant bias in intervention effect estimate
Selective reporting (reporting bias)	High risk	No protocol. Diet adherence is reported incompletely.
Other bias	Unclear risk	Baseline comparisons between groups are not reported. Diet adherence is assessed by self-reported measure. Validation and reliability of self-reported diet adherence are not reported

Logan 2010

Methods	Study design: randomized controlled trial with two intervention groups
Participants	Setting: outpatient Country: United Kingdom Chronic disease: coronary heart disease (management) Type of participants: clients (n = 40) Mean age: intervention group 1 (57.7 ± 7.8), intervention group 2 (58.0 ± 9.2) Sex: intervention group 1 (F: 19%, M: 81%) and intervention group 2 (F: 15.8%, M: 84.2%) Ethnicity: not known
Interventions	Group 1: single intervention: modelling (nutritional tools); 4 months; (n = 21) Clients received detailed information regarding the implementation of the Mediterranean diet and were provided with a diet sheet, which contained detailed advice and information on the Mediterranean diet, the potential health benefits of the diet, recipe ideas and a sample meal plan. Then, they received a home visit from the dietitian at week one and at months one, two and four. Group 2: single intervention: enablement (behavior change techniques: barrier identification/problem solving, goal setting); 4 months; (n = 19) Interventions were tailored to the individual, with personal specific advice and setting of short-and long-term goals based on their stage of change measure, which reflected their readiness to adopt a Mediterranean diet. Clients were provided a diet sheet and also a *Help to change* booklet, which contained a list of the common difficulties found when making dietary change, as well as suggestions for overcoming these. They received a home visit from the dietitian at week one and at months one, two and four
Outcomes	Measurement of diet adherence: adherence to Mediterranean diet assessed by a validated questionnaire (baseline, 6 months, 12 months)
Notes	Dietary advice: seven to ten portions of fruit and vegetables/day, more whole grain cereals, more fish (four portions/week), less meat (approximately once/week), and butter and cream were replaced with an olive-oil based spread. The oils recommended for salads and food preparation were olive and rapeseed oils. Moderate alcohol consumption, in the form of wine, was allowed at meals. Patients were also advised to include unsalted nuts as snacks Drop-out rate: 15.5% Provider: dietitian A usual care group was included in this study. Since the Mediterranean diet was not provided in the usual care group, this group was not described in the Cochrane review

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"Willing participants (n = 61) were randomised (using a block randomisation approach with computer generated random numbers) …"

Logan 2010 (*Continued*)

Allocation concealment (selection bias)	High risk	Allocation concealment using an open random allocation schedule (list of random numbers)
Blinding (performance bias and detection bias) Participants	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Providers	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Outcome assessors	Unclear risk	This study did not assess this item.
Incomplete outcome data (attrition bias) All outcomes	High risk	Plausible effect size among missing outcomes enough to have a clinically-relevant impact on observed effect size
Selective reporting (reporting bias)	Unclear risk	No protocol.
Other bias	Low risk	Baseline balance between groups. Diet adherence is assessed by self-reported measure (validated questionnaire)

Mahler 1999

Methods	Study design: randomized controlled trial with two intervention groups and one control group
Participants	Setting: outpatient Country: United States Chronic disease: coronary artery disease (management) Type of participants: clients (n = 215) Mean age: intervention group 1 (59.7 ± 8.5), intervention group 2: (63.1 ± 7.7), control (61.1 ± 8.7) Sex: intervention group 1 (F: 14%, M: 86%), intervention group 2 (F: 11%, M: 89%) and control (F: 16%, M: 84%) Ethnicity: intervention group 1 (81.5% White, 1.5% Asian, 13.8% Hispanic, 1.5% African American, 1.5% Other), intervention group 2 (82.7% White, 4% Asian, 10.7% Hispanic, 2.7% African American), control (85.3% White, 4% Asian, 10.7% Hispanic)
Interventions	Group 1: single intervention: education (educational tools - video); once; (n = 65) Mastery tape was made to depict these clients as calm and confident at the time of release, as making steady progress with no mention of complications during the six months after surgery, and as adjusting to the recommended exercise and low-fat diet with relative ease. Group 2: multiple intervention: educational tools- video + relapse prevention/coping

	planning; once; (n = 75) Coping tape was edited so that the same clients mention concerns they are experiencing about hospital release and cope with effort but successfully with a variety of difficulties (e.g. heart rhythm disturbances, fatigue, diet changes) Group 3:control (no video); once; (n = 75)
Outcomes	Measurement of diet adherence: adherence to cholesterol and saturated fat-restricted diet assessed by the *cholesterol-saturated fat subscale of the Diet Habit Survey* (1 month - 3 months)
Notes	Dietary advice: low-cholesterol and low-fat diet Drop-out rate: 9% Provider: cardiothoracic nurse specialist

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Sequence generation referring to a random number table.
Allocation concealment (selection bias)	Low risk	Allocation concealment using sequentially numbered, opaque, sealed envelopes
Blinding (performance bias and detection bias) Participants	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Providers	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Outcome assessors	Unclear risk	This study did not assess this item.
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Insufficient reporting of attrition to permit judgement.
Selective reporting (reporting bias)	Unclear risk	No protocol.
Other bias	Unclear risk	Baseline comparisons between groups are not reported. Diet adherence is assessed by self-reported measure (validated Diet Habit Survey)

McCulloch 1983

Methods	Study design: randomized controlled trial with two intervention groups and one usual care group
Participants	Setting: outpatient Country: United Kingdom Chronic disease: insulin dependent diabetes (management) Type of participants: clients (n = 40) Mean age: intervention group 1 (31.6 ± 8.3), intervention group 2 (36.5 ± 15.3), usual care (35.6 ± 10.4) Sex: intervention group 1 (F: 38.5%, M: 61.5%), intervention group 2 (F: 46.2%, M: 53.8%) and usual care (F: 42.9%, M: 57.1%) Ethnicity: not known
Interventions	Group 1: single intervention: modelling (nutritional tools); 6 months; (n = 13) Clients had individual assessment, dietary pamphlet containing 10 g carbohydrate exchange lists and were asked to come three times to the hospital canteen in groups of four or five where they had lunch with both dietitian and doctor. Participants were asked to help themselves to a variety of hot and cold dishes and to make up their carbohydrate allowance to what had been prescribed for them previously. After lunch they were shown a display of other items of food so that they could see and feel exactly how much of each item did in fact contain 10 g carbohydrate. Group 2: single intervention: education (education tools - video); 6 months; (n = 13) Clients had individual assessment and a dietary pamphlet containing 10 g carbohydrate exchange lists and viewed a 24 minutes videotape. This was viewed on three separate occasions while sitting in an armchair in a quiet room, and without dietitian or doctor being present. The videotape began with an explanation of the importance of eating a balanced diet and maintaining a consistent carbohydrate profile. It then took the viewer through a day in the life of two insulin treated patients with very different dietary requirements and lifestyles. It ended by suggesting that the viewer should try to work out his or her own carbohydrate profile with the dietitian's help. Group 3: usual care: no lunchtime nor video; 6 months; (n = 14) Clients were assessed by a dietitian and received individual instructions about what carbohydrate distribution would be appropriate for them. In addition to a pamphlet containing 10 g exchange lists they were given simple menus to emphasize the carbohydrate profile they should stick to from day to day. Clients were seen for dietary instruction three times
Outcomes	Measurement of diet adherence: adherence to day to day consistency in carbohydrate intake assessed by a seven-day food record (baseline, 6 months)
Notes	Dietary advice: an appropriate total daily intake of carbohydrate was determined jointly by the client and dietitian. This was then broken down into 10 g carbohydrate exchanges. Clients were asked to keep to an agreed distribution of carbohydrate exchanges in the form of three main meals and three snacks Drop-out rate: not known Providers: dietitian and doctor
Risk of bias	

McCulloch 1983 (*Continued*)

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Sequence generation is not described explicitly in the paper
Allocation concealment (selection bias)	Unclear risk	Allocation concealment is not described explicitly in the paper
Blinding (performance bias and detection bias) Participants	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Providers	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Outcome assessors	Unclear risk	This study did not assess this item.
Incomplete outcome data (attrition bias) All outcomes	Low risk	Missing outcome data balanced in numbers across intervention groups, with similar reasons for missing data across groups
Selective reporting (reporting bias)	Unclear risk	No protocol.
Other bias	Unclear risk	Baseline balance between groups. Diet adherence is assessed by self-reported measure. Validation and reliability of self-reported diet adherence are not reported

Meland 1994

Methods	Study design: randomized controlled trial with one intervention group and one control group
Participants	Setting: outpatient Country: Norway Chronic disease: hypertension (management) Type of participants: clients (n = 34) Mean age: intervention (53), control (52) Sex: intervention (F: 37%, M: 63%) and control (F: 47%, M: 53%) Ethnicity: intervention and control groups: 100% Caucasian
Interventions	Group 1: single intervention: training (feedback); 12 weeks; (n = 15) Clients measured their fasting morning chloride concentration on six different occasions during the trial. A recommendation of 30 to 50% reduction of urine chloride concentration compared with the initial value at the inclusion visit was set.

	Group 2: control (no self-monitoring); 1 month: (n = 19)
Outcomes	Measurement of diet adherence: adherence to sodium-restricted diet assessed by urine sodium excretion (baseline, 1 month, 3 months)
Notes	Dietary advice: fresh fish and meat should be preferred for dinner (canned, salted or smoked food is only rarely allowed), fruit and vegetables should be used plentifully, boil potatoes without salt, salt should not be used during food processing, spices and herbs should be used plentifully, lemon juice adds flavour to your food, roasting your food in the oven or microwave conserves its natural flavours, when frying, use oil instead of butter, ask for salt-reduced soups or sauces, for baking bread, use 1 teaspoon salt/litre of liquid Drop-out rate: 0% Provider: general practitioner

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Sequence generation referring to a random number table.
Allocation concealment (selection bias)	Low risk	Allocation concealment using sequentially numbered, opaque, sealed envelopes
Blinding (performance bias and detection bias) Participants	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Providers	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Outcome assessors	Unclear risk	This study did not assess this item.
Incomplete outcome data (attrition bias) All outcomes	Low risk	No missing data.
Selective reporting (reporting bias)	High risk	No protocol. Some outcomes of interest are reported incompletely (weight and HDL-cholesterol)
Other bias	Unclear risk	Baseline comparisons between groups are not reported. Diet adherence is assessed by objective measure

Micco 2007

Methods	Study design: randomized controlled trial with one intervention group and one control group
Participants	Setting: research center Country: United States Chronic disease: overweight and obesity (prevention and management) Type of participants: clients (n = 123) Mean age: intervention (47.1 ± 11.1),control (46.5 ± 10.7) Sex: intervention (F: 89%, M: 12%) and control (F: 77%, M: 23%) Ethnicity: intervention(100% White, 0% Black), control (98% White, 2% Black)
Interventions	Group 1: single intervention: education (individual session with a dietitian); 12 months; (n = 61) Monthly, clients attended an in-person meeting in place of an online chat. Group 2: control (online chat without in-person meeting); 12 months; (n = 62)
Outcomes	Measurement of diet adherence: adherence to energy intake assessed by the *Block 98.2 food frequency questionnaire* (baseline, 6 months, 12 months)
Notes	Dietary advice: 1200 to 2100 calorie diet based on baseline body weight, eating a diet abundant in fruit, vegetables and whole grains and moderate in fat, sugar, salt, and alcohol Drop-out rate: 21% Providers: dietitian and master's level graduate student

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Sequence generation is not described explicitly in the paper
Allocation concealment (selection bias)	Unclear risk	Allocation concealment is not described explicitly in the paper
Blinding (performance bias and detection bias) Participants	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Providers	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Outcome assessors	Unclear risk	This study did not assess this item.
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Insufficient reporting of attrition to permit judgement.

Micco 2007 (*Continued*)

Selective reporting (reporting bias)	High risk	No protocol. Weekly goals met (calories) is reported incompletely
Other bias	Unclear risk	Baseline imbalance between groups (body weight) but repeated measures analysis of covariance was performed to control for baseline weight differences. Diet adherence is assessed by self-reported measure. Validation and reliability of self-reported diet adherence are not reported

Miller 1988

Methods	Study design: randomized controlled trial with one intervention group and one control group
Participants	Setting: outpatient Country: United States Chronic disease: myocardial infarction (management) Type of participants: clients (n = 115) Mean age: intervention and control groups: 54 Sex: intervention (F: 27%, M: 73%) and control (F: 11%, M: 89%) Ethnicity: intervention (98% White, 2% Black), control (87% White, 13% Black)
Interventions	Group 1: multiple intervention: individual session with nurse + barrier identification/ problem solving, goal setting; 60 days; (n = 58) Clients completed a cardiac rehabilitation program during hospitalization and were visited at home 30 days after discharge. The intervention included a discussion of assessment data, identification of problems and establishment of goals. Group 2: control (no nurse intervention); duration: not known; (n = 57)
Outcomes	Measurement of diet adherence: adherence to diet assessed by the *Health Behavior scale* (Baseline, 30 days, 60 days, 1 year, 2 years)
Notes	Dietary advice: not known Drop-out rate: 55.7% (calculated) Providers: cardiovascular nurses

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	Sequence generation is not described explicitly in the paper
Allocation concealment (selection bias)	High risk	"During hospitalization, 115 subjects were alternately assigned to an experimental (n

Miller 1988 (*Continued*)

		= 58) or control group (n = 57)."
Blinding (performance bias and detection bias) Participants	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Providers	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Outcome assessors	Unclear risk	This study did not assess this item.
Incomplete outcome data (attrition bias) All outcomes	High risk	Plausible effect size among missing outcomes enough to have a clinically-relevant impact on observed effect size
Selective reporting (reporting bias)	High risk	No protocol. Some outcomes of interest in the review are reported incompletely (weight, blood pressure)
Other bias	Low risk	Baseline balance between groups. Diet adherence is assessed by self-reported measure (validated Health Behavior scale)

Morey 2008

Methods	Study design: randomized controlled trial with one intervention group and one control group
Participants	Setting: outpatient Country: United Kingdom Chronic disease: end-stage kidney failure (management) Type of participants: clients (n = 67) Mean age: intervention (60.4 ± 15.6), control (54.9 ± 15.9) Sex: intervention (F: 26.5%, M: 73.5%) and control (F: 48.5%, M: 51.5%) Ethnicity: intervention (52.9% White, 20.6% Indo-Asian, 14.7% Black, 11.8% Other) , control (48.5% White, 15.2% Asian, 30.3% Black, 6.1% Other)
Interventions	Group 1: multiple intervention: individual session with dietitian + educational tools-booklet + reminder + motivational interviewing; 6 months; (n = 34) Clients received a monthly dietetic consultation. A variety of strategies were employed to encourage dietary modification including motivational counseling, negotiation, behaviour modification therapy, reminders, reinforcement, supportive care and written and verbal education. Group 2: control (no dietetic consultation); once; (n = 33)

Morey 2008 (*Continued*)

Outcomes	Measurement of diet adherence: adherence to phosphate-restricted diet assessed by serum phosphate concentrations (baseline, 3 months, 6 months, 12 months)	
Notes	Dietary advice: phosphate-restricted diet Drop-out rate: 1.5% (calculated) Provider: dietitian	
Risk of bias		
Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"Random number generation".
Allocation concealment (selection bias)	Unclear risk	Allocation concealment is not described explicitly in the paper
Blinding (performance bias and detection bias) Participants	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Providers	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Outcome assessors	Unclear risk	This study did not assess this item.
Incomplete outcome data (attrition bias) All outcomes	Low risk	Missing outcomes are balanced between groups and the proportion of missing outcomes compared with observed event risk not enough to have a clinically-relevant impact on the intervention effect estimate
Selective reporting (reporting bias)	High risk	No protocol. Achieving target phosphate (at 6 months) is reported incompletely
Other bias	Low risk	Baseline balance between groups . Diet adherence is assessed by objective measure

Racelis 1998

Methods	Study design: randomized controlled trial with one intervention group and one control group
Participants	Setting: outpatient Country: United States Chronic disease: peripheral artery disease (management) Type of participants: clients (n = 21) Mean age: intervention (53), control (49) Sex: intervention (F: 27.3%, M: 72.7%) and control (F: 20%, M: 80%) Ethnicity: not known
Interventions	Group 1: single intervention: education (telephone follow-up); 12 months; (n = 11) Clients received quarterly a telephone call to reinforce smoking cessation and diet information Group 2: control (no telephone follow-up); once; (n = 10)
Outcomes	Measurement of diet adherence: adherence assessment not known
Notes	Dietary advice: not known Drop-out rate: 0% (calculated) Providers: advanced practice nurses and physicians

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	Sequence generation is not described explicitly in the paper
Allocation concealment (selection bias)	Unclear risk	Allocation concealment is not described explicitly in the paper
Blinding (performance bias and detection bias) Participants	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Providers	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Outcome assessors	Unclear risk	This study did not assess this item.
Incomplete outcome data (attrition bias) All outcomes	Low risk	Only one missing data. The reason for this missing data not likely related to true outcome

Racelis 1998 (*Continued*)

Selective reporting (reporting bias)	High risk	No protocol. Diet adherence is reported incompletely.
Other bias	Unclear risk	Baseline comparisons between groups are not reported. Diet adherence is not clearly defined

Ryan 2002

Methods	Study design: randomized controlled trial with two intervention groups and one control group
Participants	Setting: outpatient Country: Canada Chronic disease: type II diabetes (management) Type of participants: clients (n = 75) Mean age: intervention group 1 (56.6 ± 8.0), intervention group 2 (57.5 ± 10.7), control (54.7 ± 14.1) Sex: intervention group 1 (F: 50%, M: 50%), intervention group 2 (F: 45.8%, M: 54.2%) and control (F: 63.4%, M: 36.6%) Ethnicity: not known
Interventions	Group 1: single intervention: persuasion (reminder); 6 months; (n = 18) Knowledge and self-care practice, which serve as a reminder, were assessed at 2 weeks, 3 months and 6 months. Group 2: single intervention: persuasion (reminder); 6 months; (n = 24) Knowledge and self-care practice, which serve as a reminder, were assessed at 3 months and 6 months. Group 3: control (no reminder); 6 months; (n = 33)
Outcomes	Measurement of diet adherence: adherence to frequency of meals and snacks assessed by a simple question of frequency of meals and snacks (Baseline, 4 days, 2 weeks, 3 months, 6 months)
Notes	Dietary advice: eating 3 meals and 3 snacks/day Drop-out rate: 0% Providers: nurses, dietitians, physicians, exercise physiologist, podiatrist, ophthalmologist A second control group was included in this study. Since this control group was not randomized, this group was not described in the Cochrane review

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Sequence generated by shuffling cards or envelopes.

Ryan 2002 (*Continued*)

Allocation concealment (selection bias)	Unclear risk	Allocation concealment is not described explicitly in the paper
Blinding (performance bias and detection bias) Participants	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Providers	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Outcome assessors	Unclear risk	This study did not assess this item.
Incomplete outcome data (attrition bias) All outcomes	Low risk	No missing data.
Selective reporting (reporting bias)	High risk	No protocol. Some outcomes of interest in the review are reported incompletely (diet adherence, exercise, glucose monitoring and weight)
Other bias	High risk	Baseline imbalance between groups (percentage of males, body mass index). Diet adherence is assessed by self-reported measure. Validation and reliability of self-reported diet adherence are not reported. Some patients attending the program gave kind donation

Scisney-Matlock 2006

Methods	Study design: randomized controlled trial with one intervention group and one control group
Participants	Setting: outpatient Country: United States Chronic disease: hypertension (management) Type of participants: clients (n = 27) Mean age: not described Sex: intervention and control groups (F: 100%) Ethnicity: intervention (7 Caucasian, 6 Minority), control (7 Caucasian, 7 Minority)
Interventions	Group 1: single intervention: modelling (nutritional tools); 30 days; (n = 13) Clients were exposed to a Cognitive Representations of the *Dietary Approaches to Stop Hypertension* (DASH) diet program consisting in three separate paper wheels (knowledge dimension, attitude dimension and skill dimension) and a bar chart displaying

	their baseline Cognitive Representations of the DASH diet. All three wheels contained the same set of 18 goals. For each goal, each wheel contained one message framed to support that goal in the information dimension of that wheel. Clients were instructed to do the following every morning for a 30-day period: review an unhealthy Cognitive Representations of the DASH diet from her bar chart, use the wheels to view the three messages for that goal, and record in the notebook the feelings and thoughts she has about the goal she selected. Group 2: control (no wheel nor bar chart); 30 days; (n = 14)
Outcomes	Measurement of diet adherence: adherence to DASH diet assessed by the *Health Promotion Lifestyle Profile survey* (baseline, 30 days, 60 days, 90 days)
Notes	Dietary advice: DASH diet Drop-out rate: not known Providers: not known Two control groups were included in this study. Since patients in these control groups did not follow the DASH diet, these control groups were not described in the Cochrane review

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"Then, researchers used a computer program to randomise participants"
Allocation concealment (selection bias)	Unclear risk	"Group assignment was determined in numerical sequence from 48 numbered envelopes matching the stratified sampling criteria representative of a Salomon Four-Group Design."
Blinding (performance bias and detection bias) Participants	Low risk	"(…) study participants were unaware of their group assignments"
Blinding (performance bias and detection bias) Providers	High risk	"Because researchers provided one of the experimental groups, but not either control group, (...) the study was not blinded to the researchers"
Blinding (performance bias and detection bias) Outcome assessors	Unclear risk	This study did not assess this item.
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Insufficient reporting of attrition to permit judgement
Selective reporting (reporting bias)	Unclear risk	No protocol.

Scisney-Matlock 2006 (*Continued*)

Other bias	Low risk	Baseline balance between groups. Diet adherence is assessed by self-reported measure (Health Promotion Lifestyle Profile survey) . Internal consistency of Health Promotion Lifestyle Profile survey described

Stewart 2005

Methods	Study design: randomized controlled trial with one intervention group and one control group
Participants	Setting: outpatient Country: South Africa Chronic disease: hypertension (management) Type of participants: clients (n = 83) Mean age: intervention (56.3 ± 11.5), control (58.6 ± 11.2) Sex: intervention (F: 70.7%, M: 29.3%) and control (F: 66.7%, M: 33.3%) Ethnicity: intervention (26.8% Black, 41.5% Coloured-mixed, 14.6% Indians, 17.1% White), control (14.3% Black, 54.8% Coloured-mixed, 23.8% Indians, 7.1% White
Interventions	Group 1: single intervention: education (telephone follow-up); 24 weeks; (n = 41) Clients received monthly a telephone call to provide support. Group 2: control (no telephone follow-up); 24 weeks; (n = 42)
Outcomes	Measurement of diet adherence: non-adherence to alcohol intake and adherence to sodium-restricted diet assessed by a yes/no question (baseline, 24 weeks, 36 weeks)
Notes	Dietary advice: prudent diet Drop-out rate: 63.9% (calculated) Provider: physiotherapist

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Sequence generated by drawing of lots (clear or colored balls from a closed bag)
Allocation concealment (selection bias)	Low risk	Allocation concealment using central allocation.
Blinding (performance bias and detection bias) Participants	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Providers	Unclear risk	This study did not assess this item.

Blinding (performance bias and detection bias) Outcome assessors	Low risk	"The first author and a research assistant undertook all reassessments. Neither the first author nor the research assistant had been involved in the intervention and they were blinded to the data obtained at baseline and to which groups the patients belonged."
Incomplete outcome data (attrition bias) All outcomes	High risk	The proportion of missing outcomes compared with observed risk enough to induce clinically-relevant bias in intervention effect estimate
Selective reporting (reporting bias)	High risk	No protocol. Blood pressure is reported incompletely.
Other bias	High risk	Baseline imbalance between groups (alcohol adherence). Diet adherence is assessed by self-reported measures. Validation and reliability of self-reported diet adherence are not reported

Tsay 2003

Methods	Study design: randomized controlled trial with one intervention group and one usual care group
Participants	Setting: outpatient Country: Taiwan Chronic disease: end-stage renal disease (management) Type of participants: clients (n = 64) Mean age: intervention (57.51 ± 11.41), usual care (57.94 ± 11.62) Sex: intervention and usual care groups (F: 58.1%, M: 41.9%) Ethnicity: not known
Interventions	Group 1: multiple intervention: stress management, goal setting + feedback; 4 weeks; (n = 32) The program consisted of 12 sessions conducted three times per week while clients were receiving dialysis. Clients learned to relax muscles through listening to audiotaped instructions. Clients were encouraged to set attainable objectives such as 'decreasing a cup of tea or water a day'. If the goals were achieved, praise and recognition rewards were given. Individual counselling sessions were offered stressing physical and emotional adjustment to the chronic illness. Clients recorded their food and liquid intake daily, and these records were reviewed during each treatment. Group 2: usual care; duration: not known; (n = 32)

Outcomes	Measurement of diet adherence: adherence to fluid-restricted diet assessed by mean weight gains between dialysis sessions (baseline, 1 month, 3 months, 6 months)
Notes	Dietary advice: fluid-restricted diet Drop-out rate: 3.1% (calculated) Providers: nephrology nurse specialists, physicians, dietitians, social workers

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	Sequence generation is not described explicitly in the paper
Allocation concealment (selection bias)	Unclear risk	Allocation concealment is not described explicitly in the paper
Blinding (performance bias and detection bias) Participants	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Providers	Low risk	"Only the researcher knew which treatment patients were receiving, and care providers were not informed of participant's treatment group."
Blinding (performance bias and detection bias) Outcome assessors	Unclear risk	This study did not assess this item.
Incomplete outcome data (attrition bias) All outcomes	Low risk	Plausible effect size among missing outcomes not enough to have a clinically-relevant impact on observed effect size
Selective reporting (reporting bias)	Unclear risk	No protocol.
Other bias	Low risk	Baseline imbalance for body weight change but baseline differences in weight gain between groups were taken into account in the repeated-measured analysis by using the baseline values as a covariate. Diet adherence is assessed by objective measure

Wong 2010

Methods	Study design: randomized controlled trial with one intervention group and one control group
Participants	Setting: outpatient Country: China Chronic disease: renal failure (management) Type of participants: clients (n = 120) Mean age: intervention and control groups (62.4) Sex: intervention and control groups (F: 46.9%, M: 53.1%) Ethnicity: not known
Interventions	Group 1: multiple intervention: telephone follow-up + goal setting; 6 weeks; (n = 60) Clients received a weekly telephone call consisting to monitoring changes from the specific health concerns identified in the previous interaction, monitoring progress, providing health advice, reinforcing health self-management behaviours, and assessing need for referral and reviewing the health goals with the patient and setting mutual goals Group 2: control (no telephone follow-up); duration: not known; (n = 60)
Outcomes	Measurement of diet adherence: non-adherence to diet and fluid-restricted diet assessed by dialysis diet and fluid non-adherence questionnaire (baseline, 7 weeks, 13 weeks)
Notes	Dietary advice: dialysis diet and fluid-restricted diet Drop-out rate: 18.3% (calculated) Providers: renal nurses and general nurses

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"120 sets of computer-generated random numbers were used, and patients who fitted the criteria were randomised to the study or control group."
Allocation concealment (selection bias)	Unclear risk	Allocation concealment is not described explicitly in the paper
Blinding (performance bias and detection bias) Participants	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Providers	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Outcome assessors	Unclear risk	This study did not assess this item.

Wong 2010 (*Continued*)

Incomplete outcome data (attrition bias) All outcomes	High risk	Plausible effect size among missing outcomes enough to have a clinically-relevant impact on observed effect size
Selective reporting (reporting bias)	High risk	No protocol. Some outcomes of interest in the review are reported incompletely (blood glucose, HDL-cholesterol, triglyceride)
Other bias	Low risk	Baseline balance between groups. Diet adherence is assessed by self-reported measure (validated questionnaire)

Wood 2008

Methods	Study design: cluster-randomized controlled trial with two populations including one intervention group and one usual care group each Two populations were studied in this study: clients with coronary heart disease (population 1) and clients at high risk of cardiovascular disease (population 2)
Participants	Setting: • Population 1: outpatient • Population 2: outpatient Country: • Population1: France, Italy, Poland, Spain, Sweden, United Kingdom • Population2: Denmark, Italy, Poland, Spain, Netherlands, United Kingdom Chronic disease: • Population 1: coronary heart disease (management) • Population 2: high risk of coronary heart disease (prevention) Type of participants: • Population 1: clients (n = 3088) • Population 2: clients (n = 2317) Mean age: • Population 1: intervention (62.5 ± 9.9), usual care (63.0 ± 9.6) • Population 2: intervention (62.0 ± 7.6), usual care (62.8 ± 7.3) Sex: • Population 1: intervention (F: 30%, M: 70%) and usual care (F: 30%, M: 70%) • Population 2: intervention (F: 50%, M: 50%) and usual care (F: 43%, M: 57%) Ethnicity: not known
Interventions	Population 1 : Group 1: multiple intervention: individual session with nurse + motivational interviewing; (n = 1589) Clients and their partners attended at least eight weekly sessions with multidisciplinary team using stages of change and motivational interviews. Clients were provided with a personal record card for lifestyle and risk factor targets. Nurses also coordinated a rolling program of eight weekly workshops for coronary heart disease, cardiovascular risk (lifestyle and risk factors control), cardioprotective medication and return to work and

	leisure. Group 2: usual care; duration: not known; (n = 1499) Population 2: Group 1: multiple intervention: individual session with nurse + motivational interviewing; (n = 1189) Clients and their partners attended at least eight weekly sessions with nurse and the family doctor using stages of changes and motivational interviews. Clients were provided with a personal record card for lifestyle and risk factor targets. Nurses also coordinated a rolling program of eight weekly workshops for lifestyle and risk factors. Group 2: usual care; duration: not known; (n = 1128)
Outcomes	Measurement of diet adherence: adherence to saturated fat, oily fish, fish, and fruit and vegetables intake assessed by a food-habit questionnaire (baseline, 1 year)
Notes	Dietary advice: < 10% of energy from saturated fat, > 400 g/day of fruit and vegetables, > 20 g/day of fish, > 3 times/week of oily fish, < 30 g/day of alcohol Drop-out rate: not known Providers: • Population 1: nurses, dietitians, physiotherapists, cardiologists • Population 2: nurses, family doctors

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	Sequence generation is not described explicitly in the paper
Allocation concealment (selection bias)	Unclear risk	Allocation concealment is not described explicitly in the paper
Blinding (performance bias and detection bias) Participants	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Providers	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Outcome assessors	Unclear risk	This study did not assess this item.
Incomplete outcome data (attrition bias) All outcomes	High risk	The proportion of missing outcomes compared with observed risk enough to induce clinically-relevant bias in intervention effect estimate

Wood 2008 (*Continued*)

Selective reporting (reporting bias)	High risk	No protocol. Some outcomes of interest in the review are reported incompletely (HDL-cholesterol, triglyceride)
Other bias	Unclear risk	Baseline comparisons between groups are not reported. Diet adherence is assessed by self-reported measure (validated food habit questionnaire)

Zhao 2004

Methods	Study design: randomized controlled trial with one intervention group and one usual care group
Participants	Setting: outpatient Country: China Chronic disease: coronary heart disease (management) Type of participants: clients (n = 220) Mean age: intervention (72.9 ± 6.4), usual care (71.6 ± 4.1) Sex: intervention (F: 49%, M: 51%) and usual care (F: 53%, M: 47%) Ethnicity: not known
Interventions	Group 1: multiple intervention: telephone follow-up + individual session with a nurse + goal setting; 4 weeks; (n = 107) Nurse provided one home visit on the second day after discharge and another in the third week and made two telephone calls in the second and fourth weeks. Nurse set goals with the clients and assessed whether the clients achieved them. Group 2: usual care (no visit nor telephone follow-up) ; duration: not known; (n = 113)
Outcomes	Measurement of diet adherence: adherence to diet assessed by a seven-day recall questionnaire (baseline, 4 weeks, 12 weeks)
Notes	Dietary advice: not known Drop-out rate: 9.1% (calculated) Providers: nurses

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"The patients who agreed to participate would be assigned to the study or control group using a computer-generated randomised table, with a computer number "0" belonged to the control group and "1" the study group."

Allocation concealment (selection bias)	Low risk	"...the head nurse asked the eligible patients to draw sealed envelop that contained a slip indicating the group the patient be entered. .."
Blinding (performance bias and detection bias) Participants	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Providers	Unclear risk	This study did not assess this item.
Blinding (performance bias and detection bias) Outcome assessors	Low risk	"The measurement team was blinded of which group the subjects were in."
Incomplete outcome data (attrition bias) All outcomes	Low risk	Missing outcome data balanced in numbers across intervention groups, with similar reasons for missing data across groups
Selective reporting (reporting bias)	Unclear risk	No protocol.
Other bias	High risk	Baseline imbalance between groups (number of chronic diseases). Diet adherence is assessed by self-reported measure (validated 7-day recall questionnaire)

Characteristics of excluded studies *[ordered by study ID]*

Study	Reason for exclusion
Abramson 1980	No measure of adherence outcome.
Agras 1996	Provision of meals, food items or dietary supplements.
Ammerman 2003	No measure of adherence outcome.
Arnaud-Battandier 1999	Provision of meals, food items or dietary supplements.
Ashurst 2003	Interventions had not the same dietary advice component.
Atwood 1992	Interventions had not the same dietary advice component.
Babamoto 2009	No measure of adherence outcome.

(*Continued*)

Basler 1982	No measure of adherence outcome.
Baum 1991	No measure of adherence outcome.
Befort 2008	No measure of adherence outcome.
Berra 2007	No measure of adherence outcome.
Berteus 2008	Interventions had not the same dietary advice component.
Bertram 1990	Intervention not intended to improve diet adherence.
Boeka 2010	No measure of adherence outcome.
Borg 2002	No measure of adherence outcome.
Bosworth 2008	No measure of adherence outcome.
Brekke 2003	No measure of adherence outcome.
Brekke 2005a	No measure of adherence outcome.
Brekke 2005b	No measure of adherence outcome.
Brekke 2009	No measure of adherence outcome.
Broekhuizen 2010	No measure of adherence outcome.
Bruckert 2008	Interventions had not the same dietary advice component.
Burke 2005	Interventions had not the same dietary advice component.
Burke 2006a	No measure of adherence outcome.
Burke 2006b	No measure of adherence outcome.
Burke 2007	No measure of adherence outcome.
Burke 2008	No measure of adherence outcome.
Burke 2010	No measure of adherence outcome.
Burkett 1990	No measure of adherence outcome.
Campbell 1984	No measure of adherence outcome.
Campbell 1990	Interventions had not the same dietary advice component.
Campbell 1998	Interventions had not the same dietary advice component.

(*Continued*)

Cangiano 1991	Provision of meals, food items or dietary supplements.
Cangiano 1992	Provision of meals, food items or dietary supplements.
Cangiano 1998	Provision of meals, food items or dietary supplements.
Carels 2005	Interventions had not the same dietary advice component.
Carels 2005a	Interventions had not the same dietary advice component.
Carson 1988	No measure of adherence outcome.
Casebeer 1999	No measure of adherence outcome.
Cegala 2000	No measure of adherence outcome.
Chang 2009	No measure of adherence outcome.
Cheyette 2007	No measure of adherence outcome.
Chlebowski 1993	Interventions had not the same dietary advice component.
Costa 2008	No measure of adherence outcome.
Darlington 1986	No measure of adherence outcome.
Davidson 1996	Provision of meals, food items or dietary supplements.
De Zwaan 2005	Provision of meals, food items or dietary supplements.
Dechamps 2009	No measure of adherence outcome.
Del 2009	Provision of meals, food items or dietary supplements.
Demark-Wahnefried 2006	Interventions had not the same dietary advice component.
Dennis 2001	No measure of adherence outcome.
Digenio 2009	Interventions had not the same dietary advice component.
Domenech 1995	Interventions had not the same dietary advice component.
Donnelly 2003	Provision of meals, food items or dietary supplements.
Dyson 1997	No measure of adherence outcome.
Eriksson 2009	No measure of adherence outcome.

(*Continued*)

Evers 1987	Interventions had not the same dietary advice component.
Farmer 2009	No measure of adherence outcome.
Fehily 1991	Interventions had not the same dietary advice component.
Ferrante 2010	Interventions had not the same dietary advice component.
Fitzgibbon 2005	No measure of adherence outcome.
Forget 1990	Provision of meals, food items or dietary supplements.
Forli 2001	Provision of meals, food items or dietary supplements.
Forrester 2010	Interventions had not the same dietary advice component.
Fox 1996	No measure of adherence outcome.
Frohling 1990	Provision of meals, food items or dietary supplements.
Frost 2007	Interventions had not the same dietary advice component.
Fuchs 1993	No measure of adherence outcome.
Glasgow 2003	No measure of adherence outcome.
Gorin 2010	No measure of adherence outcome.
Grancelli 2003	Interventions had not the same dietary advice component.
Greene 1977	No measure of adherence outcome.
Hakala 1993	Provision of meals, food items or dietary supplements.
Hartwell 1986	No measure of adherence outcome.
Harvey-Berino 2004	No measure of adherence outcome.
Harvey-Berino 2009	No measure of adherence outcome.
Hebert 2001	Interventions had not the same dietary advice component.
Henkin 2000	Interventions had not the same dietary advice component.
Heraief 1985	Provision of meals, food items or dietary supplements.
Hyman 1998	No measure of adherence outcome.

(*Continued*)

Jolly 1998	No measure of adherence outcome.
Jolly 2007	No measure of adherence outcome.
Jones 2003	No measure of adherence outcome.
Jula 1990	Interventions had not the same dietary advice component.
Kaiman 2000	Provision of meals, food items or dietary supplements.
Kalodner 1991	Interventions had not the same dietary advice component.
Kalter-Leibovici 2010	No measure of adherence outcome.
Kattelmann 2009	Interventions had not the same dietary advice component.
Khoo 2007	Provision of meals, food items or dietary supplements.
Kim 2006	No measure of adherence outcome.
Kirkman 1994	Interventions had not the same dietary advice component.
Koelewijn-van Loon 2009	Interventions had not the same dietary advice component.
Korhonen 1983	No measure of adherence outcome.
Korhonen 2003	No measure of adherence outcome.
Krier 1999	Interventions had not the same dietary advice component.
Kumanyika 1993	Interventions had not the same dietary advice component.
Lampman 1977	Interventions had not the same dietary advice component.
Laws 2004	No measure of adherence outcome.
Leermakers 1999	Intervention not intended to improve diet adherence
Lesley 2007	No measure of adherence outcome.
Lindahl 2009	Not a real-life setting.
Locatelli 1990	Interventions had not the same dietary advice component.
Lopez 2006	No measure of adherence outcome.
Manchanda 2000	Interventions had not the same dietary advice component.

(*Continued*)

Mathus-Vliegen 1993	Intervention not intended to improve diet adherence
McCarron 1998	Provision of meals, food items or dietary supplements.
McConnon 2007	No measure of adherence outcome.
McConnon 2009	No measure of adherence outcome.
Melchionda 2006	No measure of adherence outcome.
Melin 2003	Not a real-life setting.
Metz 1997	Provision of meals, food items or dietary supplements.
Metz 2000	Provision of meals, food items or dietary supplements.
Mhurchu 1998	No measure of adherence outcome.
Milas 1995	Interventions had not the same dietary advice component.
Miller 2009	Interventions had not the same dietary advice component.
Morgan 2009	No measure of adherence outcome.
Nir 2004	Interventions had not the same dietary advice component.
Nugent 1984	No measure of adherence outcome.
Oldroyd 2006	Interventions had not the same dietary advice component.
Ornish 1998	Interventions had not the same dietary advice component.
Pater 2000	No measure of adherence outcome.
Pettman 2008	No measure of adherence outcome.
Pierce 1997	Interventions had not the same dietary advice component.
Pierce 2002	Interventions had not the same dietary advice component.
Pierce 2007	Interventions had not the same dietary advice component.
Pijls 2000	Interventions had not the same dietary advice component.
Pringle 1993	No measure of adherence outcome.
Rabkin 1983	No measure of adherence outcome.

(*Continued*)

Racette 1995	Interventions had not the same dietary advice component.
Rallidis 2009	Provision of meals, food items or dietary supplements.
Rhew 2007	Study did not involve a nutritional intervention
Rimmer 2000	No measure of adherence outcome.
Robertson 1992	No measure of adherence outcome.
Rosman 1989	Interventions had not the same dietary advice component.
Rosman 1990	Interventions had not the same dietary advice component.
Roumen 2008	No measure of adherence outcome.
Sadur 1999	No measure of adherence outcome.
Sartorio 2003	No measure of adherence outcome.
Schapira 1991	No measure of adherence outcome.
Sevick 2008	Interventions had not the same dietary advice component.
Shaw-Stuart 2000	No measure of adherence outcome.
Singh 1991	Interventions had not the same dietary advice component.
Singh 1992	Interventions had not the same dietary advice component.
Sisk 2006	No measure of adherence outcome.
Smith 1997	No measure of adherence outcome.
Sone 2010	No measure of adherence outcome.
Southard 2003	No measure of adherence outcome.
Sperduto 1986	No measure of adherence outcome.
Thoolen 2009	No measure of adherence outcome.
Tilley 1997	No measure of adherence outcome.
Toobert 1998	Interventions had not the same dietary advice component.
Toobert 2000	Interventions had not the same dietary advice component.

(*Continued*)

Torgerson 1999	Provision of meals, food items or dietary supplements.
Tsang 2001	No measure of adherence outcome.
Vale 2003	Interventions had not the same dietary advice component.
van der Weijden 1998	Interventions had not the same dietary advice component.
van Gool 2006	Interventions had not the same dietary advice component.
Verges 1998	No measure of adherence outcome.
Voils 2009	No measure of adherence outcome.
von Gruenigen 2008	No measure of adherence outcome.
Wadden 1997	No measure of adherence outcome.
Wadden 2009	Provision of meals, food items or dietary supplements.
Webber 2010	No measure of adherence outcome.
Wing 1986	No measure of adherence outcome.
Wing 1996	No measure of adherence outcome.
Wing 1999	No measure of adherence outcome.
Wing 2003	Intervention not intended to improve diet adherence.
Witmer 2004	No measure of adherence outcome.
Wright 1981	No measure of adherence outcome.
Zismer 1982	No measure of adherence outcome.

Characteristics of studies awaiting assessment *[ordered by study ID]*

Aldous 2009

Methods	Study design: not known
Participants	Setting: not known Country: Canada Chronic disease: not known Type of participants: clients

Aldous 2009 (*Continued*)

Interventions	The intervention *Community Cardiovascular Hearts in Motion* is a multidisciplinary, multi-vascular program combining nutrition intervention, weekly exercise, and risk factor management including motivational interviewing and behaviour change techniques
Outcomes	Measurement of diet adherence: not known
Notes	Dietary advice: not known Provider: dietitian No response to attempted contact with author.

Amato 1990

Methods	Study design: randomized controlled trial with one intervention group and one usual care group
Participants	Setting: not known Country: Italy Chronic disease: obesity (management) Type of participants: clients
Interventions	The study compared an intervention using a psychological therapy combined with the usual diet treatment with an usual care group receiving only the usual diet
Outcomes	Measurement of diet adherence: adherence to diet
Notes	Dietary advice: not known Provider: not known The study was published in Italian and only the abstract was available in English

Clark 2004

Methods	Study design: randomized controlled trial with one intervention group and one usual care group
Participants	Setting: outpatient Country: United Kingdom Chronic disease: type II diabetes (management) Type of participants: clients
Interventions	A brief, tailored lifestyle self-management intervention including assessment, clients' participation in goal setting, selection of personalized strategies to overcome barriers
Outcomes	Measurement of diet adherence: adherence to fat restriction assessed by the *Kristal Food Habits Questionnaire* and the *Block Fat Screener*
Notes	Dietary advice: not known Provider: not known The corresponding author was contacted in order to have more information about the dietary advice provided in both groups. However, no response to attempted contact with author

Contel 1993

Methods	Study design: not known
Participants	Setting: not known Country: not known Chronic disease: not known Type of participants: not known
Interventions	Not known
Outcomes	Measurement of diet adherence: not known
Notes	Diet: not known Provider: not known Abstract unobtainable.

Duncan 2001

Methods	Study design: randomized controlled trial with one intervention group and one control group
Participants	Setting: not known Country: United States Chronic disease: congestive heart failure (management) Type of participants: clients
Interventions	A behavioural intervention consisting of feedback on the three-day sodium intake of the clients and a discussion of problem-solving strategies to reduce future sodium intake was compared to a control group. Both groups received the usual dietary education class
Outcomes	Measurement of diet adherence: adherence to dietary sodium advice assessed by a three-day dietary intake log
Notes	Dietary advice: sodium-restricted diet Provider: not known Contact with author: data no longer available. Therefore, the inclusion criteria of use of provision of meals, food items or dietary supplements could not be assessed

Fernández López 2007

Methods	Study design: randomized controlled trial with two intervention groups and one control group
Participants	Setting: outpatient Country: Spain Chronic disease: hypertension (management) Type of participants: clients
Interventions	The study compared an educative sessions intervention and an intervention consisting to provide written information to clients with a control group
Outcomes	Measurement of diet adherence: not known

Notes	Dietary advice: not known Providers: nurses No response to attempted contact with author(s).

Firth 2009

Methods	Study design: not known
Participants	Setting: not known Country: Canada Chronic disease: not known Type of participants: clients
Interventions	The intervention was a web-based, self-monitoring wellness program
Outcomes	Measurement of diet adherence: not known
Notes	Dietary advice: not known Provider: not known No response to attempted contact with author.

González 1987

Methods	Study design: not known
Participants	Setting: not known Country: not known Chronic disease: not known Type of participants: not known
Interventions	Not known
Outcomes	Measurement of diet adherence: not known
Notes	Dietary advice: not known Provider: not known Abstract unobtainable.

Hauner 2006

Methods	Study design: randomized controlled trial with one intervention group and one usual care group
Participants	Setting: not known Country: Germany Chronic disease: type II diabetes (management) Type of participants: clients

Hauner 2006 (*Continued*)

Interventions	The study compared an intense nutritional training program (diet, knowledge about diabetes, physical activities and other lifestyle factors) with an usual care group
Outcomes	Measurement of diet adherence: not known
Notes	Dietary advice: not known Provider: not known No response to attempted contact with author.

Kim 2003

Methods	Study design: randomized controlled trial with one intervention group and one control group
Participants	Setting: outpatient Country: Korea Chronic disease: type II diabetes (management) Type of participants: clients
Interventions	The study compared a telephone follow-up intervention including self-monitoring blood glucose levels, diet and exercise, feedback from a dietitian and an informative booklet with a control group
Outcomes	Measurement of diet adherence: adherence to diet assessed by a self-reported adherence questionnaire
Notes	Dietary advice: not known Providers: nurse, dietitian The corresponding authors were contacted in order to have more information about the dietary advice provided in both groups. However, no response to attempted contact with authors

Koprucki 2010

Methods	Study design: randomized controlled trial with one intervention group and one control group
Participants	Setting: not known Country: United States Chronic disease: chronic kidney disease (management) Type of participants: clients
Interventions	The study compared an intervention group in which clients monitored dietary intake with a personal digital assistant (PDA) programmed with their dietary prescription and received PDA feedback regarding % of daily targets consumed and counselling based on Social Cognitive Theory with a control group
Outcomes	Measurement of diet adherence: not known
Notes	Dietary advice: sodium-restricted diet Provider: not known Contact with author(s): information provided does not allow including or excluding the study

Lin 2007

Methods	Study design: randomized controlled trial with three intervention groups
Participants	Setting: community Country: Taiwan Chronic disease: overweight and obesity (prevention/management) Type of participants: clients
Interventions	The study compared: 1) an individualized weight control education, 2) a group weight control education and 3) a mail-delivered weight control education
Outcomes	Measurement of diet adherence: not known
Notes	Dietary advice: not known Provider: not known No response to attempted contact with authors.

Martínez-Marcos 1999

Methods	Study design: not known
Participants	Setting: not known Country: not known Chronic disease: not known Type of participants: not known
Interventions	Not known
Outcomes	Measurement of diet adherence: not known
Notes	Dietary advice: not known Provider: not known Abstract unobtainable.

Mayeux 2004

Methods	Study design: not known
Participants	Setting: not known Country: United States Chronic disease: not known Type of participants: clients
Interventions	The study compared an *Aramark Nutrition Concepts© Survival Skills* diet education using a condensed one-page handout with a traditional diet education using in-depth material
Outcomes	Measurement of diet adherence: adherence to diet assessed by a telephone survey

Notes	Dietary advice: not known Provider: dietitian Address for authors correspondence not found.

Mensink 2003

Methods	Study design: randomized controlled trial with one intervention group and one control group
Participants	Setting: not known Country: Netherlands Chronic disease: glucose intolerance (prevention) Type of participants: clients
Interventions	The study compared an intensive intervention aiming to stimulate the dietary change and the physical activity with a control group
Outcomes	Measurement of diet adherence: adherence to diet assessed by a three-day food record
Notes	Dietary advice: *Dutch guidelines for a healthy diet* (Dutch Nutrition Council) Providers: dietitians and trainers The author was contacted in order to obtain more information about the dietary advice provided in both groups. However, there was no response to our attempted contact with author

Paisey 2005

Methods	Study design: randomized controlled trial with one intervention group and one control group
Participants	Setting: not known Country: United Kingdom Health problem: type II diabetes (management) Type of participants: clients
Interventions	The study compared an intensive group using self-monitoring of food intake and feedback with a control group
Outcomes	Measurement of diet adherence: not known
Notes	Dietary advice: *diabetes United Kingdom guidelines* on low fat and complex carbohydrate/ no sugar. Providers: dietitians and nurses Contact with author: information do not allow including or excluding the study

Simpson 2010

Methods	Study design: randomized controlled trial with two intervention groups
Participants	Setting: not known Country: United Kingdom Chronic disease: obesity (management) Type of participants: clients
Interventions	The study compared an intense intervention using motivational interviewing with a less intense intervention
Outcomes	Measurement of diet adherence: not known
Notes	Dietary advice: not known Provider: not known Contact with author: information do not allow including or excluding the study

Song 2009

Methods	Study design: randomized controlled trial with one intervention group and one control group
Participants	Setting: outpatient Country: Korea Chronic disease: type II diabetes (management) Type of participants: clients
Interventions	The study compared a diabetes outpatient intensive management program including multidisciplinary diabetes education, complication monitoring and telephone counseling with a control group
Outcomes	Measurement of diet adherence: adherence to diet assessed by a self-report questionnaire on adherence
Notes	Dietary advice: not known Providers: endocrinologist, diabetes education nurse, family physician, rehabilitation therapist, dermatologist, psychologist, dietitian, pharmacist, ophthalmologist and physiotherapist The corresponding author was contacted in order to obtain more information about the dietary advice provided in both groups. However, there was no response to attempted contact with author

Stollar 1993

Methods	Study design: not known
Participants	Setting: not known Country: not known Chronic disease: not known Type of participants: not known
Interventions	Not known
Outcomes	Measurement of diet adherence: not known

Stollar 1993 (*Continued*)

Notes	Dietary advice: not known Provider: not known Abstract unobtainable.

Wedman 1987

Methods	Study design: not known
Participants	Setting: outpatient Country: United States Chronic disease: diabetes (management) Type of participants: clients
Interventions	The study compared an intervention using graphic teaching aids with a control group
Outcomes	Measurement of diet adherence: adherence to diet assessed by dietitian's appointment log and by information obtained during each visit of every client
Notes	Dietary advice: decreasing fat consumption, eating meals at regular intervals and controlling portion size Provider: dietitian Address for authors correspondence not found.

Characteristics of ongoing studies *[ordered by study ID]*

Feldman 2009

Trial name or title	Home Based Blood Pressure Intervention for Blacks
Methods	Study design: cluster-randomized controlled trial with two intervention groups and one usual care group
Participants	Setting: outpatient Country: United States Chronic disease: hypertension (management) Type of participants: clients
Interventions	Two interventions will be tested and compared to a usual care group: 1) a "basic" intervention delivering key evidence-based reminders to home care nurses and patients while the patient is receiving traditional postacute home health care, 2) an "augmented" intervention that includes that same as the basic intervention plus transition to an ongoing hypertension home support program that extends support for 12 months
Outcomes	Measurement of diet adherence: adherence to healthy diet
Starting date	Not described
Contact information	Dr Penny H. Feldman: pfeldman@vnsny.org

Feldman 2009 (*Continued*)

Notes	Dietary advice: *Dietary Approaches to Stop Hypertension* (DASH) recommendations Providers: nurses

Griva 2010

Trial name or title	The effectiveness of a self-management intervention to improve outcomes in prevalent haemodialysis patients: a randomised controlled trial
Methods	Study design: randomized controlled trial with one intervention group and one usual care group
Participants	Setting: outpatient Country: Singapore Chronic disease: end-stage renal disease (management) Type of participants: clients
Interventions	One intervention will be tested and compared to an usual care group: a group-based self-management intervention including address of misconceptions, group discussion of possible coping strategies, identification of barriers to change, training in specific management strategies, identification of individual goals to be achieved, formulation of actions plans to achieve these goals and review previously set goals
Outcomes	Measurement of diet adherence: adherence to dietary restrictions assessed by values of blood phosphate, calcium phosphate and potassium levels and gain between dialysis sessions
Starting date	August 2010
Contact information	Dr Konstadina Griva: Department of Psychology, Faculty of Arts and Social Sciences, National University of Singapore, Block AS4 #02-28, 9 arts link
Notes	Dietary advice: not described Providers: psychologist, dietitian and nurse

Jansink 2006

Trial name or title	Title: Nurse-led motivational interviewing to change the lifestyle of patients with type II diabetes (MILD-project): protocol for a cluster, randomized, controlled trial on implementing lifestyle recommendations
Methods	Study design: cluster-randomized controlled trial with one intervention group and one control group
Participants	Setting: outpatient Country: Netherlands Chronic disease: type II diabetes (management) Type of participants: clients
Interventions	One intervention will be tested and compared to a control group: the clients will receive an intervention using motivational interviewing. The primary care nurse who will provide the intervention will receive training in an implementation strategy with motivational interviewing as the core component. Other components of this strategy will be adaptation of the diabetes protocol to local circumstances, introduction of a social map

Jansink 2006 (*Continued*)

	for lifestyle support, and educational and supportive tools for sustaining motivational interviewing
Outcomes	Measurement of diet adherence: adherence to diet assessed by a self-reported questionnaire
Starting date	March 2007
Contact information	Dr Renate Jansink: r.jansink@iq.umcn.nl
Notes	Dietary advice: *Dutch guidelines* norms Providers: nurses

Ma 2009

Trial name or title	Evaluation of lifestyle interventions to treat elevated cardiometabolic risk in primary care (E-LITE): a randomised controlled trial
Methods	Study design: randomized controlled trial with two intervention groups and an usual care group
Participants	Setting: outpatient Country: United States Chronic disease: overweight and obesity with pre-diabetes and/or metabolic syndrome (prevention and management) Type of participants: clients
Interventions	Two interventions will be tested and compared to an usual care group: 1) information technology-assisted self-management, 2) information technology-assisted self-management combined with care management
Outcomes	Measurement of diet adherence: adherence to diet assessed by a three-day food record
Starting date	Not described
Contact information	Dr Jun Ma: maj@pamfri.org
Notes	Dietary advice: total fat reduction (to 25% of energy), energy balance and restriction (with a goal of a 500- to 1000-calorie reduction diet), saturated fat intake (to < 10% of energy), cholesterol intake (to < 300 mg/day), consumption of a high plant-based diet that includes a variety of fruit and vegetables, whole grains, and low-fat dairy products and reduction of high glycemic index carbohydrates Providers: dietitian and exercise physiologist

Sher 2002

Trial name or title	Partners for life: a theoretical approach to developing an intervention for cardiac risk reduction
Methods	Study design: randomized controlled trial with one intervention group and one control group

Sher 2002 (*Continued*)

Participants	Setting: outpatient Country: United States Chronic disease: coronary artery disease(management) Type of participants: clients
Interventions	A standard behavioral treatment group including a couples intervention will be compared to a standard behavioral treatment (control)
Outcomes	Measurement of diet adherence: adherence to dietary recommendations
Starting date	Not described
Contact information	Dr Tamara Goldman Sher: t-sher@northwestern.edu
Notes	Dietary advice: weight loss or dietary modification based on current American Heart Association recommendations Providers: therapist

DATA AND ANALYSES

Comparison 1. Nutritional tools versus control in diet adherence

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Continuous data	2		Std. Mean Difference (IV, Random, 95% CI)	Totals not selected
1.1 Adherence to energy intake at 6 months	1		Std. Mean Difference (IV, Random, 95% CI)	0.0 [0.0, 0.0]
1.2 Adherence to protein intake at 6 months	1		Std. Mean Difference (IV, Random, 95% CI)	0.0 [0.0, 0.0]
1.3 Adherence to fat intake at 6 months	1		Std. Mean Difference (IV, Random, 95% CI)	0.0 [0.0, 0.0]
1.4 Adherence to carbohydrate intake at 6 months	1		Std. Mean Difference (IV, Random, 95% CI)	0.0 [0.0, 0.0]
1.5 Adherence to cholesterol intake at 6 months	1		Std. Mean Difference (IV, Random, 95% CI)	0.0 [0.0, 0.0]
1.6 Adherence to fiber intake at 6 months	1		Std. Mean Difference (IV, Random, 95% CI)	0.0 [0.0, 0.0]
1.7 Adherence to sodium intake at 6 months	1		Std. Mean Difference (IV, Random, 95% CI)	0.0 [0.0, 0.0]
1.8 Adherence to fruit intake at 6 months	1		Std. Mean Difference (IV, Random, 95% CI)	0.0 [0.0, 0.0]
1.9 Adherence to vegetable intake at 6 months	1		Std. Mean Difference (IV, Random, 95% CI)	0.0 [0.0, 0.0]
1.10 Adherence to sweet food intake at 6 months	1		Std. Mean Difference (IV, Random, 95% CI)	0.0 [0.0, 0.0]
1.11 Adherence to energy intake at 12 weeks	1		Std. Mean Difference (IV, Random, 95% CI)	0.0 [0.0, 0.0]
1.12 Adherence to fat intake at 12 weeks	1		Std. Mean Difference (IV, Random, 95% CI)	0.0 [0.0, 0.0]

Comparison 2. Multiple interventions versus control in diet adherence

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Continuous data	4		Std. Mean Difference (IV, Random, 95% CI)	Totals not selected
1.1 Adherence to sodium-restricted diet at 3 months	1		Std. Mean Difference (IV, Random, 95% CI)	0.0 [0.0, 0.0]
1.2 Adherence to diet at 3 months	1		Std. Mean Difference (IV, Random, 95% CI)	0.0 [0.0, 0.0]
1.3 Adherence to fluid-restricted diet at 1 month	1		Std. Mean Difference (IV, Random, 95% CI)	0.0 [0.0, 0.0]

1.4 Adherence to fluid-restricted diet at 3 months	1	Std. Mean Difference (IV, Random, 95% CI)	0.0 [0.0, 0.0]
1.5 Adherence to fluid-restricted diet at 6 months	1	Std. Mean Difference (IV, Random, 95% CI)	0.0 [0.0, 0.0]
1.6 Non-adherence to diet (days) at 7 weeks	1	Std. Mean Difference (IV, Random, 95% CI)	0.0 [0.0, 0.0]
1.7 Non-adherence to diet (days) at 13 weeks	1	Std. Mean Difference (IV, Random, 95% CI)	0.0 [0.0, 0.0]
1.8 Non-adherence to diet (degree) at 7 weeks	1	Std. Mean Difference (IV, Random, 95% CI)	0.0 [0.0, 0.0]
1.9 Non-adherence to diet (degree) at 13 weeks	1	Std. Mean Difference (IV, Random, 95% CI)	0.0 [0.0, 0.0]
1.10 Non-adherence to fluid-restricted diet (days) at 7 weeks	1	Std. Mean Difference (IV, Random, 95% CI)	0.0 [0.0, 0.0]
1.11 Non-adherence to fluid-restricted diet (days) at 13 weeks	1	Std. Mean Difference (IV, Random, 95% CI)	0.0 [0.0, 0.0]
1.12 Non-adherence to fluid-restricted diet (degree) at 7 weeks	1	Std. Mean Difference (IV, Random, 95% CI)	0.0 [0.0, 0.0]
1.13 Non-adherence to fluid-restricted diet (degree) at 13 weeks	1	Std. Mean Difference (IV, Random, 95% CI)	0.0 [0.0, 0.0]
2 Dichotomous data	5	Risk Ratio (M-H, Random, 95% CI)	Totals not selected
2.1 Adherence to sodium-restricted diet at 18 months	1	Risk Ratio (M-H, Random, 95% CI)	0.0 [0.0, 0.0]
2.2 Adherence to fat intake at 3 months	1	Risk Ratio (M-H, Random, 95% CI)	0.0 [0.0, 0.0]
2.3 Adherence to saturated fat intake at 3 months	1	Risk Ratio (M-H, Random, 95% CI)	0.0 [0.0, 0.0]
2.4 Adherence to unsaturated fat intake at 3 months	1	Risk Ratio (M-H, Random, 95% CI)	0.0 [0.0, 0.0]
2.5 Adherence to carbohydrate intake at 3 months	1	Risk Ratio (M-H, Random, 95% CI)	0.0 [0.0, 0.0]
2.6 Adherence cholesterol intake at 3 months	1	Risk Ratio (M-H, Random, 95% CI)	0.0 [0.0, 0.0]
2.7 Adherence to saturated fat intake at 15 months	1	Risk Ratio (M-H, Random, 95% CI)	0.0 [0.0, 0.0]
2.8 Adherence to fat intake at 15 months	1	Risk Ratio (M-H, Random, 95% CI)	0.0 [0.0, 0.0]
2.9 Adherence to unsaturated fat intake at 15 months	1	Risk Ratio (M-H, Random, 95% CI)	0.0 [0.0, 0.0]
2.10 Adherence to carbohydrate intake at 15 months	1	Risk Ratio (M-H, Random, 95% CI)	0.0 [0.0, 0.0]
2.11 Adherence to fiber intake at 15 months	1	Risk Ratio (M-H, Random, 95% CI)	0.0 [0.0, 0.0]
2.12 Adherence to cholesterol intake at 15 months	1	Risk Ratio (M-H, Random, 95% CI)	0.0 [0.0, 0.0]

2.13 Adherence to phosphate-restricted diet at 3 months	1	Risk Ratio (M-H, Random, 95% CI)	0.0 [0.0, 0.0]
2.14 Adherence to saturated fat intake at 1 year - CHD patients	1	Risk Ratio (M-H, Random, 95% CI)	0.0 [0.0, 0.0]
2.15 Adherence to oily fish intake at 1 year - CHD patients	1	Risk Ratio (M-H, Random, 95% CI)	0.0 [0.0, 0.0]
2.16 Adherence to fish intake at 1 year - CHD patients	1	Risk Ratio (M-H, Random, 95% CI)	0.0 [0.0, 0.0]
2.17 Adherence to fruit and vegetable intake at 1 year - CHD patients	1	Risk Ratio (M-H, Random, 95% CI)	0.0 [0.0, 0.0]
2.18 Adherence to oily fish intake at 1 year - high risk CHD patients	1	Risk Ratio (M-H, Random, 95% CI)	0.0 [0.0, 0.0]
2.19 Adherence to fish intake at 1 year - high-risk CHD patients	1	Risk Ratio (M-H, Random, 95% CI)	0.0 [0.0, 0.0]
2.20 Adherence to fruit and vegetable intake at 1 year - high-risk CHD patients	1	Risk Ratio (M-H, Random, 95% CI)	0.0 [0.0, 0.0]
2.21 Adherence to diet at 4 weeks	1	Risk Ratio (M-H, Random, 95% CI)	0.0 [0.0, 0.0]
2.22 Adherence to diet at 12 weeks	1	Risk Ratio (M-H, Random, 95% CI)	0.0 [0.0, 0.0]

Analysis 1.1. Comparison 1 Nutritional tools versus control in diet adherence, Outcome 1 Continuous data.

Review: Interventions to enhance adherence to dietary advice for preventing and managing chronic diseases in adults

Comparison: 1 Nutritional tools versus control in diet adherence

Outcome: 1 Continuous data

Study or subgroup	Control N	Mean(SD)	Experimental N	Mean(SD)	Std. Mean Difference IV,Random,95% CI	Std. Mean Difference IV,Random,95% CI
1 Adherence to energy intake at 6 months						
Assuncao 2010	95	-421.7 (3196.95)	97	-1299.1 (2966.48)		0.28 [0.00, 0.57]
2 Adherence to protein intake at 6 months						
Assuncao 2010	95	0.9 (5.85)	97	2 (4.92)		-0.20 [-0.49, 0.08]
3 Adherence to fat intake at 6 months						
Assuncao 2010	95	-2.6 (7.8)	97	-2.5 (7.88)		-0.01 [-0.30, 0.27]
4 Adherence to carbohydrate intake at 6 months						
Assuncao 2010 (1)	95	-1.7 (9.75)	97	-0.2 (8.9)		-0.16 [-0.44, 0.12]
5 Adherence to cholesterol intake at 6 months						
Assuncao 2010	95	-29.2 (101.37)	97	-29.3 (93.56)		0.00 [-0.28, 0.28]
6 Adherence to fiber intake at 6 months						
Assuncao 2010 (2)	95	-0.6 (7.8)	97	1.1 (6.9)		-0.23 [-0.51, 0.05]
7 Adherence to sodium intake at 6 months						
Assuncao 2010	95	33 (1063.38)	97	-371.5 (1109.97)		0.37 [0.09, 0.66]
8 Adherence to fruit intake at 6 months						
Assuncao 2010 (3)	95	-3.7 (277.78)	97	52 (193)		-0.23 [-0.52, 0.05]
9 Adherence to vegetable intake at 6 months						
Assuncao 2010 (4)	95	-11.1 (48.73)	97	-12.1 (37.4)		0.02 [-0.26, 0.31]
10 Adherence to sweet food intake at 6 months						
Assuncao 2010	95	-11 (187.14)	97	-44.2 (125.08)		0.21 [-0.08, 0.49]
11 Adherence to energy intake at 12 weeks						
Grace 1996	5	-2995 (2139)	8	-3759 (2155)		0.33 [-0.80, 1.46]
12 Adherence to fat intake at 12 weeks						
Grace 1996	5	-12 (5)	8	-24 (6)		1.97 [0.53, 3.41]

(1) To correct for differences in the direction of the scale, means of both groups were multiplied by -1.

(2) To correct for differences in the direction of the scale, means of both groups were multiplied by -1.

(3) To correct for differences in the direction of the scale, means of both groups were multiplied by -1.

(4) To correct for differences in the direction of the scale, means of both groups were multiplied by -1.

Analysis 2.1. Comparison 2 Multiple interventions versus control in diet adherence, Outcome 1 Continuous data.

Review: Interventions to enhance adherence to dietary advice for preventing and managing chronic diseases in adults

Comparison: 2 Multiple interventions versus control in diet adherence

Outcome: 1 Continuous data

Study or subgroup	Control N	Mean(SD)	Experimental N	Mean(SD)	Std. Mean Difference IV,Random,95% CI	Std. Mean Difference IV,Random,95% CI
1 Adherence to sodium-restricted diet at 3 months						
Arcand 2005	24	-0.26 (1.62)	23	-0.66 (1.28)		0.27 [-0.31, 0.84]
2 Adherence to diet at 3 months						
Gucciardi 2007 (1)	36	-0.2 (0.08)	25	-0.66 (0.15)		3.99 [3.10, 4.88]
3 Adherence to fluid-restricted diet at 1 month						
Tsay 2003 (2)	31	0.03 (0.82)	31	-0.27 (0.78)		0.37 [-0.13, 0.87]
4 Adherence to fluid-restricted diet at 3 months						
Tsay 2003	31	-0.07 (0.86)	31	-0.6 (0.78)		0.64 [0.13, 1.15]
5 Adherence to fluid-restricted diet at 6 months						
Tsay 2003	31	-0.06 (0.85)	31	-0.72 (0.71)		0.83 [0.31, 1.35]
6 Non-adherence to diet (days) at 7 weeks						
Wong 2010	49	-0.4 (2.01)	49	-1.23 (2.29)		0.38 [-0.02, 0.78]
7 Non-adherence to diet (days) at 13 weeks						
Wong 2010	49	-0.57 (1.97)	49	-1.28 (2.12)		0.34 [-0.05, 0.74]
8 Non-adherence to diet (degree) at 7 weeks						
Wong 2010	49	-0.24 (1)	49	-0.59 (0.92)		0.36 [-0.04, 0.76]
9 Non-adherence to diet (degree) at 13 weeks						
Wong 2010	49	-0.46 (1)	49	-0.61 (0.92)		0.15 [-0.24, 0.55]
10 Non-adherence to fluid-restricted diet (days) at 7 weeks						
Wong 2010	49	0.08 (1.95)	49	-0.37 (1.9)		0.23 [-0.17, 0.63]
11 Non-adherence to fluid-restricted diet (days) at 13 weeks						
Wong 2010	49	-0.2 (1.81)	49	-0.66 (1.8)		0.25 [-0.14, 0.65]
12 Non-adherence to fluid-restricted diet (degree) at 7 weeks						
Wong 2010	49	-0.12 (0.91)	49	-0.3 (0.75)		0.21 [-0.18, 0.61]
13 Non-adherence to fluid-restricted diet (degree) at 13 weeks						
Wong 2010	49	-0.28 (0.95)	49	-0.47 (0.67)		0.23 [-0.17, 0.63]

(1) To correct for differences in the direction of the scale, means of both groups were multiplied by -1.

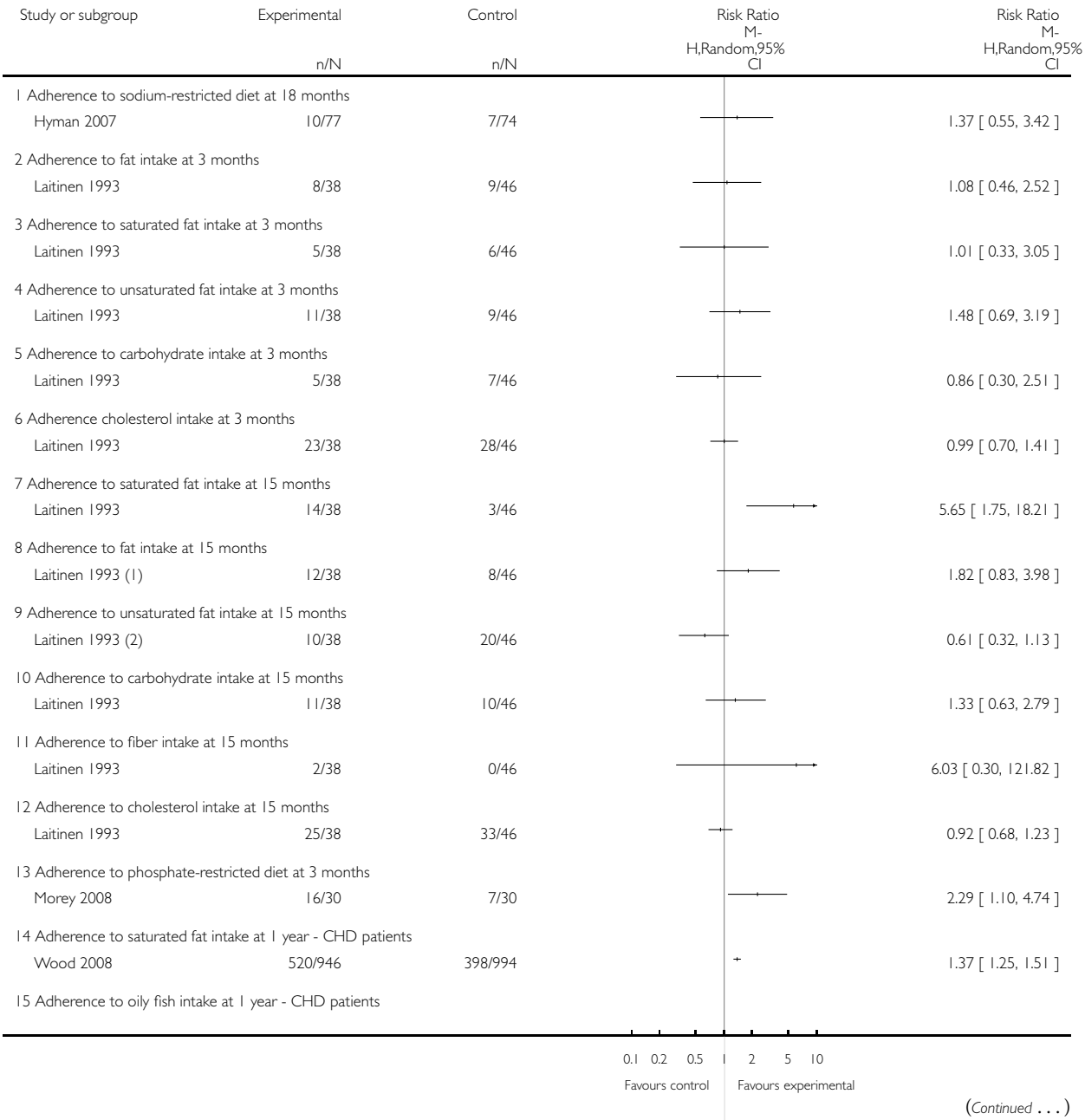
(2) In the article, the authors reported a significant group main effect when analysed with baseline mean weight gains as covariate.

Analysis 2.2. Comparison 2 Multiple interventions versus control in diet adherence, Outcome 2 Dichotomous data.

Review: Interventions to enhance adherence to dietary advice for preventing and managing chronic diseases in adults

Comparison: 2 Multiple interventions versus control in diet adherence

Outcome: 2 Dichotomous data



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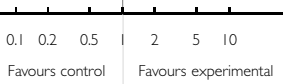
Study or subgroup	Experimental n/N	Control n/N	Risk Ratio M-H,Random,95% CI	Risk Ratio M-H,Random,95% CI
Wood 2008	161/946	80/994		2.11 [1.64, 2.72]
16 Adherence to fish intake at 1 year - CHD patients				
Wood 2008	747/946	666/994		1.18 [1.12, 1.24]
17 Adherence to fruit and vegetable intake at 1 year - CHD patients				
Wood 2008	681/946	348/994		2.06 [1.87, 2.26]
18 Adherence to oily fish intake at 1 year - high risk CHD patients				
Wood 2008	112/1019	60/1005		1.84 [1.36, 2.49]
19 Adherence to fish intake at 1 year - high-risk CHD patients				
Wood 2008	846/1019	663/1005		1.26 [1.19, 1.33]
20 Adherence to fruit and vegetable intake at 1 year - high-risk CHD patients				
Wood 2008	795/1019	392/1005		2.00 [1.84, 2.18]
21 Adherence to diet at 4 weeks				
Zhao 2004	67/100	36/100		1.86 [1.39, 2.50]
22 Adherence to diet at 12 weeks				
Zhao 2004	50/100	33/100		1.52 [1.08, 2.13]



(1) In article, the authors reported a significant difference between groups.

(2) In article, the authors reported a significant difference between groups.

ADDITIONAL TABLES

Table 1. Summary of results: education

Study	Intervention group (description)	Comparative group(s) (description)	Effects on adherence			No of studies (no of participants	Quality of the evidence (GRADE)
			Favours intervention group	Favours comparative group	No difference		
Telephone follow-up						4 (283)	○○○ Very low [2,4]
In summary, among studies using a control/usual care group, three out of ten diet adherence outcomes favoured the intervention group compared to control group and seven diet adherence outcomes had no significant difference between groups. However, these three diet adherence out-							

Table 1. Summary of results: education (*Continued*)

comes favouring the intervention group were no longer significant at a later time point.							
Chiu 2010	Telephone follow-up	Control			Adherence to sodium-restricted diet, fat, fruit and vegetable intakes at 8 weeks		
Cummings 1981	Telephone follow-up	Control; Interventions: (1) contract; (2) contract with the involvement of a family member or friend	vs control: Adherence to potassium-restricted diet and fluid-restricted diet at 6 weeks		vs control: Adherence to potassium-restricted diet and fluid-restricted diet at 3 months; vs (1) (2) : Adherence to potassium-restricted diet and fluid-restricted diet at 6 weeks and 3 months		
Racelis 1998	Telephone follow-up	Control			Adherence to diet		
Stewart 2005	Telephone follow-up	Control	Adherence to sodium-restricted diet at 24 weeks		Adherence to sodium-restricted diet at 36 weeks; Non-adherence to alcohol intake at 24 and 36 weeks		
Group sessions						2 (144)	○○ Low [1,2]
In summary, these studies did not allow us to draw conclusions on the effect of group sessions on diet adherence outcomes.							
Gill 2010 *	Group sessions	Control					
Jones 1986	Group sessions	Interventions: (1) Group sessions and teach to use prompts/cues; (2) Individual sessions with a dietitian; (3) Individual sessions with a dietitian and teach to use prompts/cues			vs (1) (2) (3): Adherence to diet at 16 weeks		

Table 1. Summary of results: education (*Continued*)

Individual sessions with a dietitian						2 (203)	○○ Low [1,2]
In summary, these studies did not allow us to draw conclusions on the effect of individual sessions with a dietitian on diet adherence outcomes.							
Jones 1986	Individual sessions with a dietitian	Interventions: (1) Group sessions and teach to use prompts/ cues; (2) Individual sessions with a dietitian; (3) Individual sessions with a dietitian and teach to use prompts/ cues			vs (1) (2) (3): Adherence to diet at 16 weeks		
Micco 2007 *	Individual sessions with a dietitian	Control					
Individual sessions with a nurse						1 (81)	○○○ Very low [1,2,3]
In summary, this study did not allow us to draw conclusions on the effect of individual sessions with a nurse on diet adherence outcomes.							
Hsueh 2007	Individual sessions with a nurse	Intervention: telephone follow-up and individual sessions with a nurse			Adherence to fiber, vegetable and fruit intakes at 3 and 6 months		
Educational tools-video						3 (318)	○ Moderate [1]
In summary, among studies using a control/usual care group, two out of three diet adherence outcomes favoured the intervention group compared to the control/usual care group and one diet adherence outcome had no significant difference between groups. However, one out of two diet adherence outcomes favouring the intervention group was no longer significant at a later time point.							

Table 1. Summary of results: education (*Continued*)

Baraz 2010	Educational tools - video	Intervention: group sessions and educational tools - booklet			Adherence to diet and fluid-restricted diet at 2 months		
Mahler 1999	Educational tools - video	Control; Intervention: (1) video and relapse prevention/ coping planning	vs control: Adherence to cholesterol and saturated fat-restricted diet at 1 month		vs control: Adherence to cholesterol and saturated fat-restricted diet at 3 months; vs (1) : Adherence to cholesterol and saturated fat-restricted diet at 1 and 3 months;		
McCulloch 1983	Educational tools - video	Usual care; Intervention: (1) nutritional tool	vs usual care: Adherence to day to day consistency in carbohydrate intake at 6 months		vs (1): Adherence to day to day consistency in carbohydrate intake at 6 months		
Educational tools-booklet						1 (83)	○○○ Very low [1,2,3,4]
In summary, this study did not allow us to draw conclusions on the effect of booklet on diet adherence outcomes.							
Kendall 1987	Educational tools - booklet	Intervention: nutritional tool			Adherence to energy, protein, vitamin A, vitamin C, thiamin, riboflavin, niacin, calcium, phosphorus, iron, zinc intakes at 3 and 6 months		

*The authors did not report measures of adherence for both groups, making comparison between groups impossible.

GRADE - Factors decreasing the quality level of a body of evidence:

[1] Limitations in the design and implementation of available studies suggesting high likelihood of bias.

[2] Indirectness of evidence

[3] Imprecision of results

[4] Downgraded by two levels due to important limitations in the design and implementation of available studies suggesting high likelihood of bias.

Table 2. Summary of results: persuasion

Study	Intervention group (description)	Comparative group(s) (description)	Effects on adherence			No of studies (no of participants)	Quality of the evidence (GRADE)
			Favours intervention group	Favours comparative group	No difference		
Reminders						2 (248)	○ Moderate [1]
In summary, among studies using a control/usual care group, 3 out of 19 diet adherence outcomes had no significant difference between groups. It was impossible to assess this result for 16 diet adherence outcomes since data and/or statistical analyses needed for comparison between groups were not provided.							
Gans 1994	Reminder - client	Usual care			Adherence to diet at 3 months		
Gans 1994	Reminder - physician	Usual care			Adherence to diet at 3 months		
Gans 1994	Reminder - client and physician	Usual care			Adherence to diet at 3 months		
Ryan 2002 *	Reminder - 2 weeks, 3 and 6 months	Control					
Ryan 2002 *	Reminder - 3 and 6 months	Control					

*The authors did not report measures of adherence for both groups, making comparison between groups impossible.

GRADE - Factors decreasing the quality level of a body of evidence:

[1] Limitations in the design and implementation of available studies suggesting high likelihood of bias.

[2] Indirectness of evidence

[3] Imprecision of results

[4] Downgraded by two levels due to important limitations in the design and implementation of available studies suggesting high likelihood of bias.

Table 3. Summary of results: incentivisation

Study	Intervention group (description)	Comparative group(s) (description)	Effects on adherence	No of studies (no of participants)	Quality of the evidence (GRADE)

Table 3. Summary of results: incentivisation (*Continued*)

			Favours intervention group	Favours comparative group	No difference		
Contracts with rewards						1 (116)	○○ Low [1,3]
In summary, among studies using a control/usual care group, two out of four diet adherence outcomes favoured the intervention group compared to the control group and two diet adherence outcomes had no significant difference between groups. However, these two diet adherence outcomes favouring the intervention group were no longer significant at three months.							
Cummings 1981	Contract	Control; Interventions: (1) telephone follow-up; (2) contract with the involvement of a family member or friend	vs control: Adherence to potassium-restricted diet and fluid-restricted diet at 6 weeks		vs control: Adherence to potassium-restricted diet and fluid-restricted diet at 3 months; vs (1) (2): Adherence to potassium-restricted diet and fluid-restricted diet at 6 weeks and 3 months		

GRADE - Factors decreasing the quality level of a body of evidence:
[1] Limitations in the design and implementation of available studies suggesting high likelihood of bias.
[2] Indirectness of evidence
[3] Imprecision of results
[4] Downgraded by two levels due to important limitations in the design and implementation of available studies suggesting high likelihood of bias.

Table 4. Summary of results: training

Study	Intervention group (description)	Comparative group(s) (description)	Effects on adherence			No of studies (no of participants)	Quality of the evidence (GRADE)
			Favours intervention group	Favours comparative group	No difference		
Feedback						3 (661)	○○ Low [4]

Table 4. Summary of results: training (*Continued*)

In summary, among studies using a control/usual care group, one out of seven diet adherence outcomes favoured the intervention group compared to the control/usual care group, four favoured the control group whereas two had no significant difference between groups.							
Beasley 2008	Feedback	Control	Adherence to energy, fat, saturated fat and cholesterol intakes at 4 weeks				
French 2008	Feedback - less intensive	Usual care		Adherence to general diet and specific diet at 12 months			
French 2008	Feedback - most intensive	Usual care		Adherence to general diet and specific diet at 12 months			
Meland 1994	Feedback	Control			Adherence to sodium-restricted diet at 1 and 3 months		

GRADE - Factors decreasing the quality level of a body of evidence:
[1] Limitations in the design and implementation of available studies suggesting high likelihood of bias.
[2] Indirectness of evidence
[3] Imprecision of results
[4] Downgraded by two levels due to important limitations in the design and implementation of available studies suggesting high likelihood of bias.

Table 5. Summary of results: restriction

Study	Intervention group (description)	Comparative group(s) (description)	Effects on adherence			No of studies (no of participants)	Quality of the evidence (GRADE)
			Favours intervention group	Favours comparative group	No difference		
Restriction						1 (7)	○○○ Very low[1,2,3]

Table 5. Summary of results: restriction (*Continued*)

In summary, this study did not allow us to draw conclusions on the effect of restriction on diet adherence outcomes.							
Conrad 2000*	Restriction	Control			Adherence to very low fat diet at 7 months		

*The authors did not report measures of adherence for both groups, making comparison between groups impossible.

GRADE - Factors decreasing the quality level of a body of evidence:

[1] Limitations in the design and implementation of available studies suggesting high likelihood of bias.

[2] Indirectness of evidence

[3] Imprecision of results

[4] Downgraded by two levels due to important limitations in the design and implementation of available studies suggesting high likelihood of bias.

Table 6. Summary of results: modelling

Study	Intervention group (description)	Comparative group(s) (description)	Effects on adherence			No of studies (no of participants)	Quality of the evidence (GRADE)
			Favours intervention group	Favours comparative group	No difference		
Nutritional tools						7 (514)	○○○ Very low[2,4]
In summary, among studies using a control/usual care group, 3 out of 17 diet adherence outcomes favoured the intervention group and 11 diet adherence outcomes had no significant difference between groups. It was impossible to assess this result for three diet adherence outcomes as data and/or statistical analyses needed for comparison between groups were not provided.							
Assuncao 2010	Nutritional tools	Usual care	Adherence to sodium at 6 months		Adherence to energy, protein, fat, carbohydrate, cholesterol, fiber, fruit, vegetable and sweet food intakes at 6 months		
Chen 2006	Nutritional tools	Control	Adherence to protein intake				

Table 6. Summary of results: modelling (*Continued*)

			at 1 month				
Grace 1996	Nutritional tools	Control	Adherence to fat intakes at 12 weeks		Adherence to energy at 12 weeks		
Kendall 1987	Nutritional tools	Intervention: educational tool - booklet			Adherence to energy, protein, vitamin and mineral intakes at 3 and 6 months		
Logan 2010	Nutritional tools	Intervention: Barrier identification/ problem solving and goal setting			Adherence to Mediterranean diet at 6 and 12 months		
McCulloch 1983	Nutritional tools	Usual care; Intervention: (1) educational tool - video			vs control and (1): Adherence to day to day consistency in carbohydrate intake at 6 months		
Scisney-Matlock 2006*	Nutritional tools	Control					

*The authors did not report measures of adherence for both groups, making comparison between groups impossible.

GRADE - Factors decreasing the quality level of a body of evidence:

[1] Limitations in the design and implementation of available studies suggesting high likelihood of bias.

[2] Indirectness of evidence

[3] Imprecision of results

[4] Downgraded by two levels due to important limitations in the design and implementation of available studies suggesting high likelihood of bias.

Table 7. Summary of results: enablement

Study	Intervention group (description)	Comparative group(s) (description)	Effects on adherence			No of studies (no of participants)	Quality of the evidence (GRADE)
			Favours intervention group	Favours comparative group	No difference		
Behaviour change techniques						3 (136)	
In summary, only one study used a control group and three out of three diet adherence outcomes had no difference between groups.							
Aldarondo 1999	Barrier identification/ problem solving and self-talk	Control			Adherence to energy, fat and saturated fat intakes at 14 weeks		○○○ Very low[2,4]
Bennett 1986	Teach to use prompts/cues	Interventions: (1) self-talk; (2) barrier identification/problem solving	vs (1) (2): Adherence to energy intake between baseline and 15 weeks				
Bennett 1986	Self-talk	Interventions: (1) teach to use prompts/ cue; (2) barrier identification/problem solving		vs (1): Adherence to energy intake between baseline and 15 weeks	vs (2): Adherence to energy intake between baseline and 15 weeks		
Bennett 1986	Barrier identification/problem solving	Interventions: (1) teach to use prompts/ cue; (2) self-talk		vs (1): Adherence to energy intake between baseline and 15 weeks	vs (2): Adherence to energy intake between baseline and 15 weeks		
Logan 2010	Barrier identification/ problem solving and goal setting	Intervention: Nutritional tools			Adherence to Mediterranean diet at 6 and 12 months		

GRADE - Factors decreasing the quality level of a body of evidence:

[1] Limitations in the design and implementation of available studies suggesting high likelihood of bias.
[2] Indirectness of evidence
[3] Imprecision of results
[4] Downgraded by two levels due to important limitations in the design and implementation of available studies suggesting high likelihood of bias.

Table 8. Summary of results: multiple interventions

Study	Intervention group (description)	Comparative group(s) (description)	Effects on adherence			No of studies (no of participants)	Quality of the evidence (GRADE)
			Favours intervention group	Favours comparative group	No difference		
Multiple interventions						18 (7700)	**
In summary, among studies using a control/usual care group, 21 out of 56 diet adherence outcomes favoured the intervention group whereas 32 diet adherence outcomes had no significant difference between groups. It was impossible to assess this result for three diet adherence outcomes as data and/or statistical analyses needed for comparison between groups were not provided. However, 4 out of 21 diet adherence outcomes favouring the intervention group was no longer significant at a later time point.							
Arcand 2005	Individual sessions with a dietitian and goal setting	Usual care			Adherence to sodium-restricted diet at 3 months		
Baraz 2010	Intervention: group sessions and educational tools - booklet	Intervention: educational tools - video			Adherence to diet and fluid-restricted diet at 2 months		
Becker 1998	Telephone follow-up and barrier identification/problem solving	Usual care			Adherence to fat-restricted diet at 2 years		
Blanson 2009	Motivational interviewing and self-monitoring and feedback-diary	Control			Adherence to diet at 28 days		
Cummings 1981	Contract with the involve-	Control; Interventions:	vs control: Adherence		vs control: Adherence		

Table 8. Summary of results: multiple interventions (*Continued*)

	ment of a family member or friend	(1) telephone follow-up; (2) contract	to potassium-restricted diet and fluid-restricted diet at 6 weeks		to potassium-restricted diet and fluid-restricted diet at 3 months; vs (1) (2): Adherence to potassium-restricted diet and fluid-restricted diet at 3 months		
Gucciardi 2007	Group sessions, nutritional tools and barrier identification/problem solving	Control	Adherence to diet at 3 months				
Hsueh 2007	Telephone follow-up and individual sessions with a nurse	Intervention: Individual sessions with a nurse			Adherence to fiber, vegetable and fruit intake at 3 and 6 months		
Hyman 2007	Telephone follow-up and motivational interviewing - simultaneous	Usual care; Intervention: (1) telephone follow-up and motivational interviewing - sequential	vs usual care and (1): Adherence to sodium-restricted diet at 6 months		vs usual care and (1): Adherence to sodium-restricted diet at 18 months		
Hyman 2007	Telephone follow-up and motivational interviewing - sequential	Usual care; Intervention: (1) telephone follow-up and motivational interviewing - simultaneous		vs (1): Adherence to sodium-restricted diet at 6 months	vs control: Adherence to sodium-restricted diet at 6 months and 18 months; vs (1): Adherence to sodium-restricted diet at 18 months		

Table 8. Summary of results: multiple interventions (*Continued*)

Jiang 2004	Individual sessions with a nurse, telephone follow-up and goal setting	Usual care	Adherence to ATP step II diet at 3 and 6 months.		
Jones 1986	Group sessions and teach to use prompts/cues	Interventions: (1) group sessions; (2) individual sessions with a dietitian; (3) individual sessions with a dietitian and teach to use prompts/cues			vs (1) (2) (3): adherence to diet at 16 weeks
Jones 1986	Individual sessions with a dietitian and teach to use prompts/cues	Interventions: (1) group sessions; (2) individual sessions with a dietitian; (3) group sessions and teach to use prompts/cues			vs (1) (2) (3): adherence to diet at 16 weeks
Laitinen 1993	Individual sessions with a dietitian, nutritional tools and goal setting	Usual care	Adherence to saturated fat intakes at 15 months		Adherence to saturated fat intakes at 3 months; Adherence to total fat, unsaturated fat, carbohydrate, fiber and cholesterol intakes at 3 and 15 months
Mahler 1999	Educational tools - video and relapse prevention/coping planning	Control; Intervention: (1) educational tools - video	vs control: Adherence to cholesterol and saturated fat-restricted diet at		vs control: Adherence to cholesterol and saturated fat-

Table 8. Summary of results: multiple interventions (*Continued*)

			1 month		restricted diet at 3 months; vs (1): Adherence to cholesterol and saturated fat - restricted diet at 1 and 3 months		
Miller 1988	Individual sessions with a nurse and barrier identification/ problem solving and goal setting	Control	Adherence to diet at 2 years		Adherence to diet at 30 days, 60 days and 1 year		
Morey 2008	Individual sessions with a dietitian, educational tools-booklet, reminders, motivational interviewing	Control	Adherence to phosphate-restricted diet at 3 months				
Tsay 2003	Self-monitoring and feedback-diary, stress management and goal setting	Usual care	Adherence to fluid-restricted diet at 3 months and 6 months		Adherence to fluid-restricted diet at 1 month		
Wong 2010	Telephone follow-up and goal setting	Control			Non-adherence to diet (days and degree) at 7 weeks and 13 weeks Non-adherence to fluid-restricted diet (days and degree) at 7 weeks and 13 weeks		

Table 8. Summary of results: multiple interventions (*Continued*)

Wood 2008 - coronary heart disease	Individual sessions with a nurse and motivational interviewing	Usual care	Adherence to saturated fat, oily fish, fish and fruit and vegetable intakes at 1 year				
Wood 2008 - high risk of coronary heart disease	Individual sessions with a nurse and motivational interviewing	Usual care	Adherence to oily fish, fish and fruit and vegetables intakes at 1 year				
Zhao 2004	Telephone follow-up, individual sessions with a dietitian and goal setting	Usual care	High adherence to diet at 4 and 12 weeks				

**Multiple interventions included a variety of interventions, which did not allow the use of GRADE.

APPENDICES

Appendix 1. PubMed search strategy

#1 Patient compliance[MH:NOEXP]
#2 Complian*[TIAB] OR Comply*[TIAB] OR Complied[TIAB] OR Adher*[TIAB] OR Noncomplian*[TIAB] OR Nonadher*[TIAB]
#3 #1 OR #2
#4 Diet[MH]
#5 Diet therapy[MH]
#6 Nutrition assessment[MH]
#7 Food habits[MH]
#8 Nutrition policy[MH]
#9 Nutritional requirements[MH]
#10 Nutrition therapy[MH:NOEXP]
#11 Diet therapy[SH]
#12 Diet[TIAB] OR Diets[TIAB] OR Dieta*[TIAB] OR Diete*[TIAB] OR Dieti*[TIAB] OR Nutrition*[TIAB] OR Food habit*[TIAB] OR Feeding behaviour*[TIAB] OR Eating behaviour*[TIAB]
#13 #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12
#14 Randomized controlled trial[PT]
#15 Controlled clinical trial[PT]
#16 Randomized[TIAB]

#17 Randomly[TIAB]
#18 Trial[TIAB]
#19 Groups[TIAB]
#20 Placebo[TIAB]
#21 Drug therapy[SH]
#22 #14 OR #15 OR #16 OR #17 OR #18 OR #19 OR #20 OR #21
#23 Animals[MH] NOT Humans[MH]
#24 (#3 AND #13 AND #22) NOT #23

Appendix 2. EMBASE search strategy

#1 'Patient compliance'/de
#2 (Complian* OR Comply* OR Complied OR Adher* OR Noncomplian* OR Nonadher*):ti,ab
#3 #1 OR #2
#4 Diet/exp
#5 'Diet therapy'/exp
#6 'Nutritional assessment'/de
#7 'Feeding behavior'/exp
#8 'Nutritional requirement'/exp
#9 #4 OR #5 OR #6 OR #7 OR #8
#10 (Diet* OR Nutrition* OR 'Food habit' OR 'Food habits' OR 'Feeding behavior' OR 'Feeding behaviors' OR 'Eating behavior' OR 'Eating behaviors'):ti,ab
#11 #9 OR #10
#12 #3 AND #11
#13 'Randomized controlled trial'/de
#14 'Controlled clinical trial'/de
#15 'Single blind procedure'/de OR 'Double blind procedure'/de
#16 'Crossover procedure'/
#17 Random*:ti,ab
#18 Placebo*:ti,ab
#19 ((singl* or doubl*) adj (blind* or mask*)):ti,ab
#20 (crossover or 'cross over' or factorial* or 'latin square'):ti,ab
#21 (assign* or allocat* or volunteer*):ti,ab
#22 #13 OR #14 OR #15 OR #16 OR #17 OR #18 OR #19 OR #20 OR #21
#23 (Animal/ OR Nonhuman) NOT Human/
#24 #22 NOT #23
#25 #12 AND #24

Appendix 3. CINAHL search strategy

S1 MH "Patient Compliance"
S2 TI (Complian* OR Comply* OR Complied OR Adher* OR Noncomplian* OR Nonadher*) OR AB (Complian* OR Comply* OR Complied OR Adher* OR Noncomplian* OR Nonadher*)
S3 S1 OR S2
S4 MH "Diet+"
S5 MH "Diet therapy+"
S6 MH "Nutritional assessment"
S7 MH "Food habits"
S8 MH "Eating behavior+"
S9 MH "Nutrition policy+"
S10 MH "Nutritional requirement+"
S11 MW "DH"

S12 TI (Diet* OR Nutrition* OR "Food habit*" OR "Feeding behavior*" OR "Eating behavior*") OR AB (Diet* OR Dieti* OR Nutrition* OR "Food habit*" OR "Feeding behavior*" OR "Eating behavior*")
S13 S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10 OR S11 OR S12
S14 S2 AND S13
S15 Randomi?ed controlled Trial*
S16 PT "Clinical Trial"
S17 MH "Clinical Trials +"
S18 MH "Random Assignment"
S19 MH "Placebos"
S20 MH "Quantitative studies"
S21 TI (random* OR trial or groups or placebo*) OR AB (random* OR trial or groups or placebo*)
S22 TI (singl* or doubl* or tripl* or trebl*) and TI (blind* or mask*)
S23 AB (singl* or doubl* or tripl* or trebl*) and AB (blind* or mask*)
S24 S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23
S25 S14 AND S24
S26 S25 (Limiters - Exclude Medline records)

Appendix 4. PsycINFO search strategy

#1 (complian* or comply* or complied or adher* or noncomplian* or nonadheren*)
#2 (diet* or nutrition* or "food habit" or "food habits" or "food intake" or "food intakes" or "eating behavior" or "eating behaviors" OR "feeding behavior" OR "feeding behaviors").
#3 #1 AND #2
#4 Random*
#5 Trial*
#6 Control*
#7 Placebo*
#8 ((singl* or doubl* or trebl* or tripl*) and (blind* or mask*))
#9 "cross over" or crossover or factorial* or "latin square"
#10 assign* or allocat* or volunteer*
#11 it = "treatment effectiveness evaluation"
#12 it = "mental health program evaluation"
#13 it = "Experimental design"
#14 #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13
#15 #3 AND #14

Appendix 5. *The Cochrane Library* search strategy

#1 (Complian* OR Comply* OR Complied OR Adher* OR Noncomplian* OR Nonadher*):ti,ab,kw
#2 (Diet* OR Nutrition* OR "Food habit*" OR "Feeding behavior*" OR "Eating behavior*"):ti,ab,kw
#3 MeSH descriptor Diet explode all trees
#4 MeSH descriptor Diet Therapy explode all trees
#5 #2 OR #3 OR #4
#6 #1 AND #5

Appendix 6. Methods for potential application in future updates of the review

Unit of analysis issues

We will meta-analyse cluster RCTs with non-cluster RCTs after inflating the standard errors to account for clustering. If cluster RCTs are included, we will request the intracluster correlation coefficient (ICC) from the study authors. If the ICC is not available, it will be imputed with external estimates obtained from similar studies. The ICC will then be used to calculate the design effect in order to obtain an inflated standard error that accounts for clustering by multiplying the standard error of the effect estimate (from an analysis ignoring clustering) by the square root of the design effect. We will also perform sensitivity analyses to assess how sensitive results are to reasonable changes in ICC imputation.

Dealing with missing data

Where data are missing, we will attempt to contact study authors. We will conduct an intention-to-treat (ITT) analysis where possible; otherwise data will be analysed as reported. Loss to follow-up will be documented and assessed as a source of potential bias. We will perform sensitivity analyses based on consideration of 'best-case' and 'worst-case' scenarios (CCCRG 2010; Gamble 2005). The 'best-case' scenario is that all missing outcomes in the experimental intervention group had good outcomes, and all those missing in the control intervention group had poor outcomes; the 'worst-case' scenario is the reverse.

Assessment of heterogeneity

Where meta-analysis is possible, we will assess statistical heterogeneity between trials using the Chi^2 statistic and I^2 statistic. A Chi^2 P value of less than 0.10 or an I^2 value equal to or more than 50% will be considered to indicate substantial heterogeneity. If heterogeneity is identified, we will undertake subgroup analysis to investigate its possible source. We will conduct a meta-regression if there are enough studies to assess the effect of the possible sources of heterogeneity.

Data synthesis

We will group data with respect to participants' health condition (prevention versus management of chronic diseases). We will analyse included studies to determine whether there are studies sufficiently similar in participants' characteristics (e.g. age, gender), study design (RCT, cluster RCT), type of intervention (e.g. directed towards client, family or non-family caregiver), environmental setting (e.g. outpatient, workplace, or other community settings), and outcome measurement to allow for a meta-analysis of their combined data. If studies are sufficiently similar, we will conduct meta-analyses using a random-effects model. If studies are too heterogeneous, we will present a descriptive review of included studies using a narrative along with extracted data in tables and figures.

Subgroup analysis and investigation of heterogeneity

If enough studies are found to justify subgroup analyses, the following subgroups could be investigated using random-effects meta-regression:

- Type of intervention (e.g. directed towards client, family or non-family caregiver); and
- Characteristics of participants (e.g. age, gender, socioeconomic status, immigrant status).

Sensitivity analysis

We will conduct a primary analysis with studies which we consider to have a low risk of bias (i.e. those receiving a 'low risk' rating for the criteria of sequence generation and allocation concealment). Sensitivity analyses will also be performed with all included studies in order to show how conclusions might be affected if studies at high risk of bias were appropriate in order to explore the influence of the following factors on effect size:

- excluding unpublished studies;
- excluding studies that do not provide the drop out rate;
- excluding any large studies to establish how they impact on the results;
- excluding studies using the following filters; language of publication, source of funding (industry versus other);
- excluding studies based on weak-evidence advice (e.g. not coming from practice guidelines).

CONTRIBUTIONS OF AUTHORS

SD coordinated and contributed to all stages of the review.

AL performed the search strategy, identified eligible studies, extracted data, performed analysis and interpreted result and wrote the first draft of the review.

ST assisted with statistical analyses, contributed to the writing of the review.

SR developed the search strategy, contributed to the writing of the review.

KG contributed to the protocol development and to the writing of the review.

FL contributed to the protocol development and to the writing of the review.

DECLARATIONS OF INTEREST

None known.

SOURCES OF SUPPORT

Internal sources

- No sources of support supplied

External sources

- Canadian Institutes of Health Research, Canada.

Salary of Annie Lapointe

DIFFERENCES BETWEEN PROTOCOL AND REVIEW

The protocol was published in 2010 (Desroches 2010).

Types of interventions: Multiple interventions are now defined as those with two or more interventions.

Pubmed search strategy: Food habit*[TIAB] or Feeding behaviour*[TIAB] or Eating behaviour*[TIAB] were added to the Pubmed search strategy.

Assessment of reporting biases: publication bias using funnel plot was not explored since multiple adherence outcome measures were reported in several studies and could not be pooled together.

INDEX TERMS

Medical Subject Headings (MeSH)

*Patient Compliance; Chronic Disease [prevention & control; *therapy]; Counseling [methods]; Diet Therapy [methods]; Dietetics [*methods]; Health Education [methods]; Randomized Controlled Trials as Topic

MeSH check words

Adult; Humans