CRD summary
The authors concluded that tailored nutrition education was a promising strategy to improve diets of adults; however, there was a possibility of false-positive findings. Although the authors’ conclusions reflected the evidence presented, a lack of a synthesis of studies unsuitable for meta-analysis and pooling of diverse data raised questions about the reliability of the data.

Authors' objectives
To evaluate the impact of tailored nutrition education compared to generic nutrition education or no education on diet-related behaviours, in particular amongst ethnic minority or low-income groups.

Searching
MEDLINE, PsycINFO, CINAHL, ERIC, EMBASE, DARE, CDSR, Digital Abstracts and Science Citation Index were searched from January 1990 to December 2007 for English-Language articles. Search terms were reported. Bibliographies of relevant articles were handsearched.

Study selection
Parallel quasi-randomised or randomised controlled trials (RCT) with at least six months follow-up that compared tailored nutrition education with generic nutrition education or no education in adults of any ethnic or health status were eligible for inclusion. Tailored nutrition education had to include some non face-to-face format (such as print, email). Outcomes of interest were nutrition-related health behaviours (food intake or purchases) or anthropometric measures (change in body weight, body mass index or waist circumference).

Most included studies assessed nutrition education tailored by current diet, nutrient intake, food purchases or behaviour change theories. Comparator groups received generic nutrition education or no education. Tailoring was delivered in a range of formats. Frequency ranged from one to 36 occasions. Duration ranged from one day to 20 months. Most participants were female, white and of healthy or mixed health status. Ages ranged from 18 to more than 85 years. Some studies were of participants only with breast or prostate cancer, diabetes and the overweight or obese. Only the outcomes of total fruit and vegetable intake and total fat intake were suitable for meta-analysis. In most studies, outcomes were assessed by self-report.

It was unclear how many reviewers screened titles and abstracts. Full articles were screened by one author, with a second author available to resolve any selection doubts.

Assessment of study quality
Study quality was assessed according to randomisation, allocation concealment, blinding, comparability of groups at baseline, loss to follow-up, intention-to-treat analyses and a priori sample size calculations. On the basis of these criteria, each study was awarded a risk of bias score (high, low or medium) according to Cochrane guidelines.

The authors did not state how many reviewers performed validity assessment.

Data extraction
The mean and standard deviation (SD) of continuous outcomes was extracted and used to calculated mean differences between groups. Study authors were contacted for further data where necessary.

The authors did not state how many reviewers performed data extraction.
Methods of synthesis
Weighted mean differences with 95% confidence intervals (CI) were pooled using meta-analyses. Statistical heterogeneity was assessed using the $\chi^2$ method. A random-effects model was used where significant statistical heterogeneity was found. Sensitivity analyses that excluded trials with a high risk of bias were carried out. Publication bias was assessed using a funnel plot. Results were reported in a narrative synthesis for studies where more than 50% of the population was of an ethnic minority or on a low income.

Results of the review
Twenty-five studies met the review inclusion criteria, but only 15 contained data suitable for inclusion in the meta-analysis (n=20,809). Four studies met inclusion criteria for priority ethnic groups (n=5,981). One study was of a low income group (n=2,024). Three trials had a high risk of bias. Two trials had a low risk of bias. Ten trials had a medium risk of bias.

All population groups: Tailored nutrition education significantly increased fruit and vegetable consumption compared to generic nutrition education (WMD 0.35 servings per day, 95% CI 0.19 to 0.52; four trials, n=4,638) and no nutrition education (WMD 0.59 servings per day, 95% CI 0.21 to 0.98, $I^2=93%$; six trials, n=12,187). Tailored nutrition education significantly reduced energy from total fat compared to generic nutrition education (WMD -2.2%, 95% CI -3.0% to -1.4%; three trials, n=1,060) or no education (WMD -2.45% 95% CI -4.08% to -0.82%, $I^2=80%$; six trials, n=6,572). The funnel plot indicated a lack of small studies. Sensitivity analyses that excluded studies with a high risk of bias did not significantly alter the results.

Ethnic Minorities: Four RCTs had a majority of participants from ethnic minorities. Three trials measured daily fruit and vegetable servings and all found that tailored nutrition education significantly increased fruit and vegetable consumption compared to no education/control groups (p<0.03 and p<0.05). Tailored nutrition education was not associated with significant changes in total fat or total saturated fat intake.

Low income: Tailored education significantly increased fruit consumption (p<0.05), but not vegetable consumption in young adults on a low income (n=1,021).

Authors’ conclusions
Tailored nutrition education was a promising strategy to improve diets of adults over the long term. However, use of self-reported measures of diet introduced the possibility of false-positive findings.

CRD commentary
The review addressed a clear question. Inclusion criteria were well defined. Several relevant databases were searched. The search was restricted to English-language articles, which introduced a risk of language bias. It appeared that no attempts were made to identify unpublished data, so publication bias could not be ruled out. It appeared that appropriate methods to minimise reviewer error and bias were not used in data extraction and validity assessment processes. The screening process used was prone to error and bias. Methodological quality of included studies was assessed using suitable criteria; most studies had a medium risk of bias. The authors noted that outcomes were assessed primarily using self-report methods, which increased risk of a bias towards positive findings due to social desirability or recall bias. There were high levels of clinical heterogeneity between studies. Given the characteristics of most of the included studies, it was unclear to what extent the results were generalisable to males and to participants outside of USA. Appropriate methods were used to combine studies. However, no narrative synthesis was conducted for studies unsuitable for meta-analysis; therefore, the authors’ conclusions were not based on all available evidence. Statistical heterogeneity was assessed, but possible causes were not explored when it was found. Although the authors’ conclusions appeared to reflect the evidence presented, a lack of a narrative synthesis of studies unsuitable for meta-analysis and pooling of clinically and statistically heterogeneous data raised questions about the reliability of the conclusions.

Implications of the review for practice and research
Practice: The authors did not state any implications for practice.

Research: The authors stated that further trials were needed to investigate tailored nutrition in multiple settings. Trials needed to focus on a narrow range of nutrition-related outcomes assessed with objective measures. Studies should have
appropriate randomisation, allocation concealment and use a priori sample size calculations and intention-to-treat analyses. Trials should be reported according to CONSORT guidelines. Further large-scale studies were needed for priority ethnic groups, men and low-income groups.

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