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Dietary advice given by a dietitian versus other health professional or self-help resources to reduce blood cholesterol (Review)

Thompson RL, Summerbell CD, Hooper L, Higgins JPT, Little P, Talbot D, Ebrahim S

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TABLE OF CONTENTS

[Intervention Review]

Dietary advice given by a dietitian versus other health professional or self-help resources to reduce blood cholesterol

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ABSTRACT

Background

The average level of blood cholesterol is an important determinant of the risk of coronary heart disease. Blood cholesterol can be reduced by dietary means. Although dietitians are trained to provide dietary advice, for practical reasons it may be given by other health professionals or using self-help resources.

Objectives

To assess the effects of dietary advice given by a dietitian compared with another health professional, or the use of self-help resources, in reducing blood cholesterol in adults.

Search methods

We searched The Cochrane Library (to Issue 3 2002), the EPOC trial register (October 2002), MEDLINE (1966 to September 2002), EMBASE (1980 to September 2002), Cinahl (1982 to August 2002), Human Nutrition (1991 to 1998), Science Citation Index, Social Sciences Citation Index, hand searched conference proceedings on nutrition and heart disease, and contacted experts in the field.

Selection criteria

Randomised trials of dietary advice given by a dietitian compared with another health professional or self-help resources. The main outcome was difference in blood cholesterol between dietitian groups compared with other intervention groups.

Data collection and analysis

Two reviewers independently extracted data and assessed study quality.

Main results

Twelve studies with 13 comparisons were included. Four studies compared dietitian with doctor, seven with self-help resources, and only one study was found for dietitian versus nurse and dietitian versus counsellor comparisons. Participants receiving advice from dietitians experienced a greater reduction in blood cholesterol than those receiving advice only from doctors (-0.25 mmol/L (95% CI -0.37, -0.12 mmol/L)). There was no statistically significant difference in change in blood cholesterol between dietitians and self-help resources (-0.10 mmol/L (95% CI -0.22, 0.03 mmol/L)). No statistically significant differences were detected for secondary outcome measures between any of the comparisons with the exception of dietitian versus nurse for HDLc, where the dietitian group showed a greater reduction (-0.06 mmol/L (95% CI -0.11, -0.01)) and dietitian versus counsellor for body weight, where the dietitian group showed a greater reduction (-5.80 kg (95% CI -8.91, -2.69 kg)).

Authors' conclusions

Dietitians were better than doctors at lowering blood cholesterol in the short to medium term, but there was no evidence that they were better than self-help resources. There was no evidence that dietitians provided better outcomes than nurses.

The results should be interpreted with caution as the studies were not of good quality and the analysis was based on a limited number of trials.

PLAIN LANGUAGE SUMMARY

Dietary advice by dietitians to lower blood cholesterol can be more effective than advice by doctors, but may not be more effective than self-help resources.

Blood cholesterol level is an important indicator of the risk of heart disease. This review looked at the effectiveness of dietary advice given by dietitians to lower blood cholesterol, compared with the effectiveness of dietary advice given by other types of health professional or using self-help resources. The review found that advice by dietitians to lower blood cholesterol was more effective than that of doctors (in the short to medium term), but possibly not more effective than using self-help resources. There was no evidence to suggest that dietary advice given by dietitians was more effective than that given by nurses.

BACKGROUND

Description of the condition

The average level of blood cholesterol within a population is an important determinant of the coronary heart disease (CHD) risk of the population. In countries in which the average cholesterol levels of the population are low CHD tends to be an uncommon disease. In prospective epidemiological studies of individuals those with lower levels of cholesterol run lower risk of developing CHD. The association between cholesterol level and future risk of CHD is graded and continuous: there is no threshold above which CHD risk begins to increase.

Differences in the average levels of blood cholesterol between communities or populations are largely determined by differences in their diets. Countries with high dietary saturated fat intake and a low ratio of polyunsaturated to saturated fatty acids have high average cholesterol levels (Grundy 1982). Randomised controlled trials in institutional settings demonstrate that if components of the diets of individuals are changed substantially then large changes in blood cholesterol levels can be achieved (Clarke 1997). The generally small changes in blood cholesterol which are produced by interventions aimed at free-living populations (Ebrahim 1997; Brunner 1997; Tang 1998) may reflect poor compliance to the dietary advice given in community settings and/or that the people providing the advice could be more effective in their role.

Description of the intervention

How the intervention might work

It appears that the willingness and ability of general populations to modify their eating habits, and thereby their blood cholesterol levels, in response to dietary advice as customarily given in primary care and occupational health settings is very limited. A recent US trial of a range of dietary fat reductions in hypercholesterolemia volunteers of above average education and with very positive health behaviours showed reductions in total cholesterol of between 4-10% over one year, although one in eight participants dropped out during the year (Knopp 1997). However, this trial had no placebo group and probably over-estimated reductions because of regression to the mean effects. In a British trial comparing the effects of dietary advice given by a practice nurse, dietitian or use of a self-help leaflet, allowance for regression to the mean effects reduced the observed fall in total blood cholesterol to 1.5% (Neil 1995). These studies suggest that the level of cholesterol reduction that may be expected from advice by doctors and nurses is likely to be very small.

Why it is important to do this review

Dietitians are specifically trained and motivated to provide high quality dietary advice. Dietitians have a variety of different approaches available in order to provide advice and information that is appropriate for an individual patient. Due to the limited number of dietitians and the large proportion of the population who are at risk from, or have, coronary heart disease, much of the dietary advice is given by physicians and nurses rather than by dietitians with extensive nutrition training (Summerbell 1996). The effectiveness of dietary advice given by dietitians compared with other health professionals or self-help resources is unknown. Knowledge of the relative effectiveness would inform policy decisions on the best way to manage raised blood cholesterol in the general population. If dietitians prove to be much better than other health professionals at reducing blood cholesterol it may be sensible to increase the number of dietitians, alternatively if there is not a large difference some dietetic work could be channeled into training nurses and doctors to give appropriate advice. It is important that patients get the best treatment but that this also fits within current resources and financial constraints.

OBJECTIVES

Primary objective

The review aimed to answer the following question:

In adults, what is the relative efficacy of dietary advice given by a dietitian compared with another health professional, or using self-help resources in reducing blood cholesterol?

Comparisons included:

1. Dietitians with other health professionals (including nurses and doctors);

2. Dietitians with self-help resources (such as leaflets, videos, computers in which there was no contact with a health professional).

Secondary objectives

To determine the effect of other factors on the effectiveness of reducing blood cholesterol.

1. Participants at high risk of coronary heart disease versus those at low risk;

2. Dietary interventions alone versus multiple lifestyle interventions (e.g. smoking cessation, physical activity given in addition to dietary advice);

3. Length of follow-up;

4. Setting for dietary advice (workplace, primary care, out-patient clinics);

5. Contact time with health professional;

6. Concurrent use of lipid lowering drugs in all arms;

7. Dietetic training for other health professionals.

METHODS

Criteria for considering studies for this review

Types of studies

Randomised controlled trials (RCTs) of at least six weeks from baseline visit. This includes any study in which the term random has been used to describe the method of study group allocation.

Types of participants

Age: studies of individuals aged at least 18 years.
Gender: both males and females were included.
Health: studies of participants with or without existing heart disease or previous myocardial infarction were included.
Setting: free-living subjects recruited from primary care, workplace, out-patient clinics and other community settings.
Studies of participants who were hospitalised or living in institutions were excluded.

Types of interventions

All interventions including dietary advice to reduce blood cholesterol. Interventions of dietary advice using dietary supplements were excluded. Accepted interventions included dietary advice given by a dietitian or a nutritionist compared with another health professional (e.g. doctor or nurse) or self-help resources. Nutritionists as well as dietitians have been included as in different settings and different countries the terms dietitian and nutritionist may both be used to describe a health professional trained to give dietary advice. Studies in which the intervention included the provision of meals or food items were not accepted. Trials of lipid lowering drugs, where drugs were given to the intervention group only, were excluded.

Types of outcome measures

Primary outcomes:
The main outcome was difference in blood cholesterol between dietitian group compared with other intervention groups.
Secondary outcomes:
We examined data on change in low density lipoprotein cholesterol, high density lipoprotein cholesterol, body mass index (or body weight) and blood pressure. Since patient preference and acceptability of methods are important, data on patient satisfaction with the interventions were also examined.

Search methods for identification of studies

Electronic searches

We searched the EPOC trial register (October 2002), MEDLINE (1966 to September 2002), EMBASE (1980 to September 2002), Human Nutrition (1991 to 1998), CINAHL (1982 to August 2002), The Cochrane Library (to Issue 3 2002). The search was not limited to English language publications only.
The following strategy developed in MEDLINE (written for Silver Platter) was used and modified as necessary for other databases.
Topic search:
explode "HYPERLIPIDEMIA"/ all subheadings
explode "CHOLESTEROL" / all subheadings
explode "CARDIOVASCULAR-DISEASES"/ all subheadings
"LIPIDS"/ all subheadings
explode "LIPOPROTEINS"/ all subheadings
explode "HYPERLIPOPROTEINEMIA" /all subheadings
HYPERCHOLESTEROL* in TI,AB
HYPERLIP* in TI,AB
CHOLESTEROL* in TI,AB
HEART in TI,AB
CORONARY in TI,AB
CARDIOVASCULAR in TI,AB
CARDIO VASCULAR in TI,AB
LIPID* in TI,AB
LIPOPROTEIN* in TI,AB
MYOCARDIAL INFARCTION* in TI,AB
#1 or #2 or #3 or #4 or #5 or #6
#7 or #8 or #9 or #10 or #11 or #12 or #13 or #14 or #15 or #16
#17 or #18
explode "DIET"/ all subheadings
explode "DIET-THERAPY"/ all subheadings
explode "DIETARY-FATS"/ all subheadings
explode "FOOD"/ all subheadings
"EATING"/ all subheadings
explode "FEEDING-BEHAVIOR"/ all subheadings
DIET* in TI,AB
DIET-THERAPY in MESH
NUTRI* in TI,AB
FOOD* in TI,AB
FEED* in TI,AB
LIFESTYL* in TI,AB
LIFE STYL* in TI,AB
EAT* in TI,AB
FAT* near INTAKE* in TI,AB
FAT* near CONSUM* in TI,AB
#20 or #21 or #22 or #23 or #24 or #25
#26 or #27 or #28 or #29 or #30 or #31 or #32 or #33 or #34 or #35
#36 or #37
#19 and #38
RCT search
(TG=ANIMAL) not ((TG=HUMAN) and (TG=ANIMAL))
RANDOMIZED-CONTROLLED-TRIAL in PT
CONTROLLED-CLINICAL-TRIAL in PT
RANDOMIZED-CONTROLLED-TRIALS
RANDOM-ALLOCATION
DOUBLE-BLIND-METHOD
SINGLE-BLIND-METHOD
#2 or #3 or #4 or #5 or #6 or #7
Titles and abstracts from the above searches were screened by RT. When the title/abstract could not be rejected with certainty, the full text of the article was obtained for further evaluation.

Searching other resources

Hand searches

The following conference proceedings were hand searched by RT. Proceedings of the Nutrition Society (1990 to 1998); 3rd and 4th International Conferences on Preventive Cardiology (1993 and 1997); 15th and 16th International Congresses on Nutrition (1993 and 1997); and 15th Congress of the European Society of Cardiology (1993).

Other searches

Published systematic reviews addressing dietary advice to lower blood cholesterol were sought as a source of RCTs. The reference lists of both published reviews and studies included in this review were also checked for other potentially important studies.

Experts in the field were contacted for references to studies not yet identified by the search process. Experts were defined as the first authors of studies meeting the inclusion criteria for this review or any relevant systematic review.

A forward search on included studies was conducted using Science Citation Index (1981 to 1998) and Social Sciences Citation Index (1981 to 1998).

Data collection and analysis

Each potentially relevant study was assessed for inclusion in the review independently by at least two reviewers (RT, LH, PL). Differences between the reviewers were resolved by discussion. It was planned that if after discussion agreement between the reviewers could not be established a third reviewer would be used. However this was unnecessary. The Kappa statistic for the agreement between the reviewers was 0.68 (a good agreement). The main area of discrepancy between the reviewers was establishing who was responsible for giving the dietary advice as it was not always explicit.

Excluded studies along with the reasons for their exclusion are given in the Characteristics of excluded studies table.

Data Collection

A data extraction form based upon the standard EPOC checklist was designed for this review (See EDITORIAL INFORMATION under GROUP DETAILS for METHODS USED IN REVIEWS.).

The following information on outcome variables from each trial was extracted: number of subjects, baseline and final values, mean change (final minus baseline values) and standard deviation of change for both intervention and control groups. If standard deviations were not reported they were estimated using the methods described by Follmann (Follmann 1992). Four studies provided baseline and follow-up values with standard deviations but no standard deviation for the mean change (Bacon 2002; Luepker 1978; Smith 1976; Tomson 1995). Using two studies (Foreyt 1979; Neil 1995) in which data were provided for baseline, follow-up and change from baseline a value for the correlation between baseline and follow-up values was computed. A conservative estimate (lowest correlation) was used to compute the standard deviation for the mean change for four studies .

The standard EPOC criteria were used to assess the methodological quality of randomised trials. (See EDITORIAL INFORMATION under GROUP DETAILS for METHODS USED IN REVIEWS.) In brief the criteria were:

1) Concealment of allocation score DONE if random process was explicitly described.
2) Follow-up of participants at end of study score DONE if at least 80%.
3) Blinded assessment of blood cholesterol score DONE if a standardised, automated laboratory test was used.
4) Similar baseline measures for each intervention group score DONE if no substantial differences.
5) Reliable blood cholesterol measure score DONE if standardized test used.
6) Protection against contamination score DONE if it is unlikely there was any communication between intervention groups.

Original reports of trial results were extracted by two independent reviewers (RT, LH) using the data extraction form. Minor differences mainly in terms of the quality assessment between reviewers' extraction results were resolved by discussion.

Data analysis

The outcome measurements - total blood cholesterol, low density lipoprotein cholesterol, high density lipoprotein cholesterol, body mass index and blood pressure were continuous variables. Only one study reported any data on the qualitative measures of patient preference and therefore this outcome has not been included in the meta-analysis.

Net differences (i.e. dietitian minus other group differences) at the longest duration of follow-up available were computed. Unstandardised mean differences were examined using the random effects model. Standardised mean differences were also performed to allow for the difference in length of follow-up between the studies. Where there were no material differences between results using standardised and unstandardised mean differences, the unstandardised results are presented.

Differences between the results of the trials were checked for heterogeneity by visual inspection of the graphs and by statistical test (chi square).

Sensitivity analysis was carried out to assess the robustness of the results in terms of quality. Funnel plots were used to assess asymmetry between the effects of larger and smaller studies. Sensitivity analyses were also performed to assess the robustness of meta-analytic results to unit of analysis errors. For cluster randomised trials for which papers presented results based on participants as units of analysis, variances of treatment effect estimates were inflated by a 'design effect' as described by Hauck et al (Hauck 1991). A range of feasible intra class correlation coefficients was assumed, using findings of Ukoumunne (Ukoumunne 1999) as a guide. In particular, for general practices values of 0.001 and 0.01 were used.

RESULTS

Description of studies

See: Characteristics of included studies; Characteristics of excluded studies.

Details of the studies included in the review are shown in the table of characteristics of included studies. The column headed 'methods' presents the results of the quality assessment (see methods of the review). The column headed 'notes' refers to additional information about the studies and includes the conclusions made by the authors of the studies.

Twelve studies (13 comparisons) were identified that met all the inclusion criteria (one study had two relevant comparisons). There were four studies comparing advice from dietitians and doctors, seven comparing advice from dietitians and self-help resources, one comparing dietitian and counsellor and one comparing dietitians and nurses. Most studies were carried out in the UK, USA and Australia. Studies were carried out in a range of settings including general practice (Caggiula 1996; Gosselin 1996; Neil 1995; Tomson 1995), workplace (Barratt 1994; Luepker 1978; Smith 1976) and a variety of clinic settings (Bacon 2002; Dyson 1997; Foreyt 1979; Heller 1989; Wing 1998). The health status at baseline of participants varied; slightly raised blood cholesterol values (Barratt 1994; Foreyt 1979), raised lipid values requiring treatment (Caggiula 1996; Gosselin 1996; Luepker 1978; Neil 1995; Smith 1976; Tomson 1995), others had raised fasting plasma glucose (Dyson 1997), risk factors for diabetes (Wing 1998), obese (Bacon 2002) or previous heart disease (Heller 1989).

The duration of the studies varied from six weeks to 104 weeks. Most interventions were diet alone with the exception of two studies that included exercise in both intervention groups (Bacon 2002; Dyson 1997). Only three studies reported participants taking lipid lowering medication (Caggiula 1996; Luepker 1978; Smith 1976;). One study (Caggiula 1996) presented results separately for those participants not receiving lipid lowering medication, and in the other two studies (Luepker 1978; Smith 1976) lipid lowering medication was introduced after 6 weeks into the study. In order to reduce the clinical heterogeneity between the studies only data for the first six weeks for the studies by Luepker (Luepker 1978) and Smith (Smith 1976) were included.

The service delivery methods also differed between the studies. Those participants seen by a doctor tended to have less frequent appointments or less time at appointments than those seen by a dietitian (Caggiula 1996; Gosselin 1996; Luepker 1978; Smith 1976). The self-help resources tended to be fairly simple leaflets. The interventions by the dietitians included group sessions of less than 10 meetings (Barratt 1994); group sessions of more than 10 meetings (Bacon 2002; Foreyt 1979; Wing 1998), individual consultations (Caggiula 1996; Dyson 1997; Gosselin 1996; Heller 1989; Neil 1995) and three studies used both individual and group sessions (Luepker 1978; Smith 1976; Tomson 1995). For three of the five comparisons for dietitian versus doctor and one for dietitian versus self-help resources the participants who were randomised to receive advice from a dietitian also received non-dietary advice from a physician (Caggiula 1996; Luepker 1978; Smith 1976; Tomson 1995).

In terms of outcomes, in addition to measuring blood cholesterol four trials measured LDLc (Bacon 2002; Dyson 1997; Gosselin 1996; Neil 1995); eight measured HDLc (Bacon 2002; Barratt 1994; Dyson 1997; Gosselin 1996; Heller 1989; Neil 1995; Tomson 1995; Wing 1998), four measured blood pressure (Bacon 2002; Dyson 1997; Foreyt 1979; Wing 1998) and six body weight (Bacon 2002; Barratt 1994; Dyson 1997; Foreyt 1979; Gosselin 1996; Wing 1998). Only one study measured patient satisfaction (Caggiula 1996).

The main reason for exclusion was that 'interventions were not dietitian versus other health professional or self-help resources' (91%). Other criteria that were often not met were 'blood cholesterol not measured' (32%) and 'study was not a randomised trial' (18%).

Risk of bias in included studies

The methodological quality of the studies is described in the Characteristics of included studies table. The six quality criteria applied to RCTs are described in METHODS OF THE REVIEW

All 12 of the reported studies had methodological weaknesses according to the EPOC criteria. None of the studies fulfilled all of the quality criteria.

1. Concealment of allocation

All the RCTs failed to report the method of randomisation in detail, therefore it was not possible to determine whether allocation to groups was capable of being manipulated. (Stephenson 1998).

2. Follow-up of participants

Patient follow-up of at least 80% was achieved for four studies for both dietitian and comparison groups (Dyson 1997; Luepker 1978; Neil 1995; Smith 1976) and three studies for the group seeing the dietitian but not the self-help resources (Foreyt 1979; Tomson 1995; Wing 1998). Follow-up was not achieved in four studies for either the dietitian or comparison groups (Bacon 2002; Barratt 1994; Gosselin 1996; Heller 1989).

3. Blinded assessment of blood cholesterol

The main outcome was blood cholesterol, using an objective outcome measure, therefore a blinded assessment was assumed for all studies. It was not possible to blind participants to dietary interventions and this may cause bias

4. Similar baseline blood cholesterol measures for each intervention group

Baseline values for blood cholesterol between groups in each trial were compared. When differences at baseline were likely to affect the post intervention differences the baseline measurement was considered NOT DONE. For example it might be expected that groups with a higher blood cholesterol at baseline may experience a larger reduction at follow-up than those with a lower blood cholesterol. This was the case for four studies (Barratt 1994; Heller 1989; Neil 1995; Wing 1998) where the dietitian group had a higher

blood cholesterol measure than the comparison group; and Neil (Neil 1995) where the self-help resources group had a statistically significantly greater blood cholesterol than the dietitian group. In the studies that did not have similar baseline blood cholesterol for each intervention group it was unclear whether adjustment for the difference in baseline values had been carried out in the analysis.

5. Reliable blood cholesterol measure

The main outcome was change in blood cholesterol using a standard method, therefore a reliable outcome was assumed for all studies (Stephenson 1998).

6. Protection against contamination

Protection against contamination was judged DONE for seven studies (Caggiula 1996; Foreyt 1979; Gosselin 1996; Luepker 1978; Neil 1995(dietitian versus self-help resources); Smith 1976; Tomson 1995).

One study randomised by cluster (physician practice) and analysed their data at the level of the participant (Caggiula 1996). The remaining studies randomised and analysed their data at the level of the participant.

Judged by the six quality criteria two studies met five of the criteria (Luepker 1978; Smith 1976); five studies met four of the criteria (Dyson 1997; Foreyt 1979; Gosselin 1996; Neil 1995 (dietitian versus self-help resources); Tomson 1995), two studies met three of the criteria (Bacon 2002;Caggiula 1996) and three studies met only two of the criteria (Barratt 1994; Heller 1989; Wing 1998). In general those studies comparing dietitian with doctor were of a higher quality than the studies comparing dietitian with self-help resources.

Effects of interventions

The results are presented separately for each comparison (dietitian versus doctor, self-help resources, nurse or counsellor). Some studies reported measuring some secondary outcomes of interest, however, not all these data were in the appropriate format for inclusion. The results are presented by the outcome of interest. There was no heterogeneity detected for any of the comparisons.

Sub-group analyses

Due to the limited number of studies identified we restricted the sub-group analysis to length of follow-up for the primary outcome blood cholesterol. We compared data at follow-ups of six months or less with follow-ups of one year.

Blood cholesterol

Dietitian versus doctor

The random effects analyses demonstrated a statistically significant reduction in participants receiving advice from dietitians compared with doctors (change -0.25 mmol/L, 95% CI -0.37, -0.12 mmol/L). Two studies (Caggiula 1996; Gosselin 1996) individually showed statistically significant reductions for the dietetic group compared with those seeing the doctor. Although the overall difference between dietitians and doctors was similar between the studies, the actual reduction achieved by dietitian or doctor for individual studies was greatest for Luepker (Luepker 1978) and Smith (Smith 1976), where data for six weeks follow-up were used; this difference progressively declined with duration of study. Results were robust to unit of analysis errors. The single cluster randomised trial contributed to the comparison of dietitians with doctors. Even assuming an intra class correlation coefficient of 1 did not affect the statistical significance of the result.

Dietitian versus self-help resources

The random effects analyses for dietitian versus self-help resources showed no difference in reduction of blood cholesterol (change -0.10 mmol/L,95% CI -0.22, 0.03). Four studies showed virtually no difference (Barratt 1994; Dyson 1997; Neil 1995; Tomson 1995). Two studies found that those seeing the dietitian had a greater reduction than those using self-help resources (Heller 1989; Wing 1998); however, both of these were rated of lower quality. There did not appear to be a trend of smaller reductions in blood cholesterol with increasing study duration for either the dietitian or self-help group.

If the results of self-help resources, counsellor and doctors compared with dietitians are pooled, dietitians performed better than the other methods (change -0.14 mmol/L, 95% CI -0.23, -0.05). We did not include the data for nurses as the only study on nurses also reported on self-help resources, and therefore both these interventions were compared with the same group of participants receiving advice from a dietitian.

In most of the trials the baseline blood cholesterol value was higher for the dietitian group than those receiving advice from a doctor or using self-help resources. The difference in baseline blood cholesterol (dietitian minus other group) was computed. A trend was observed such that higher baseline differences were associated with higher mean differences, indicating that if dietitians saw participants with higher cholesterol then larger treatment effects were observed.

Dietitian versus nurse

The only study meeting the inclusion criteria (Neil 1995) found that reduction in blood cholesterol was slightly less for the dietitian group compared with the nurse group (0.08 mmol/L, 95% CI -0.11, 0.27).

Dietitian versus counsellor

The only study meeting the inclusion criteria (Bacon 2002) showed no apparent difference between the dietitian group and counsellor group (-0.03 mmol/L, 95% CI -0.46, 0.40).

Sub-group analysis - effects of length of follow-up on cholesterol reduction

Follow-up of 6 months or less compared with follow-up at one year.

Dietitian versus doctor

All studies were six months or less in duration. The difference between dietitian and doctor was -0.25 mmol/L 95% CI -0.37, -0.12.

Dietitian versus self-help resources

Five of the seven studies had follow-up of six months or less (Barratt 1994; Foreyt 1979; Heller 1989; Neil 1995; Wing 1998). Heterogeneity was detected for this comparison with the random effect analyses for dietitian versus self-help resources showing a statistically significant difference in favour of the dietitian group (-0.25 mmol/L 95% CI -0.48, -0.02). The heterogeniety appears to be the result of an increased in blood cholesterol in the participants receiving self-help resources in the study by Wing 1998. If this study is removed from the meta-analysis the difference is reduced to -0.15 mmol/L 95% CI -0.35, 0.04.

Four of the seven studies had follow-up between six months and one year (Dyson 1997; Foreyt 1979; Tomson 1995; Wing 1998). No heterogeneity was detected and there was a non-statistically significant difference in favour of the dietitian group (-0.05 mmol/L 95% CI -0.18, 0.09). The heterogeniety appears to be the result of an increased in blood cholesterol in the participants receiving self-help resources in the study by Wing 1998.

Two studies (Foreyt 1979; Wing 1998) had follow-up at six months and one year. Both showed a decline in difference (mmol/L) between the methods with increased follow-up (-0.28 and -0.21 for Foreyt 1979 and -0.61 and -0.13 for Wing 1998).

Dietitian versus nurse

The only study (Neil 1995) was of six months and showed a non-statistically significant result in favour of the nurse group.

Dietitian versus counsellor

The only study (Bacon 2002) had follow-ups at 12, 14 and 52 weeks. The differences between dietitian and counsellor were -0.42 mmol/L 95% CI -0.87, 0.03 (not shown in forest plot, -0.37mmol/L 95% CI -0.82, 0.08, and -0.03mmol/L 95% CI -0.46, 0.40 respectively

LDL cholesterol

Five studies provided usable information on LDLc.

Dietitian versus doctor

Gosselin (Gosselin 1996) found a non-statistically significant difference in favour of the dietitian.

Dietitian versus self-help resources

The three studies showed no difference (0.03 mmol/L, 95% CI -0.14, 0.19 mmol/L). One favoured the dietitian (Wing 1998) and two the self-help resources (Dyson 1997; Neil 1995).

Dietitian versus nurse

Neil (Neil 1995) found a non-statistically significant difference in favour of the nurse group.

Dietitian versus counsellor

Bacon (Bacon 2002) found a non-statistically significant difference in favour of the dietitian group.

HDL cholesterol

Dietitian versus doctor

One study compared dietitian and doctor (Gosselin 1996) and found no difference.

Dietitian versus self-help resources

Five studies (Barratt 1994; Dyson 1997; Heller 1989; Neil 1995; Wing 1998) provided appropriate data and most of the studies clustered around the line of no effect. The exception was Heller (Heller 1989), who reported a greater reduction in the dietitian group; however this study contributed little to the overall result (3.5%). Overall those seeing the dietitian showed a non-statistically significant decline in HDLc (-0.02 mmol/L, 95% CI -0.05, 0.01 mmol/L).

Dietitian versus nurse

Neil (Neil 1995) showed a statistically significant difference in favour of the nurse group. The difference for dietitian versus nurse was -0.06 mmol/L (95% CI -0.11, -0.01).

Dietitian versus counsellor

Bacon (Bacon 2002) found a non-statistically significant result in favour of the dietitian group.

Diastolic blood pressure

Dietitian versus self-help resources

Three studies (Dyson 1997; Foreyt 1979; Wing 1998) provided required data. None of the studies individually or together showed a statistically significant difference (0.30 mmHg, 95% CI -1.4, 2.0).

Dietitian versus counsellor

Bacon (Bacon 2002) showed a non-statistically significant result in favour of the dietitian group.

Systolic blood pressure

Dietitian versus self-help resources

Three studies provided required data. Two studies favoured the dietitian (Dyson 1997; Foreyt 1979) and one favoured the self-help resources (Wing 1998). The overall effect was -1.8 mmHg (95% CI -4.4, 0.9 mmHg) in favour of the dietitian.

Dietitian versus counsellor

Bacon (Bacon 2002) showed a non-statistically significant result in favour of the dietitian group.

Body weight

Dietitian versus self-help resources

Data from four studies (Barratt 1994; Dyson 1997; Foreyt 1979; Wing 1998) could be used for body weight as some studies only presented results for relative weight or body mass index. Although no studies were individually or together statistically significant, all favoured the dietitian. However the overall weight loss was minimal (-0.42kg 95% CI -1.0, 0.2). One study (Wing 1998) achieved a mean weight loss of -2.1kg after two years; however this study was of poor quality.

Dietitian versus counsellor

Bacon (Bacon 2002) showed a statistically significant result in favour of the dietitian group (-5.8kg 95% CI -8.91, -2.69). The main objective of the interventions in this study was weight loss.

Patient satisfaction

One study (Caggiula 1996) reported patient satisfaction with the interventions. Participants receiving advice from a nutritionist indicated that they used the provided literature more, found them more helpful and less difficult and were more positive in recommending the programme than participants receiving advice from

the doctor. However this may reflect the greater amount of time spent with the participants randomised to see the nutritionist.

Funnel plots

Funnel plots prepared for blood cholesterol showed no evidence of asymmetry for the dietitian versus doctor comparison, although there were only four studies. The funnel plot for dietitian versus self-help resources showed that, amongst the smaller studies, most favoured the dietitian over the self-help resources. This may be due to publication bias, but could well be due to a larger underlying effect in smaller studies.

DISCUSSION

Dietary advice from a dietitian was more effective than advice from a doctor in reducing blood cholesterol. However there was no difference for secondary outcome variables or for dietitian versus self-help resources. There was no detected heterogeneity between studies for any of the comparisons with the exception of the subgroup analyses for dietitian versus self-help resources.

Dietitian versus doctor

The effect on blood cholesterol of advice from a dietitian compared with a doctor was small (-0.25 mmol/L, about 4%) but statistically significant. The quality of the four studies was superior to that of those comparing dietitian and self-help resources. It is worth noting that the participants who were randomised to receive advice from the dietitian also saw a doctor although not for dietary advice. It is possible that the presence of the doctor improves participant compliance. Most of the data available for use from studies were of short duration (nine weeks or less) and therefore we have no evidence of the long term effects, although there was some evidence to suggest that length of duration of the study appeared to be inversely related to the reduction in blood cholesterol achieved. It is not possible to distinguish whether the difference in blood cholesterol was a result of advice from a different health professional or from more contact with the health professional. Participants randomised to the dietitian generally received more time with a health professional than those randomised to the doctor. All the studies were carried out in the USA or Canada, which limits their generalisability to Europe. Only one study assessed patient satisfaction, and showed a greater satisfaction with advice from the dietitian rather than advice from the doctor. This may partly be explained by participants seeing the dietitian having a longer consultation time.

Dietitian versus self-help

The effect of advice from dietitians or self-help resources on blood cholesterol was more varied. The overall effect was small (-0.10 mmol/L, less than 2%). The effect of dietary advice from dietitians in the self-help comparison compared with those in the doctor comparison was much less. This may have been because the overall follow-up time was longer, only two had the presence of a doctor or a multi-disciplinary team. The baseline blood cholesterol values were below 6 mmol/l for three of the seven studies, possibly leading to a low motivation for participants to change their dietary habits. The quality of the studies varied, with three studies being of low quality. An explanation for a similar but poor effect of the interventions might be that some well-motivated participants will change their dietary habits with little input from the health professional. A leaflet in some circumstances may be sufficient. The subgroup analyses appeared to show a greater decline in blood cholesterol in studies with a follow-up at 6 months or less compared with a one year follow-up. The difference between the methods with a follow-up of 6 months or less was similar to that for the comparison of dietitian versus doctor, however, caution should be exercised as heterogeity was detected in the dietitian versus self-help resources comparison and only two studies had data for both follow-ups.

Dietitian versus nurse

Only one study comparing advice from a dietitian with a nurse was found. This is an important comparison to investigate as many practice nurses give dietary advice in relation to coronary heart disease. Nurses may have more opportunities to provide dietary advice than dietitians as they have more patient contact.

Dietitian versus counsellor

Only one study comparing advice from a dietitian with a counsellor was found. Despite the small study sample this study whose main objective was weight loss did show a greater weight loss in the dietitian group (Traditional weight loss programme) compared with the counsellor group ('health-centred' non-diet wellness programme). Both approaches however seemed to result in a similar reduction in blood cholesterol. As in the case for nurses further studies are required to assess the impact of counsellors giving dietary advice on blood cholesterol.

Patient satisfaction

It is unfortunate that only one study included questions on patient satisfaction. This is an important point as improved patient compliance may be achieved if new interventions, in particular self-help resources and accompanying literature, are prepared in consultation with the user.

Methodological quality

None of the studies fulfilled all of the quality criteria. Most trials were of a relatively small sample size. Seven of the 12 trials had less than 50 participants with blood cholesterol measures at follow-up in each arm of the trial. The smaller studies showed bigger effect sizes favouring the dietitian. This may relate to publication bias in which studies favouring self-help resources were missed, however, it may be that in smaller studies dietitians perform better. There was imbalance in the randomisation process for some of the

studies, most notably, the smaller studies where participants with higher baseline blood cholesterol appeared to be randomised to the dietitian group. In these studies the size of the mean differences appeared greater. This may be partly due to regression to the mean, or it may be easier to reduce blood cholesterol in participants with higher baseline levels.

Although we were able to address the primary question of the review, due to the small number of studies fulfilling the selection criteria the secondary objectives could not be carried out. Some important questions remain outstanding. It was not possible to assess the effect of type of patient, setting, length of follow-up and whether the intervention was diet alone or a multiple lifestyle intervention approach, on the outcomes assessed.

AUTHORS' CONCLUSIONS

Implications for practice

Dietitians are better at lowering blood cholesterol in the short to medium term than doctors, but the evidence is not convincing that they are better than self-help resources. More evidence is required to assess whether change can be maintained in the longer term. The evidence for the comparison with nurses is limited but so far there is no evidence that dietitians provide better outcomes than nurses.

However in practice there will never be enough dietitians to see every patient with a raised blood cholesterol. It may be more practical and a better use of resources to ensure that all members of the health team are trained by dietitians to give the appropriate advice. The use of self-help resources need to be encouraged and patients involved in their development. Some patients will respond well to self-help resources and these patients should be identified and targeted appropriately. Using self-help resources will be more cost-effective than individual dietary advice and if they are as effective they should be employed. The remaining dietetic time can then be used with patients who have more complex medical problems, who require more in depth nutrition education or need support to encourage and motivate them to make dietary changes. The presence of a doctor or other health professional (not to give dietary advice) for individual or group education may also aid compliance.

Patient education should include ways of maintaining dietary change so that long term reductions in blood cholesterol are achieved.

Implications for research

Many of these studies were small and of poor quality. There is a need for good quality randomised controlled trials for all of the comparisons studied. The efficacy of nurse-led dietary interventions compared with dietetic advice is an important comparison that requires further work, due both to the limited number of papers and the practical implications of nurses giving dietary advice.

Further work is needed on which elements of dietary advice make it effective, e.g. length and frequency of contact, type of approach (e.g. individual or group, behavioural therapy or instructional techniques), level of belief of practitioner, level of training of practitioner, patient satisfaction, initial characteristics of patients. Research in the setting in which dietary advice is given would inform us about the effectiveness of advice in primary care and the workplace compared with hospital settings. Work would be especially useful on the types of self-help resources that are the most effective. For example, are interactive computer programmes better than simple leaflets. The method of administration may also be important. Does it make any difference if a leaflet is handed out by a doctor or nurse, or administered by post?

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* *Indicates the major publication for the study*

CHARACTERISTICS OF STUDIES

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

Bacon 2002

Methods	RCT Randomisation concealment: NOT CLEAR Follow-up: Dietitian: NOT DONE Counsellor: NOT DONE Blinded assessment: DONE Baseline: DONE Reliable outcomes: DONE Protection against contamination: NOT CLEAR Unit of allocation: participant Unit of analysis: participant
Participants	N (dietitian) 39 N (counsellor) 39 Inclusion criteria: causcasian, female, age 30-45y, bmi > or = 30, non-smoker, not pregnant, intending to get pregnant, or lactating; practicing birth control if appropriate, chronic dieters, no recent MI, no active neoplasms, no diabetes, no cerebrovascular or renal disease. Exclusion criteria: weight loss drugs. Baseline blood cholesterol: Dt 5.19 Cs 5.19 mmol/l Setting: General population Country: USA
Interventions	The study aim was to evaluate the effects of a 'health centred' non-diet wellness program and compare this program to a traditional 'weight-loss centred' diet program. The aim of the dietary interventions was to reduce energy and fat. Dietitian: 24 group sessions each of 90 minutes Counsellor: 24 group sessions each of 90 minutes Both were given a manual No lipid lowering drugs documented. Study duration: 52 weeks
Outcomes	Blood cholesterol, LDLc, HDLc, BMI, body weight, blood pressure
Notes	Authors concluded that a diet approach results in weight loss for those who complete the intervention, while a non-diet approach does not. However a non-diet approach can produce similar improvements in metabolic fitness, psychology and eating behaviour, while at the same time reducing the attrition common in diet programs

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Barratt 1994

Methods	RCT Randomisation concealment: NOT CLEAR Follow-up: Dietitian: NOT DONE Self-help: NOT DONE Blinded assessment: DONE Baseline: NOT DONE Reliable outcomes: DONE Protection against contamination: NOT DONE Unit of allocation: participant Unit of analysis: participant
Participants	N (dietitian) 114 N (self-help methods) 310 Inclusion criteria: blood cholesterol 5.2mmol/l or above. Exclusion criteria: blood pressure above 140/90 mmHg Baseline blood cholesterol: Dt 6.2; SH 6.0 mmol/L Setting: Workplace Country: Australia
Interventions	The study aim was to examine the feasibility of conducting a large work-site cholesterol screening project and to evaluate by randomised controlled trial two dietary interventions to lower cholesterol. The aim of the dietary interventions was to reduce total and saturated fat and increase fibre intake. 1. Dietitian-led nutrition course (five 1-hour sessions) included demonstrations and discussions 2. Self-help package (workbook with similar education content to nutrition course and quizzes, shopping guides, video and recipes) Other interventions: diet alone No lipid lowering drugs documented Duration of study: 26 weeks
Outcomes	Blood cholesterol, HDLc, body weight
Notes	Authors concluded that there was no benefit from interventions in reducing blood cholesterol. Strategies are required to maintain high ongoing participation rates

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Caggiula 1996

Methods	RCT Randomisation concealment: NOT CLEAR Follow-up: Dietitian: NOT CLEAR Doctor: NOT CLEAR Blinded assessment: DONE Baseline: NOT CLEAR Reliable outcomes: DONE Protection against contamination: DONE Unit of allocation: physician practices Unit of analysis: participants
Participants	N (dietitian) 169 N (physician and office personnel) 262 Inclusion criteria: treatment indicated by the National Cholesterol Education Program Adult Treatment Panel I algorithm Baseline blood cholesterol: DT 6.8; Dr 7.0mmol/L Setting: General practice Country: USA
Interventions	The study aim was to test the feasibility of cholesterol lowering in physician office practices using NCEP Adult treatment Panel I guidelines. The aim of the dietary interventions was to reduce total and saturated fat and dietary cholesterol. 1. Nutritionist at Nutrition centre (3 visits). One visit to physician and office personnel who did not give any dietary advice. 2. Physicians and their office personnel (1 visit). Physicians and their office personnel had a 1-day training seminar on diet therapy. Other interventions: diet alone Participants taking lipid lowering medication were analysed separately and were excluded from this review. Duration of study: 9 weeks
Outcomes	Blood cholesterol, patient satisfaction
Notes	Baseline values were used at follow-up for subjects who did not attend. Authors concluded that the impact of nutrition intervention delivered through physician offices on blood cholesterol was less than clinically desirable

Risk of bias

Item	**Authors' judgement**	**Description**
Allocation concealment?	Unclear	B - Unclear

Dyson 1997

Methods	RCT Randomisation concealment: NOT CLEAR Follow-up: Dietitian: DONE Self-help: DONE Blinded assessment: DONE Baseline: DONE Reliable outcomes: DONE Protection against contamination: NOT DONE Unit of allocation: participant Unit of analysis: participant
Participants	N (dietitian) 111 N (self-help) 116 Inclusion criteria: self-referred subjects with fasting plasma glucose (5.5 to 7.7 mmol/l) Baseline blood cholesterol: Dt 5.0; SH 4.9 mmol/L Setting: Clinic Country: England & France
Interventions	The study aim was to study the effects of both life-style changes and sulfonylurea therapy in a factorial two-by-two design. The aim of the dietary interventions was to reduce fat and increase fibre. 1. Dietitian: 3 monthly individual consultations 2. Self-help: basic advice from written literature handed out by physician and physician advised weight loss if necessary Other interventions: physical activity (both groups) No lipid lowering drugs documented Study duration: 52 weeks
Outcomes	Body weight, blood pressure, blood cholesterol, LDLc, HDLc
Notes	Authors concluded that healthy-living advice from a dietitian was no more successful than basic advice in the form of a leaflet on body weight or glycaemia

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Foreyt 1979

Methods	RCT Randomisation concealment: NOT CLEAR Follow-up: Dietitian: DONE Self-help: NOT DONE Blinded assessment: DONE Baseline: DONE Reliable outcomes: DONE Protection against contamination: DONE Unit of allocation: participant Unit of analysis: participant
Participants	N (dietitian) 76 N (self-help) 91 Volunteers recruited by newspaper articles and workshops. Inclusion criteria: lipid levels within the average range for the American population. Baseline blood cholesterol: Dt 5.4; SH 5.4 mmol/L Setting: Diet modification clinic Country: USA
Interventions	The study aim was to compare the effectiveness of three intervention prgrammes for reducing plasma cholesterol and triglyceride in free-living individuals with average levels of cholesterol. The aim of the dietary interventions was to reduce total and saturated fat and increase polyunsaturated fat and fibre. 1. Dietitian: nutrition education and behaviour therapy (17 x 60 minute group sessions) 2. Self-help: given Help Your Heart Eating Plan and were allowed to telephone a dietitian. Other interventions: diet alone No lipid lowering medication Study duration: 52 weeks
Outcomes	Blood cholesterol, blood pressure, body weight.
Notes	Authors concluded that individuals with average plasma cholesterol values who receive behavioural advice can achieve modest reduction in cholesterol for up to 6 months. However, they did not maintain the reduction at one year

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Gosselin 1996

Methods	RCT Randomisation concealment: NOT CLEAR Follow-up: Dietitian: NOT DONE Doctor: NOT DONE Blinded assessment: DONE Baseline: DONE Reliable outcomes: DONE Protection against contamination: DONE Unit of allocation: participant Unit of analysis: participant
Participants	135 male and female patients Inclusion criteria: LDL in the range 3.0-7.0 for age 20-29 years and 3.4-7.0 for people aged 30 or more years. Exclusion criteria: BMI > 35, pregnancy, secondary hypercholesterolaemia, triglyceride > 4.5mmol/L, myocardial infarction, major surgey in last 3 months, on a diet for other reasons. Baseline blood cholesterol: Dt 6.4; Dr 6.3 mmol/L Setting: General practice Country: Canada
Interventions	The study aim was to compare the efficacy of brief dietary intervention by family physician in their daily practice and in group sessions to standard dietetic treatment in mild to moderate hypercholesterolaemia. The aim of the dietary interventions was to reduce total and saturated fat and dietary cholesterol. 1. Dietitian: 3 individual appointments (total time 85 minutes) 2. Doctor: 3 individual appointments (total time 60 minutes) Other interventions: diet alone No lipid lowering medication Study duration: 26 weeks
Outcomes	Blood cholesterol, LDLc, HDLc, body weight
Notes	Authors concluded that the standard dietetic approach was better in correcting the lipid profile of subjects with a mild or moderate hypercholesterolaemia

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Heller 1989

Methods	RCT Randomisation concealment: NOT CLEAR Follow-up: Dietitian: NOT DONE Self-help: NOT DONE Blinded assessment: DONE Baseline: NOT DONE Reliable outcomes: DONE Protection against contamination: NOT DONE Unit of allocation: participant Unit of analysis: participant
Participants	N (dietitian) 31 N (self-help) 28 Inclusion criteria: peripheral vascular disease and blood cholesterol < 9mmol/L Baseline blood cholesterol: Dt 7.0; SH 6.6 mmol/L Setting: Vascular Clinic Country: Australia
Interventions	The study aim was to compare dietary advice from a dietitian with that provided by a leaflet in their abilities to produce reductions in blood cholesterol of patients with peripheral vascular disease. The aim of the dietary interventions was not specified but the general aim was to reduce blood cholesterol 1. Dietitian: 2 individual consultations 2. Self-help: diet fact sheet that was handed out by clinic nurse with encouragement Other interventions: diet alone No lipid lowering medication Study duration: 13 weeks
Outcomes	Blood cholesterol, HDLc
Notes	Authors concluded that individual advice which is provided by a dietitian is more successful in leading to a reduction in blood cholesterol levels than is the administration of a diet fact sheet

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Luepker 1978

Methods	RCT Randomisation concealment: NOT CLEAR Follow-up: Dietitian: DONE Doctor: DONE Blinded assessment: DONE Baseline: DONE Reliable outcomes: DONE Protection against contamination: DONE Unit of allocation: participant Unit of analysis: participant
Participants	N (nutritionist) 37 N (doctor) 38 Inclusion criteria: type II hyperlipoproteinaemia Exclusion criteria: cardiovascular disease, normal cholesterol at second screening, secondary hyperlipoproteinaemia Baseline blood cholesterol: Dt 7.5; Dr 7.7 mmol/L Setting: Workplace Country: USA
Interventions	The aim of the study was to determine how a sizeable healthy working population with hypercholesterolaemia can be most effectively identified and treated. The aim of the dietary interventions was to reduce saturated fat and dietary cholesterol and increase polyunsaturated fat. 1. Dietitian: 4 visits (individual and group sessions). Employees also saw the physician (who did not give dietary advice). 2. Doctor: referred to private physician who was given participants' blood values and information about dietary management Other interventions: diet alone No lipid lowering medication for first 6 weeks Study duration: 6 weeks
Outcomes	Blood cholesterol, relative weight
Notes	Authors concluded that specific treatment by lipid clinic or by private physician can effectively decrease fasting cholesterol levels in apparently healthy subjects

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Neil 1995

Methods	RCT Randomisation concealment: NOT CLEAR Follow-up: Dietitian: DONE Nurse: DONE Self-help: DONE Blinded assessment: DONE Baseline: Dietitian versus self-help: NOT DONE Dietitian versus nurse: NOT DONE Reliable outcomes: DONE Protection against contamination: Dietitian versus nurse: NOT DONE Dietitian versus self-help: DONE Unit of allocation: participant Unit of analysis: participant
Participants	N (dietitian) 103 N (nurse) 104 N (self-help) 102 Inclusion criteria: blood cholesterol 6.0-8.5 mmol/l. Exclusion criteria: LDLc < 3.5 mmol/l, triglycerides 5.6mmol/l or above, diabetes, hypothyroidism, renal disease, severe illness in last three months Baseline blood cholesterol: Dt 7.0; Nurse 7.2; SH 7.2 mmol/L Setting: General practice Country: UK
Interventions	The study aim was to determine the relative efficacy in general practice of dietary advice given by a dietitian, a practice nurse, or a diet leaflet alone in reducing total and LDL cholesterol. The aim of the dietary interventions was to reduce total and saturated fat and dietary cholesterol and increase polyunsaturated and monounsaturated fat and fibre. 1. Dietitian: 30 minute individual consultation followed by 10 minutes at 8 weeks 2. Nurse: 30 minute individual consultation followed by 10 minutes at 8 weeks 3. Self-help: leaflet posted to participants Other interventions: diet alone No lipid lowering medication Study duration: 26 weeks
Outcomes	Blood cholesterol, LDLc, HDLc, body mass index
Notes	Baseline values were used at follow-up for subjects who did not attend. Authors concluded that dietary advice is equally effective when given by a dietitian, practice nurse, or a diet leaflet but results in only a small reduction in total and LDL cholesterol

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Smith 1976

Methods	RCT Randomisation concealment: NOT CLEAR Follow-up: Dietitian: DONE Doctor: DONE Blinded assessment: DONE Baseline: DONE Reliable outcomes: DONE Protection against contamination: DONE Unit of allocation: participant Unit of analysis: participant
Participants	N (nutritionist) 47 N (doctor) 53 Inclusion criteria: type IV hyperlipidaemia Exclusion criteria: cardiovascular disease, diabetes, hypothyroidism, alcoholism, secondary hyperlipoproteinaemia Baseline blood cholesterol: Dt 6.0; Dr 6.0 mmol/L Setting: Workplace Country: USA
Interventions	The aim of the study was to investigate how a sizeable population of hyperlipoproteinemia subjects (apparently healthy, relatively young adults) be most effectively and efficiently identified and treated. The aim of the dietary interventions was to reduce saturated fat and dietary cholesterol. 1. Dietitian: 4 visits (individual and group sessions). Employees also saw the physician (who did not give dietary advice). 2. Doctor: referred to private physician who was given participants blood values and information about dietary management Other interventions: diet alone No lipid lowering medication for first 6 weeks Study duration: 6 weeks
Outcomes	Blood cholesterol, relative weight
Notes	Authors concluded that specific treatment by a lipid intervention clinic or physician will markedly decrease blood triglyceride levels in healthy type IV hyperlipoproteinaemic subjects

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Tomson 1995

Methods	RCT Randomisation concealment: NOT CLEAR Follow-up: Dietitian: DONE Self-help: NOT DONE Blinded assessment: DONE Baseline: DONE Reliable outcomes: DONE Protection against contamination: DONE Unit of allocation: participant Unit of analysis: participant
Participants	N (dietitian) 47 N (self-help) 45 Inclusion criteria: blood cholesterol 7.0-7.8 mmol/l. Exclusion criteria: hypertension, CHD, diabetes Baseline blood cholesterol: Dt 7.3; SH 7.3 mmol/L Setting: General practice Country: Sweden
Interventions	The aim of the study was to compare costs and effects of two different intervention strategies for the nonpharmacological treatment of hypercholesterolaemia. The aim of the dietary interventions was to reduce total and saturated fat and dietary cholesterol and increase polyunsaturated fat. 1. Dietitian: 3 visits (1 group session). Also saw general practitioner 2. Self-help: general practitioner posted diet booklet with simple dietary advice Other interventions: diet alone No lipid lowering medication documented Study duration: 52 weeks
Outcomes	Blood cholesterol, HDLc
Notes	Authors concluded that because the effect of the two intervention programmes did not differ the low-intensity (self-help) programme is to be preferred from a cost-effectiveness viewpoint

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Wing 1998

Methods	RCT Randomisation concealment: NOT CLEAR Follow-up: Dietitian: DONE Self-help: NOT DONE Blinded assessment: DONE Baseline: NOT DONE Reliable outcomes: DONE Protection against contamination: NOT DONE Unit of allocation: participant Unit of analysis: participant
Participants	N (dietitian) 37 N (self-help) 40 Participants recruited from newspaper advertisements. Inclusion criteria: at least one biological parent with type 2 diabetes, overweight (30-100% of ideal body weight) Exclusion criteria: diabetes Baseline blood cholesterol: Dt 5.2; SH 4.8 mmol/L Setting: Clinic Country: USA
Interventions	The aim of the study was to assess the effect of lifestyle intervention over 2 years on changes in weight, CHD risk factors, and incidence of diabetes in overweight individuals with a parental history of diabetes. The aim of the dietary interventions was to reduce energy and total fat. intakes. 1. Dietitian: 51 group sessions led by a dietitian as part of a multidisciplinary team including a behaviour therapist. Individual consultations were also provided. 1. Self-help: copy of the Learn manual, a self-help behavioural manual. Other interventions: diet alone. No lipid lowering medication. Study duration: 104 weeks (2 years).
Outcomes	Blood cholesterol, LDLc, HDLc, weight, blood pressure
Notes	Although initially successful, the interventions were not effective in producing long-term changes in behaviour, weight, or physiological parameters

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Dt = dietitian, Dr = doctor/physician, SH = self-help resources , Cs= counsellor

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

Study	Reason for exclusion
Agewall 1993	Drugs: one arm received lipid lowering medication
Agewall 2001	Drugs:one arm received lipid lowering medication Intervention: not dietitian versus other health professional or self-help methods
Agurs 1997	Intervention: not dietitian versus other health professional or self-help methods
Aish 1996	Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Allen 1996	Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Allison 2000	Drugs: One arm received lipid lowering medication Intervention: not dietitian versus other health professional or self-help methods
Andersen 1985	Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Anderson 1990	Intervention: not dietitian versus other health professional or self-help methods
Anderson 1999	Randomised controlled trial: no Intervention: not dietitian versus other health professional or self-help methods
Anonymous 1965	Intervention: not dietitian versus other health professional or self-help methods
Anonymous 1991	Randomised controlled trial: no Drugs: one arm received lipid lowering medication Intervention: not dietitian versus other health professional or self-help methods
Appel 1995	Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Applegate 1992	Blood cholesterol: not measured at follow-up Intervention: not dietitian versus other health professional or self-help methods
Arntzenius 1985	Randomised controlled trial: no Intervention: not dietitian versus other health professional or self-help methods
Avila 1994	Intervention: not dietitian versus other health professional or self-help methods
Bae 1991	Randomised controlled trial: no Intervention: not dietitian versus other health professional or self-help methods

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Baer 1993	Randomised controlled trial: no Intervention: not dietitian versus other health professional or self-help methods
Bakx 1997	Intervention: not dietitian versus other health professional or self-help methods
Baron 1990	Intervention: not dietitian versus other health professional or self-help methods
Baxter 1997	Randomised controlled trial: no Intervention: not dietitian versus other health professional or self-help methods
Beckmann 1995	No food provided: no Intervention: not dietitian versus other health professional or self-help methods
Bemelmans 2000	Randomised controlled trial: no Intervention: not dietitian versus other health professional or self-help methods
Beresford 1992	Blood cholesterol:not measured Intervention: not dietitian versus other health professional or self-help methods
Beresford 1997	Intervention: not dietitian versus other health professional or self-help methods
Bergstrom 1967	Randomised controlled trial: no Blood cholesterol: not measured No food provided: no Study duration: less than 6 weeks Intervention: not dietitian versus other health professional or self-help methods
Bertera 1981	Randomised controlled trial: no Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Bierenbaum 1967	Intervention: not dietitian versus other health professional or self-help methods
Bloemberg 1991	Intervention: not dietitian versus other health professional or self-help methods
Bonk 1975	Randomised controlled trial: no Intervention: not dietitian versus other health professional or self-help methods
Bourn 1994	Randomised controlled trial: no Intervention: not dietitian versus other health professional or self-help methods
Boyd 1988	Intervention: not dietitian versus other health professional or self-help methods
Boyd 1990	Intervention: not dietitian versus other health professional or self-help methods
Braeckman 1999	Intervention: not dietitian versus other health professional or self-help methods

(*Continued*)

Brown 1974	Randomised controlled trial: no Drugs: one arm received lipid lowering drugs
Brown 1984	Intervention: not dietitian versus other health professional or self-help methods
Brug 1996	Blood cholesterol: not measured Study duration: less than 6 weeks Intervention: not dietitian versus other health professional or self-help methods
Bruno 1983	Intervention: not dietitian versus other health professional or self-help methods
Brunt 1996	Randomised controlled trial: no Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Buchwald 1996	Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Burke 1999	Intervention: not dietitian versus other health professional or self-help methods
Burr 1989	Intervention: not dietitian versus other health professional or self-help methods
Byers 1995	Intervention: not dietitian versus other health professional or self-help methods
Cambien 1981	Intervention: not dietitian versus other health professional or self-help methods
Campbell 1990	Intervention: not dietitian versus other health professional or self-help methods
Campbell 1994	Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Carlsson 1997	Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Carson 1994	Randomised controlled trial: no Blood cholesterol: not measured Study duration: less than 6 weeks Intervention: not dietitian versus other health professional or self-help methods
Cederholm 1985	Intervention: not dietitian versus other health professional or self-help methods
Chlebowski 1993	Intervention: not dietitian versus other health professional or self-help methods
Clark 1997	Intervention: not dietitian versus other health professional or self-help methods
Cohen 1991	Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods

(*Continued*)

Cousins 1992	Blood cholesterol: not measured
Cox 1996	Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Crouch 1986	Intervention: not dietitian versus other health professional or self-help methods
Cupples 1994	Intervention: not dietitian versus other health professional or self-help methods
Curzio 1989	Intervention: not dietitian versus other health professional or self-help methods
Dahl 1995	Randomised controlled trial: no Intervention: not dietitian versus other health professional or self-help methods
Dalgard 2001	Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
De Busk 1994	Intervention: not dietitian versus other health professional or self-help methods
de Sonnaville 1997	Randomised controlled trial: no Intervention: not dietitian versus other health professional or self-help methods
de Waard 1993	Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Delahanty 2001	Intervention: not dietitian versus other health professional or self-help methods
Dobs 1994	Intervention: not dietitian versus other health professional or self-help methods
Dodson 1984	No food provided: no Intervention: not dietitian versus other health professional or self-help methods
Dodson 1989	Intervention: not dietitian versus other health professional or self-help methods
Domenech 1995	Randomised controlled trial: no Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Dreon 1998	Intervention: not dietitian versus other health professional or self-help methods
Duff 2000	Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Dullaart 1992	Intervention: not dietitian versus other health professional or self-help methods
Dunstan 1997	No food provided: no Intervention: not dietitian versus other health professional or self-help methods

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Eastwood 1969	Randomised controlled trial: no No food provided:no Intervention: not dietitian versus other health professional or self-help methods
Edington 1987	Intervention: not dietitian versus other health professional or self-help methods
Ehnholm 1982	Randomised controlled trial: no No food provided: no Intervention: not dietitian versus other health professional or self-help methods
Elmer 1995	Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Engblom 1992	No food provided: no Intervention: not dietitian versus other health professional or self-help methods
Eriksson 1999	Intervention: not dietitian versus other health professional or self-help methods
Evans 1996	Intervention: not dietitian versus other health professional or self-help methods
Fagerberg 1998	Drugs: one arm received lipid lowering drugs Intervention: not dietitian versus other health professional or self-help methods
FHS 1994	Intervention: not dietitian versus other health professional or self-help methods
Fitzgerald 1991	Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Fletcher 1987	Blood cholesterol: not measured No food provided: no Intervention: not dietitian versus other health professional or self-help methods
Fodor 1991	Randomised controlled trial: no Intervention: not dietitian versus other health professional or self-help methods
Fortmann 1993	Randomised controlled trial: no Intervention: not dietitian versus other health professional or self-help methods
Franz 1995	Intervention: not dietitian versus other health professional or self-help methods
Fuchs 1993	Blood cholesterol: not measured
Gans 1994	Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Gemson 1990	Randomised controlled trial: no Intervention: not dietitian versus other health professional or self-help methods

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Gentile 1995	Randomised controlled trial: no Intervention: not dietitian versus other health professional or self-help methods
Giampaoli 1997	Randomised controlled trial: no Intervention: not dietitian versus other health professional or self-help methods
Gillum 1983	Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Glasgow 1989	Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Glasgow 1992	Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Glasgow 1995	Intervention: not dietitian versus other health professional or self-help methods
Glasgow 1996	Intervention: not dietitian versus other health professional or self-help methods
Goble 1997	Intervention: not dietitian versus other health professional or self-help methods
Gomel 1993	Intervention: not dietitian versus other health professional or self-help methods
Grace 1996	Intervention: not dietitian versus other health professional or self-help methods
Greene 1992	Randomised controlled trial: no Intervention: not dietitian versus other health professional or self-help methods
Gyntelberg 1981	Intervention: not dietitian versus other health professional or self-help methods
Hakala 1993	Blood cholesterol: not measured No food provided: no Intervention: not dietitian versus other health professional or self-help methods
Hakala 1994	Blood cholesterol: not measured No food provided: no Intervention: not dietitian versus other health professional or self-help methods
Hall 1974	Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Hanefeld 1991	Drugs: one arm received lipid lowering medication
Hanlon 1995	Intervention: not dietitian versus other health professional or self-help methods
Hannah 1997	No food provided: no Intervention: not dietitian versus other health professional or self-help methods

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Harris 1990	Intervention: not dietitian versus other health professional or self-help methods
Hartman 1997	Intervention: not dietitian versus other health professional or self-help methods
Hartwell 1986	Intervention: not dietitian versus other health professional or self-help methods
Haskell 1988	Drugs: one arm received lipid lowering medication Intervention: not dietitian versus other health professional or self-help methods
Haynes 1984	Intervention: not dietitian versus other health professional or self-help methods
HDFP 1985	Drugs: one arm received lipid lowering medication Intervention: not dietitian versus other health professional or self-help methods
Heber 1992	Randomised controlled trial: no Intervention: not dietitian versus other health professional or self-help methods
Hebert 1995	Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Heller 1988	Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Heller 1993	Intervention: not dietitian versus other health professional or self-help methods
Heller 1994	Intervention: not dietitian versus other health professional or self-help methods
Heller 2001	Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Henkin 2000	Intervention: not dietitian versus other health professional or self-help methods
Hitchcock Noel 1998	Intervention: not dietitian versus other health professional or self-help methods
Hjermann 1986	Intervention: not dietitian versus other health professional or self-help methods
Hollis 1984	Randomised controlled trial: no Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Howard 1997	Intervention: not dietitian versus other health professional or self-help methods
HPT 1990	Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Hunninghake 1993	Drugs: One arm received lipid lowering medication Intervention: not dietitian versus other health professional or self-help methods

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Hyman 1996	Intervention: not dietitian versus other health professional or self-help methods
Hyman 1998	Intervention: not dietitian versus other health professional or self-help methods
Insull 1990	Intervention: not dietitian versus other health professional or self-help methods
Iso 2002	Intervention: not dietitian versus other health professional or self-help methods
Ives 1993	Intervention: not dietitian versus other health professional or self-help methods
Jaax 1997	Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Jalkanen 1991	Intervention: not dietitian versus other health professional or self-help methods
Jeffery 1983	Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Johnston 1995	Intervention: not dietitian versus other health professional or self-help methods
Jolly 1999	Intervention: not dietitian versus other health professional or self-help methods
Jones 1979	Intervention: not dietitian versus other health professional or self-help methods
Jones 1986	Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Jones 1996	Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Jula 1990	No food provided: no Intervention: not dietitian versus other health professional or self-help methods
Kaplan 1985	Intervention: not dietitian versus other health professional or self-help methods
Karvetti 1981	No food provided: participants were in-patients for first 2 weeks Intervention: not dietitian versus other health professional or self-help methods
Karvetti 1992	Intervention: not dietitian versus other health professional or self-help methods
Katzel 1995	No food provided: no Intervention: not dietitian versus other health professional or self-help methods
Kelley 1994	Randomised controlled trial: no No food provided: oats provided Study duration: less than 6 weeks Intervention: not dietitian versus other health professional or self-help methods

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Ketola 2001	Intervention: not dietitian versus other health professional or self-help methods
Keyserling 1997	Intervention: not dietitian versus other health professional or self-help methods
Kirkman 1994	Intervention: not dietitian versus other health professional or self-help methods
Knutsen 1991	Intervention: not dietitian versus other health professional or self-help methods
Koopman 1990	Intervention: not dietitian versus other health professional or self-help methods
Korhonen 1983	Blood cholesterol: not measured Clinical setting: no education given to in-patients
Korhonen 1987	Intervention: not dietitian versus other health professional or self-help methods
Krachler 1997	Intervention: not dietitian versus other health professional or self-help methods
Kraemer 1997	No food provided: no Intervention: not dietitian versus other health professional or self-help methods
Kreuter 1996	Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Kumanyika 1999	Intervention: not dietitian versus other health professional or self-help methods
Kumpusalo 1996	Randomised controlled trial: no Intervention: not dietitian versus other health professional or self-help methods
Lackey 1992	Randomised controlled trial: no Intervention: not dietitian versus other health professional or self-help methods
Laitinen 1993	Intervention: not dietitian versus other health professional or self-help methods
Lauritzen 1995	Intervention: not dietitian versus other health professional or self-help methods
Le Lorier 1978	Randomised controlled trial: no Drugs: one arm received lipid lowering medication Intervention: not dietitian versus other health professional or self-help methods
Leduc 1994	Intervention: not dietitian versus other health professional or self-help methods
Lee 1997	Dietary advice: none given Intervention: not dietitian versus other health professional or self-help methods
Leenen 1993	Randomised controlled trial: no No food provided: no Intervention: not dietitian versus other health professional or self-help methods

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Leren 1970	No food provided: no Intervention: not dietitian versus other health professional or self-help methods
Lidell 1996	Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Lindholm 1995	Intervention: not dietitian versus other health professional or self-help methods
Lisspers 1999	Blood cholesterol: not measured Clinical setting: no No food provided: no Intervention: not dietitian versus other health professional or self-help methods
Little 1990	Randomised controlled trial: no Intervention: not dietitian versus other health professional or self-help methods
Lovibond 1986	Intervention: not dietitian versus other health professional or self-help methods
Luepker 1994	Randomised controlled trial: no Intervention: not dietitian versus other health professional or self-help methods
Lyons 1997	Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
MacLennan 1995	Intervention: not dietitian versus other health professional or self-help methods
MacMahon 1985	Drugs: one arm received lipid lowering medication Intervention: not dietitian versus other health professional or self-help methods
Manning 1995	Intervention: not dietitian versus other health professional or self-help methods
Margetts 1985	Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Marniemi 1990	Intervention: not dietitian versus other health professional or self-help methods
Masley 2001	Intervention: not dietitian versus other health professional or self-help methods
Mazzuca 1986	Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
McCance 1985	Intervention: not dietitian versus other health professional or self-help methods
McCann 1997	Intervention: not dietitian versus other health professional or self-help methods
McGowan 1994	Intervention: not dietitian versus other health professional or self-help methods

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McNabb 1997	Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Meland 1997	Intervention: not dietitian versus other health professional or self-help methods
Miettinen 1972	Randomised controlled trial: no No food provided: no Intervention: not dietitian versus other health professional or self-help methods
Miettinen 1985	Drugs: one arm received lipid lowering medication Intervention: not dietitian versus other health professional or self-help methods
Milkereit 1992	Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Miller 2002	Intervention: not dietitian versus other health professional or self-help methods
Miracle 1996	Randomised controlled trial: no Intervention: not dietitian versus other health professional or self-help methods
Mishra 1994	Randomised controlled trial: no Intervention: not dietitian versus other health professional or self-help methods
Mojonnier 1980	Intervention: not dietitian versus other health professional or self-help methods
Mori 1994	No food provided: Fish or fish oil capsules provided Intervention: not dietitian versus other health professional or self-help methods
Morrison 1951	Dietary advice: included vitamin supplements Intervention: not dietitian versus other health professional or self-help methods
MRFIT 1982	Intervention: not dietitian versus other health professional or self-help methods
Nader 1989	Intervention: not dietitian versus other health professional or self-help methods
Naslund 1996	Intervention: not dietitian versus other health professional or self-help methods
Niebauer 1995a	Randomised controlled trial: no No food provided: no Intervention: not dietitian versus other health professional or self-help methods
Niebauer 1995b	No food provided: no Intervention: not dietitian versus other health professional or self-help methods
Nikolaus 1991	Clinical setting: no on metabolic ward for 3 weeks No food provided: no Intervention: not dietitian versus other heallth professional or self-help methods

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Nilsson 2001	Intervention: not dietitian versus other health professional or self-help methods
Nisbeth 2000	Intervention: not dietitian versus other health professional or self-help methods
Nordevang 1990	Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
O'Loughlin 1995	Randomised controlled trial: no Intervention: not dietitian versus other health professional or self-help methods
Ockene 1995	Intervention: not dietitian versus other health professional or self-help methods
ODES 1993	Intervention: not dietitian versus other health professional or self-help methods
Oldenburg 1985	Blood cholesterol: not measured No food provided: no Intervention: not dietitian versus other health professional or self-help methods
Oldenburg 1995	Intervention: not dietitian versus other health professional or self-help methods
Oldroyd 2001	Intervention: not dietitian versus other health professional or self-help methods
Ornish 1990	No food provided: no Intervention: not dietitian versus other health professional or self-help methods
Ostwald 1989	No food provided: no Intervention: not dietitian versus other health professional or self-help methods
Oxcheck 1995	Intervention: not dietitian versus other health professional or self-help methods
Pace 1983	Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Page 1992	Intervention: not dietitian versus other health professional or self-help methods
Pan 1997	Blood choletserol: not measured at follow-up Intervention: not dietitian versus other health professional or self-help methods
Perry 1997	Intervention: not dietitian versus other health professional or self-help methods
Persson 1996	Drugs: one arm received lipid lowering medication Intervention: not dietitian versus other health professional or self-help methods
Pilkington 1960	Drugs: one arm received lipid lowering medication Intervention: not dietitian versus other health professional or self-help methods
Pontes 1990	Intervention: not dietitian versus other health professional or self-help methods

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Pritchard 1997	Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Pritchard 1999	Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Puddey 1992	Intervention: not dietitian versus other health professional or self-help methods
Puska 1983	No food provided: no Intervention: not dietitian versus other health professional or self-help methods
Puska 1985	Intervention: not dietitian versus other health professional or self-help methods
Rabkin 1983	Intervention: not dietitian versus other health professional or self-help methods
Ramsay 1978	Blood cholesterol: not measured
Redman 1995	Intervention: not dietitian versus other health professional or self-help methods
Rhodes 1996	Intervention: not dietitian versus other health professional or self-help methods
Ribeiro 1984	Randomised controlled trial: no Intervention: not dietitian versus other health professional or self-help methods
Rich 1996	No food provided: no Intervention: not dietitian versus other health professional or self-help methods
Ridgeway 1999	Intervention: not dietitian versus other health professional or self-help methods
Roderick 1997	Intervention: not dietitian versus other health professional or self-help methods
Rose 1992	Randomised controlled trial: no Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Sacks 1984	Randomised controlled trial: no Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Salkeld 1997	Intervention: not dietitian versus other health professional or self-help methods
Sarkkinen 1994	No food provided: fats provided Intervention: not dietitian versus other health professional or self-help methods
Schectman 1996	Drugs: one arm received lipid lowering drugs

(*Continued*)

Schlierf 1988	Randomised controlled trial: no Clinical setting: no stayed on a metabolic ward for first 3 weeks No food provided: no Intervention: not dietitian versus other health professional or self-help methods
Schuster 1995	Randomised controlled trial: no Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Sciarrone 1990	Intervention: not dietitian versus other health professional or self-help methods
Shenberger 1992	Randomised controlled trial: no Intervention: not dietitian versus other health professional or self-help methods
SimkinSilverman 1995	Intervention: not dietitian versus other health professional or self-help methods
Simon 1997	Intervention: not dietitian versus other health professional or self-help methods
Singh 1990	Intervention: not dietitian versus other health professional or self-help methods
Singh 1990 (2)	Intervention: not dietitian versus other health professional or self-help methods
Singh 1995	Intervention: not dietitian versus other health professional or self-help methods
Singh 1997	Intervention: not dietitian versus other health professional or self-help methods
Sivarajan 1983	Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Sjostrom 1992	Randomised controlled trial: no Intervention: not dietitian versus other health professional or self-help methods
Smith 1991	Randomised controlled trial: no Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Sopko 1985	No food provided: no Intervention: not dietitian versus other health professional or self-help methods
Sorensen 1992	Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Sorensen 1998	Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Stamler 1987	Intervention: not dietitian versus other health professional or self-help methods

(*Continued*)

Stamler 1989	Intervention: not dietitian versus other health professional or self-help methods
Stefanick 1998	Intervention: not dietitian versus other health professional or self-help methods
Steptoe 1999	Intervention: not dietitian versus other health professional or self-help methods
Steptoe 2001	Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Stevens 1993	Blood cholesterol: not measured
Stolley 1997	Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Stone 1963	Intervention: not dietitian versus other health professional or self-help methods
Svendsen 1994	No food provided: formula diet Intervention: not dietitian versus other health professional or self-help methods
Taylor 1991	Intervention: not dietitian versus other health professional or self-help methods
Thoresen 1982	Intervention: not dietitian versus other health professional or self-help methods
Timlin 2002	Randomised controlled trial: no Blood cholesterol: not measured
Traeden 1998	Randomised controlled trial: no Intervention: not dietitian versus other health professional or self-help methods
Travers 1992	Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Trento 2001	Intervention: not dietitian versus other health professional or self-help methods
Tuomilehto 1985	Randomised controlled trial: no Intervention: not dietitian versus other health professional or self-help methods
Turnin 1992	Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Uusitupa 1994	No food provided: Fats provided Intervention: not dietitian versus other health professional or self-help methods
Vale 2002	Intervention: not dietitian versus other health professional or self-help methods
van Beurden 1990	Randomised controlled trial: no Intervention: not dietitian versus other health professional or self-help methods

(*Continued*)

van Elderen 1994	Randomised controlled trial: no Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Vanninen 1992	Intervention: not dietitian versus other health professional or self-help methods
Walden 1991	Intervention: not dietitian versus other health professional or self-help methods
Walden 1997	Intervention: not dietitian versus other health professional or self-help methods
Wass 1981	Intervention: not dietitian versus other health professional or self-help methods
Watts 1994	No food provided: no Intervention: not dietitian versus other health professional or self-help methods
WHISG 1998	Intervention: not dietitian versus other health professional or self-help methods
WHO Trial 1980	Intervention: not dietitian versus other health professional or self-help methods
Wierenga 1994	Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Wilhelmsen 1986	Drugs: one arm received lipid lowering medication Intervention: not dietitian versus other health professional or self-help methods
Winett 1991	Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Wolmarans 1991	No food provided:no Intervention: not dietitian versus other health professional or self-help methods
Wood 1988	Intervention: not dietitian versus other health professional or self-help methods
Wood 1991	Intervention: not dietitian versus other health professional or self-help methods
Woodhill 1978	Intervention: not dietitian versus other health professional or self-help methods
Woollard 1995	Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Wylie Rosett 1993	Blood cholesterol: not measured Intervention: not dietitian versus other health professional or self-help methods
Wylie Rosett 1994	Intervention: not dietitian versus other health professional or self-help methods
Wylie-Rosett 2001	Intervention: not dietitian versus other health professional or self-help methods

(*Continued*)

Yanek 2001	Intervention: not dietitian versus other health professional or self-help methods
Zino 1997	Intervention: not dietitian versus other health professional or self-help methods

DATA AND ANALYSES

Comparison 1. Dietitian compared with other health professional or self-help resources

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Blood cholesterol at final visit	12		Mean Difference (IV, Random, 95% CI)	Subtotals only
1.1 Dietitian versus doctor	4	664	Mean Difference (IV, Random, 95% CI)	-0.25 [-0.37, -0.12]
1.2 Dietitian versus nurse	1	207	Mean Difference (IV, Random, 95% CI)	0.08 [-0.11, 0.27]
1.3 Dietitian versus self-help resources	7	973	Mean Difference (IV, Random, 95% CI)	-0.10 [-0.22, 0.03]
1.4 Dietitian versus counsellor	1	52	Mean Difference (IV, Random, 95% CI)	-0.03 [-0.46, 0.40]
2 LDLcholesterol at final visit	5		Mean Difference (IV, Random, 95% CI)	Subtotals only
2.1 Dietitian versus doctor	1	74	Mean Difference (IV, Random, 95% CI)	-0.2 [-0.54, 0.14]
2.2 Dietitian versus nurse	1	207	Mean Difference (IV, Random, 95% CI)	0.07 [-0.19, 0.33]
2.3 Dietitian versus self-help resources	3	467	Mean Difference (IV, Random, 95% CI)	0.03 [-0.14, 0.19]
2.4 Dietitian versus counsellor	1	52	Mean Difference (IV, Random, 95% CI)	-0.08 [-0.45, 0.29]
3 HDLcholesterol at final visit	7		Mean Difference (IV, Random, 95% CI)	Subtotals only
3.1 Dietitian versus doctor	1	74	Mean Difference (IV, Random, 95% CI)	-0.02 [-0.13, 0.09]
3.2 Dietitian versus nurse	1	207	Mean Difference (IV, Random, 95% CI)	-0.06 [-0.11, -0.01]
3.3 Dietitian versus self-help resources	5	779	Mean Difference (IV, Random, 95% CI)	-0.02 [-0.05, 0.01]
3.4 Dietitian versus counsellor	1	52	Mean Difference (IV, Random, 95% CI)	0.03 [-0.12, 0.18]
4 Diastolic blood pressure at final visit	4		Mean Difference (IV, Random, 95% CI)	Subtotals only
4.1 Dietitian versus self-help resources	3	382	Mean Difference (IV, Random, 95% CI)	0.30 [-1.39, 1.98]
4.2 Dietitian versus counsellor	1	52	Mean Difference (IV, Random, 95% CI)	-1.3 [-5.90, 3.30]
5 Systolic blood pressure at final visit	4		Mean Difference (IV, Random, 95% CI)	Subtotals only
5.1 Dietitian versus self-help resources	3	381	Mean Difference (IV, Random, 95% CI)	-1.77 [-4.40, 0.86]
5.2 Dietitian versus counsellor	1	52	Mean Difference (IV, Random, 95% CI)	-3.70 [-10.58, 3.18]
6 Body weight (kg) at final visit	5		Mean Difference (IV, Random, 95% CI)	Subtotals only
6.1 Dietitian versus self-help resources	4	588	Mean Difference (IV, Random, 95% CI)	-0.42 [-1.02, 0.17]
6.2 Dietitian versus counsellor	1	52	Mean Difference (IV, Random, 95% CI)	-5.80 [-8.91, -2.69]
7 Blood cholesterol at one year	5	502	Mean Difference (IV, Random, 95% CI)	-0.04 [-0.18, 0.09]
7.1 Dietitian versus doctor	0	0	Mean Difference (IV, Random, 95% CI)	Not estimable
7.2 Dietitian versus nurse	0	0	Mean Difference (IV, Random, 95% CI)	Not estimable
7.3 Dietitian versus self-help resources	4	450	Mean Difference (IV, Random, 95% CI)	-0.05 [-0.18, 0.09]
7.4 Dietitian versus counsellor	1	52	Mean Difference (IV, Random, 95% CI)	-0.03 [-0.46, 0.40]
8 Blood cholesterol up to 6 months	10		Mean Difference (IV, Random, 95% CI)	Subtotals only
8.1 Dietitian versus doctor	4	664	Mean Difference (IV, Random, 95% CI)	-0.25 [-0.37, -0.12]
8.2 Dietitian versus nurse	1	207	Mean Difference (IV, Random, 95% CI)	0.08 [-0.11, 0.27]

8.3 Dietitian versus self-help resources	5	702	Mean Difference (IV, Random, 95% CI)	-0.25 [-0.48, -0.02]
8.4 Dietitian versus counsellor	1	52	Mean Difference (IV, Random, 95% CI)	-0.37 [-0.82, 0.08]

Comparison 2. Dietitian compared with doctor, nurse, counsellor and self-help resources

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Blood cholesterol at final visit	12	1689	Mean Difference (IV, Random, 95% CI)	-0.14 [-0.23, -0.05]

Analysis 1.1. Comparison 1 Dietitian compared with other health professional or self-help resources, Outcome 1 Blood cholesterol at final visit.

Review: Dietary advice given by a dietitian versus other health professional or self-help resources to reduce blood cholesterol

Comparison: 1 Dietitian compared with other health professional or self-help resources

Outcome: 1 Blood cholesterol at final visit

Study or subgroup	Dietitian N	Mean(SD)	Other N	Mean(SD)	Mean Difference IV,Random,95% CI	Weight	Mean Difference IV,Random,95% CI
1 Dietitian versus doctor							
Caggiula 1996	169	-0.54 (0.73)	262	-0.31 (0.83)		58.2 %	-0.23 [-0.38, -0.08]
Gosselin 1996	36	-0.47 (0.7)	38	-0.13 (0.78)		22.0 %	-0.34 [-0.68, 0.00]
Smith 1976	46	-0.66 (1.23)	48	-0.39 (1.41)		10.1 %	-0.27 [-0.80, 0.26]
Luepker 1978	31	-1 (1.21)	34	-0.82 (1.02)		9.7 %	-0.18 [-0.73, 0.37]
Subtotal (95% CI)	**282**		**382**			**100.0 %**	**-0.25 [-0.37, -0.12]**
Heterogeneity: Tau² = 0.0; Chi² = 0.41, df = 3 (P = 0.94); I² =0.0%							
Test for overall effect: Z = 3.75 (P = 0.00018)							
2 Dietitian versus nurse							
Neil 1995	103	-0.1 (0.77)	104	-0.18 (0.63)		100.0 %	0.08 [-0.11, 0.27]
Subtotal (95% CI)	**103**		**104**			**100.0 %**	**0.08 [-0.11, 0.27]**
Heterogeneity: not applicable							
Test for overall effect: Z = 0.82 (P = 0.41)							
3 Dietitian versus self-help resources							
Heller 1989	22	-0.6 (0.49)	23	-0.13 (0.81)		8.1 %	-0.47 [-0.86, -0.08]
Wing 1998	35	-0.12 (0.61)	31	0.18 (0.53)		13.7 %	-0.30 [-0.58, -0.02]

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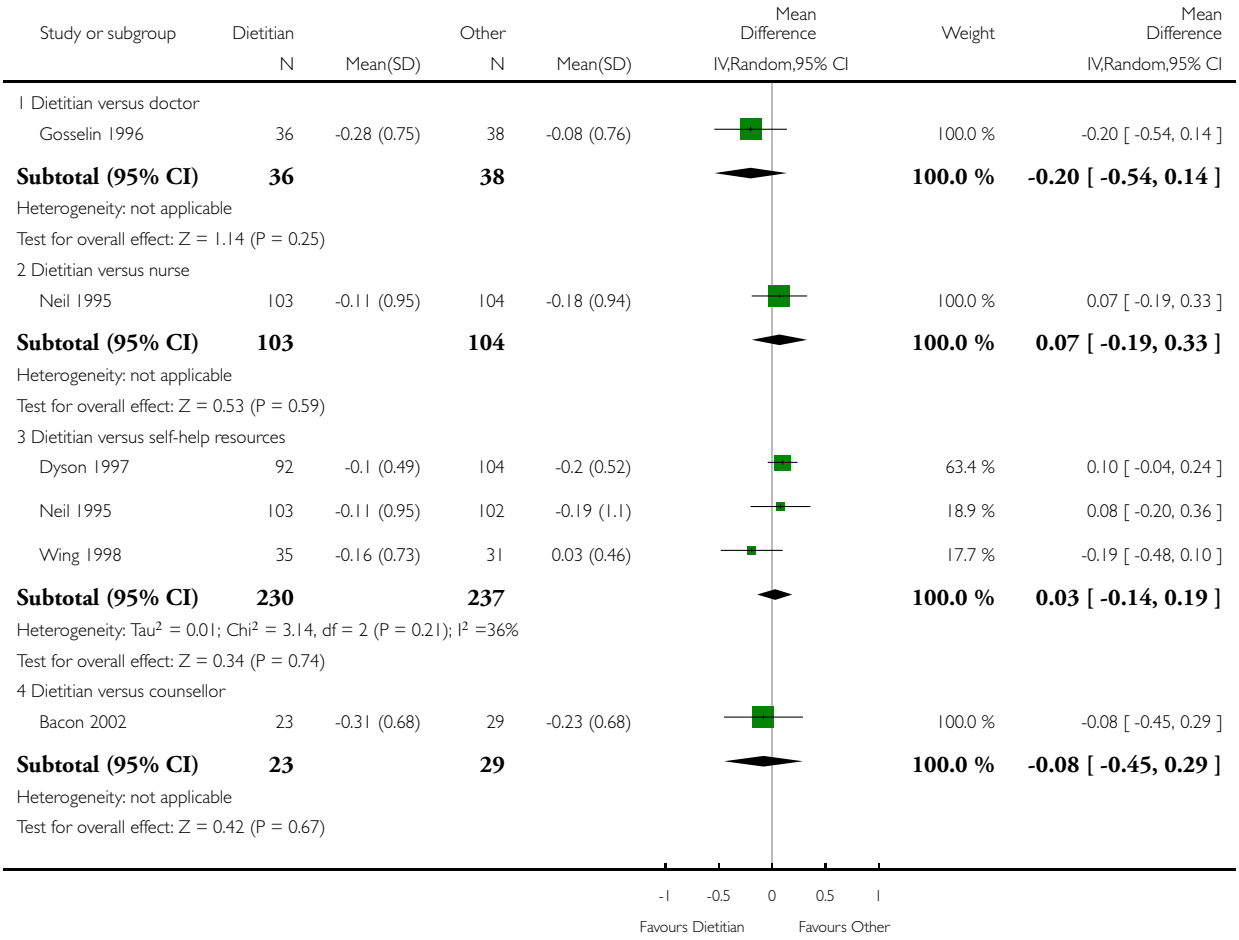
Study or subgroup	Dietitian N	Mean(SD)	Other N	Mean(SD)	Mean Difference IV,Random,95% CI	Weight	Mean Difference IV,Random,95% CI
Barratt 1994	66	-0.05 (0.83)	203	-0.02 (0.62)		18.5 %	-0.03 [-0.25, 0.19]
Dyson 1997	92	-0.2 (0.49)	104	-0.2 (0.78)		22.7 %	0.0 [-0.18, 0.18]
Foreyt 1979	63	-0.18 (0.73)	53	0.03 (1.44)		6.9 %	-0.21 [-0.64, 0.22]
Tomson 1995	41	-0.27 (0.78)	35	-0.24 (0.77)		9.6 %	-0.03 [-0.38, 0.32]
Neil 1995	103	-0.1 (0.77)	102	-0.13 (0.69)		20.4 %	0.03 [-0.17, 0.23]
Subtotal (95% CI)	**422**		**551**			**100.0 %**	**-0.10 [-0.22, 0.03]**
Heterogeneity: $Tau^2 = 0.01$; $Chi^2 = 8.86$, df = 6 (P = 0.18); $I^2 = 32\%$							
Test for overall effect: Z = 1.54 (P = 0.12)							
4 Dietitian versus counsellor							
Bacon 2002	23	-0.85 (0.78)	29	-0.82 (0.78)		100.0 %	-0.03 [-0.46, 0.40]
Subtotal (95% CI)	**23**		**29**			**100.0 %**	**-0.03 [-0.46, 0.40]**
Heterogeneity: not applicable							
Test for overall effect: Z = 0.14 (P = 0.89)							

Analysis 1.2. Comparison 1 Dietitian compared with other health professional or self-help resources, Outcome 2 LDLcholesterol at final visit.

Review: Dietary advice given by a dietitian versus other health professional or self-help resources to reduce blood cholesterol

Comparison: 1 Dietitian compared with other health professional or self-help resources

Outcome: 2 LDLcholesterol at final visit

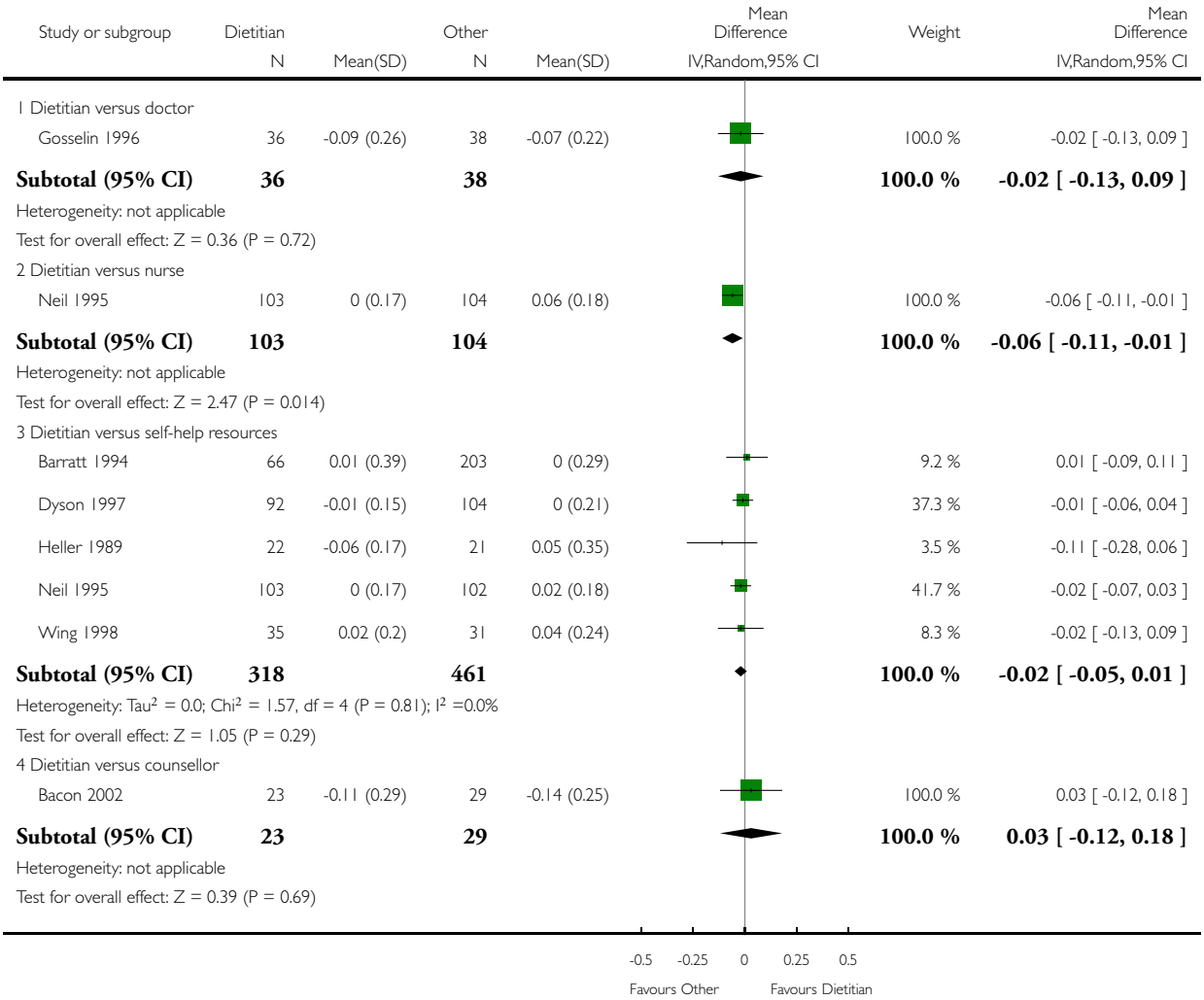


Analysis 1.3. Comparison 1 Dietitian compared with other health professional or self-help resources, Outcome 3 HDLcholesterol at final visit.

Review: Dietary advice given by a dietitian versus other health professional or self-help resources to reduce blood cholesterol

Comparison: 1 Dietitian compared with other health professional or self-help resources

Outcome: 3 HDLcholesterol at final visit

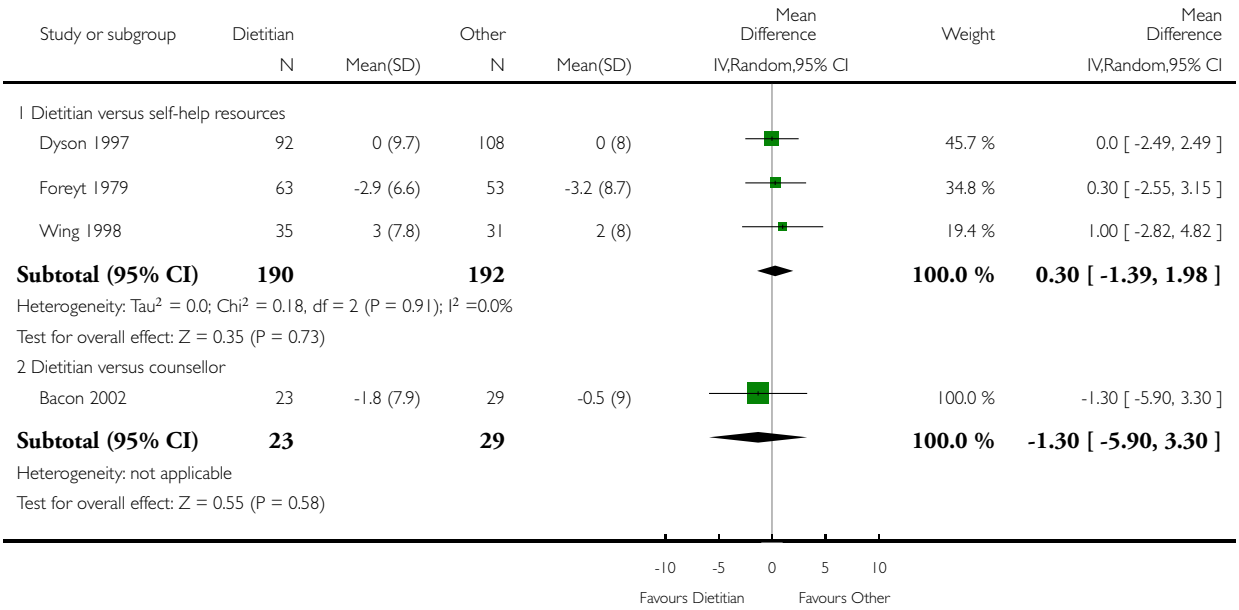


Analysis 1.4. Comparison 1 Dietitian compared with other health professional or self-help resources, Outcome 4 Diastolic blood pressure at final visit.

Review: Dietary advice given by a dietitian versus other health professional or self-help resources to reduce blood cholesterol

Comparison: 1 Dietitian compared with other health professional or self-help resources

Outcome: 4 Diastolic blood pressure at final visit

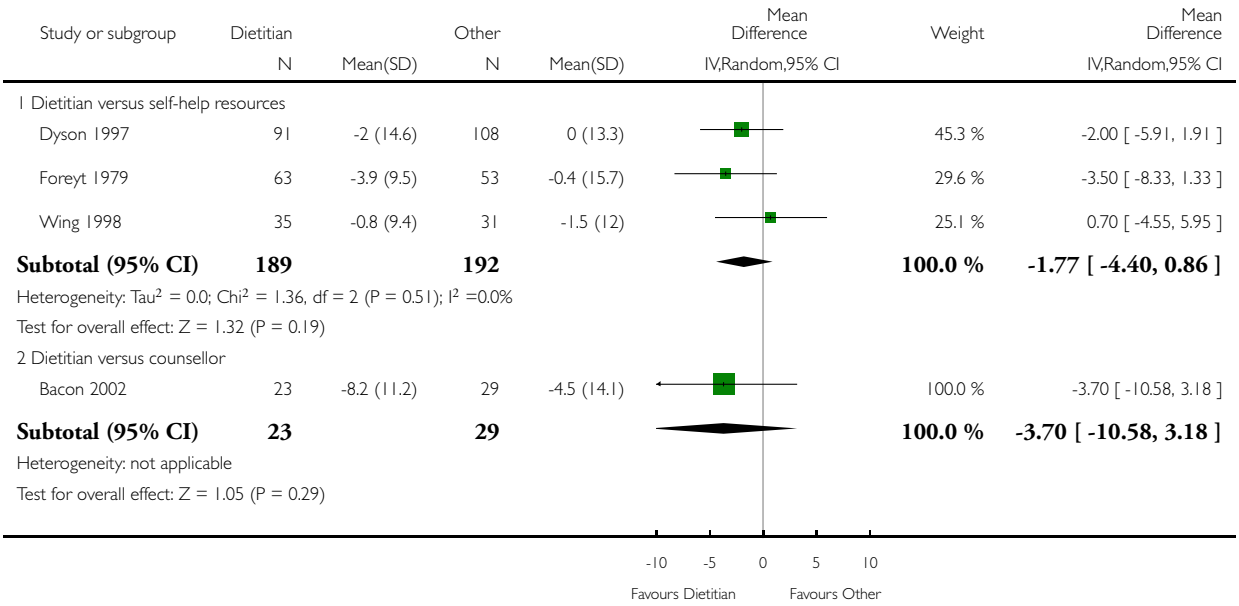


Analysis 1.5. Comparison 1 Dietitian compared with other health professional or self-help resources, Outcome 5 Systolic blood pressure at final visit.

Review: Dietary advice given by a dietitian versus other health professional or self-help resources to reduce blood cholesterol

Comparison: 1 Dietitian compared with other health professional or self-help resources

Outcome: 5 Systolic blood pressure at final visit



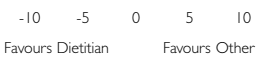
Analysis 1.6. Comparison 1 Dietitian compared with other health professional or self-help resources, Outcome 6 Body weight (kg) at final visit.

Review: Dietary advice given by a dietitian versus other health professional or self-help resources to reduce blood cholesterol

Comparison: 1 Dietitian compared with other health professional or self-help resources

Outcome: 6 Body weight (kg) at final visit

Study or subgroup	Dietitian N	Mean(SD)	Other N	Mean(SD)	Mean Difference IV,Random,95% CI	Weight	Mean Difference IV,Random,95% CI
1 Dietitian versus self-help resources							
Barratt 1994	56	-0.4 (2.5)	152	0.1 (3.1)		32.8 %	-0.50 [-1.32, 0.32]
Dyson 1997	91	-0.4 (4.6)	107	-0.2 (3.9)		28.4 %	-0.20 [-1.40, 1.00]
Foreyt 1979	63	-0.4 (4)	53	-0.2 (3.5)		26.4 %	-0.20 [-1.57, 1.17]
Wing 1998	35	-2.1 (7.6)	31	-0.3 (4.5)		12.4 %	-1.80 [-4.77, 1.17]
Subtotal (95% CI)	**245**		**343**			**100.0 %**	**-0.42 [-1.02, 0.17]**
Heterogeneity: $Tau^2 = 0.0$; $Chi^2 = 1.09$, df = 3 (P = 0.78); $I^2 = 0.0\%$							
Test for overall effect: Z = 1.39 (P = 0.16)							
2 Dietitian versus counsellor							
Bacon 2002	23	-5.9 (6.3)	29	-0.1 (4.8)		100.0 %	-5.80 [-8.91, -2.69]
Subtotal (95% CI)	**23**		**29**			**100.0 %**	**-5.80 [-8.91, -2.69]**
Heterogeneity: not applicable							
Test for overall effect: Z = 3.65 (P = 0.00026)							



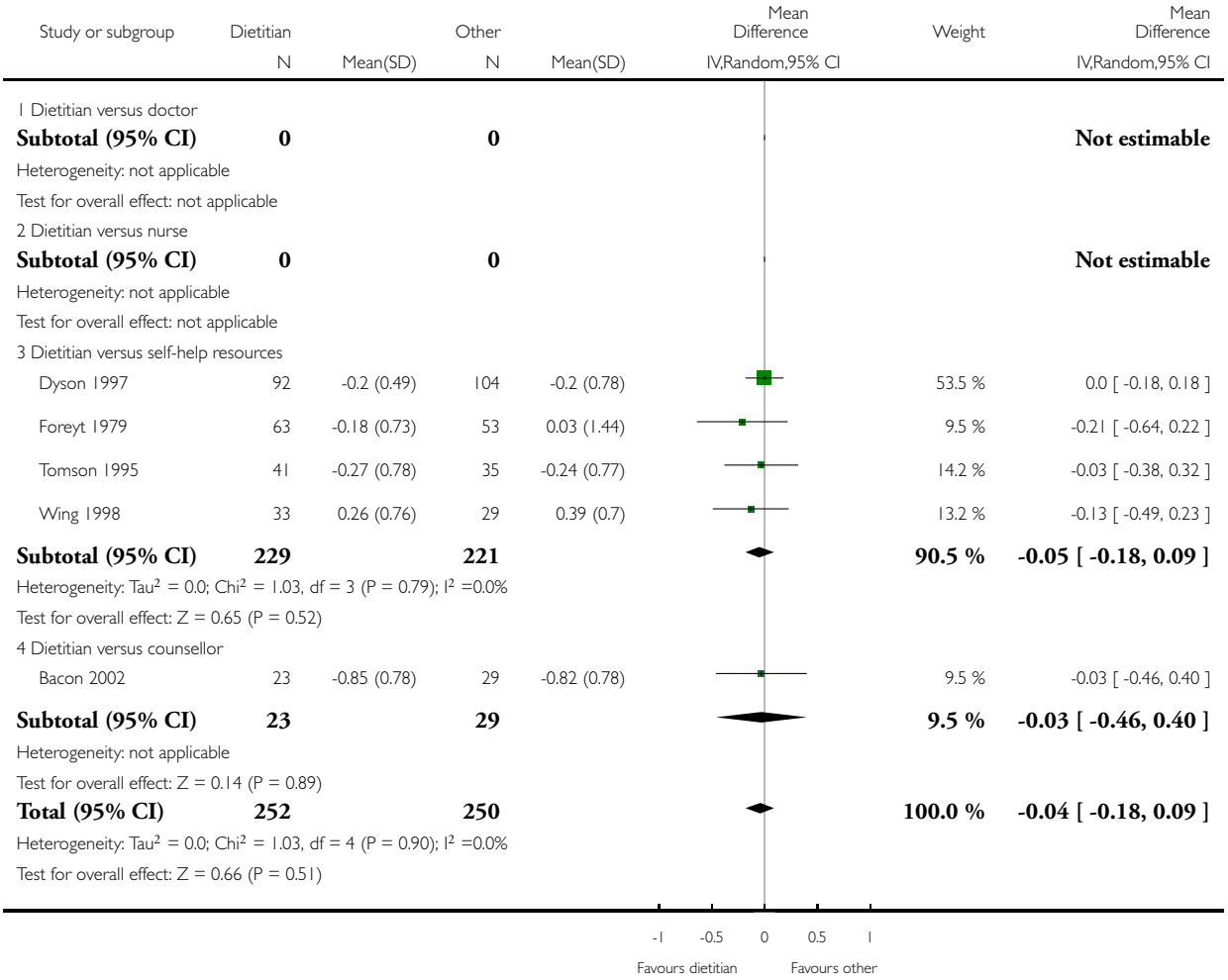
Analysis 1.7. Comparison 1 Dietitian compared with other health professional or self-help resources, Outcome 7 Blood cholesterol at one year.

Review: Dietary advice given by a dietitian versus other health professional or self-help resources to reduce blood cholesterol

Comparison: 1 Dietitian compared with other health professional or self-help resources

Outcome: 7 Blood cholesterol at one year

Study or subgroup	Dietitian N	Mean(SD)	Other N	Mean(SD)	Mean Difference IV,Random,95% CI	Weight	Mean Difference IV,Random,95% CI
1 Dietitian versus doctor							
Subtotal (95% CI)	**0**		**0**				**Not estimable**
Heterogeneity: not applicable							
Test for overall effect: not applicable							
2 Dietitian versus nurse							
Subtotal (95% CI)	**0**		**0**				**Not estimable**
Heterogeneity: not applicable							
Test for overall effect: not applicable							
3 Dietitian versus self-help resources							
Dyson 1997	92	-0.2 (0.49)	104	-0.2 (0.78)		53.5 %	0.0 [-0.18, 0.18]
Foreyt 1979	63	-0.18 (0.73)	53	0.03 (1.44)		9.5 %	-0.21 [-0.64, 0.22]
Tomson 1995	41	-0.27 (0.78)	35	-0.24 (0.77)		14.2 %	-0.03 [-0.38, 0.32]
Wing 1998	33	0.26 (0.76)	29	0.39 (0.7)		13.2 %	-0.13 [-0.49, 0.23]
Subtotal (95% CI)	**229**		**221**			**90.5 %**	**-0.05 [-0.18, 0.09]**
Heterogeneity: $Tau^2 = 0.0$; $Chi^2 = 1.03$, df = 3 (P = 0.79); $I^2 = 0.0\%$							
Test for overall effect: Z = 0.65 (P = 0.52)							
4 Dietitian versus counsellor							
Bacon 2002	23	-0.85 (0.78)	29	-0.82 (0.78)		9.5 %	-0.03 [-0.46, 0.40]
Subtotal (95% CI)	**23**		**29**			**9.5 %**	**-0.03 [-0.46, 0.40]**
Heterogeneity: not applicable							
Test for overall effect: Z = 0.14 (P = 0.89)							
Total (95% CI)	**252**		**250**			**100.0 %**	**-0.04 [-0.18, 0.09]**
Heterogeneity: $Tau^2 = 0.0$; $Chi^2 = 1.03$, df = 4 (P = 0.90); $I^2 = 0.0\%$							
Test for overall effect: Z = 0.66 (P = 0.51)							

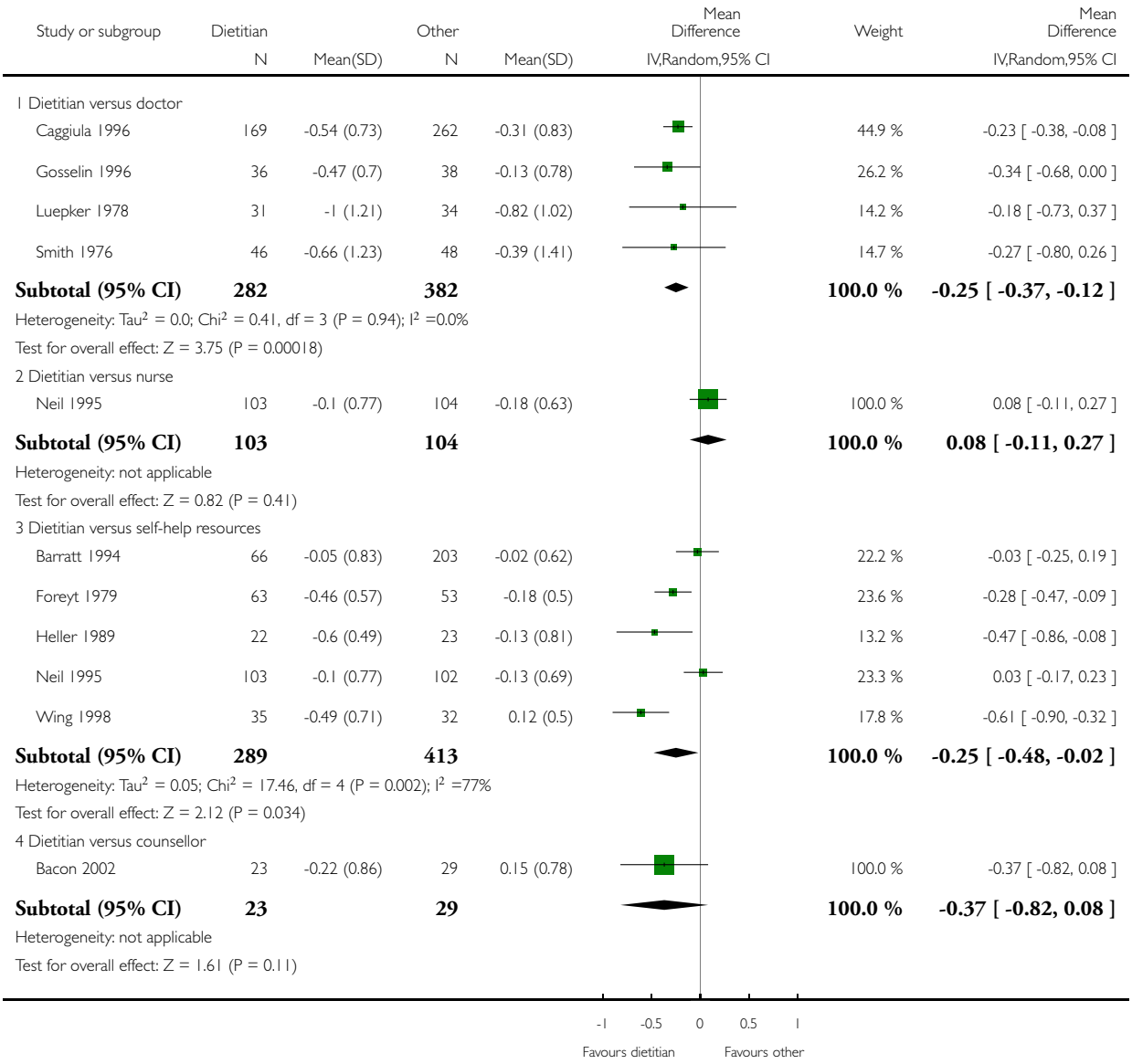


Analysis 1.8. Comparison 1 Dietitian compared with other health professional or self-help resources, Outcome 8 Blood cholesterol up to 6 months.

Review: Dietary advice given by a dietitian versus other health professional or self-help resources to reduce blood cholesterol

Comparison: 1 Dietitian compared with other health professional or self-help resources

Outcome: 8 Blood cholesterol up to 6 months



Analysis 2.1. Comparison 2 Dietitian compared with doctor, nurse, counsellor and self-help resources, Outcome 1 Blood cholesterol at final visit.

Review: Dietary advice given by a dietitian versus other health professional or self-help resources to reduce blood cholesterol

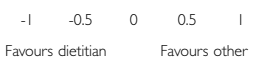
Comparison: 2 Dietitian compared with doctor, nurse, counsellor and self-help resources

Outcome: 1 Blood cholesterol at final visit

Study or subgroup	Dietitian N	Mean(SD)	Other methods N	Mean(SD)	Mean Difference IV,Random,95% CI	Weight	Mean Difference IV,Random,95% CI
Heller 1989	22	-0.6 (0.49)	23	-0.13 (0.81)		4.8 %	-0.47 [-0.86, -0.08]
Wing 1998	35	-0.12 (0.61)	31	0.18 (0.53)		8.6 %	-0.30 [-0.58, -0.02]
Barratt 1994	66	-0.05 (0.83)	203	-0.02 (0.62)		12.2 %	-0.03 [-0.25, 0.19]
Dyson 1997	92	-0.2 (0.49)	104	-0.2 (0.78)		15.8 %	0.0 [-0.18, 0.18]
Gosselin 1996	36	-0.47 (0.7)	38	-0.13 (0.78)		6.1 %	-0.34 [-0.68, 0.00]
Foreyt 1979	63	-0.18 (0.73)	53	0.03 (1.44)		4.0 %	-0.21 [-0.64, 0.22]
Smith 1976	46	-0.66 (1.23)	48	-0.39 (1.41)		2.7 %	-0.27 [-0.80, 0.26]
Tomson 1995	41	-0.27 (0.78)	35	-0.24 (0.77)		5.7 %	-0.03 [-0.38, 0.32]
Caggiula 1996	169	-0.54 (0.73)	262	-0.31 (0.83)		19.8 %	-0.23 [-0.38, -0.08]
Luepker 1978	31	-1 (1.21)	34	-0.82 (1.02)		2.5 %	-0.18 [-0.73, 0.37]
Neil 1995	103	-0.1 (0.77)	102	-0.13 (0.69)		13.8 %	0.03 [-0.17, 0.23]
Bacon 2002	23	-0.85 (0.78)	29	-0.82 (0.78)		4.0 %	-0.03 [-0.46, 0.40]
Total (95% CI)	**727**		**962**			**100.0 %**	**-0.14 [-0.23, -0.05]**

Heterogeneity: $Tau^2 = 0.00$; $Chi^2 = 13.83$, df = 11 (P = 0.24); $I^2 = 20\%$

Test for overall effect: Z = 2.98 (P = 0.0028)



WHAT'S NEW

Last assessed as up-to-date: 22 May 2003.

Date	Event	Description
20 October 2008	Amended	Converted to new review format.

HISTORY

Protocol first published: Issue 1, 1999

Review first published: Issue 1, 2001

Date	Event	Description
23 May 2003	New citation required and conclusions have changed	Substantive amendment

CONTRIBUTIONS OF AUTHORS

All co-reviewers were active in the design of the review and in providing comments on revisions of the manuscript. Julian Higgins was responsible for giving statistical advice. Shah Ebrahim and Carolyn Summerbell were primary advisors for the review. Lee Hooper and Paul Little duplicated the application of inclusion/exclusion criteria and Lee Hooper duplicated the data extraction from included studies. Rachel Thompson was the principal author and instigator of the review and participated in all aspects of the review. Rachel Thompson is guarantor for the review.

DECLARATIONS OF INTEREST

Rachel Thompson, Carolyn Summerbell, Lee Hooper and Diane Talbot are dietitians. This review was funded in part by the British Dietetic Association.

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- British Dietetic Association, UK.

INDEX TERMS

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MeSH check words

Humans