A meta-analysis of trials evaluating patient education and counseling for three groups of preventive health behaviors


Authors' objectives
To examine the overall effectiveness of patient education and counseling on preventative health behaviours and to examine the effects of various approaches for modifying specific types of behaviours.

Searching
Searches were made of the following: MEDLINE; Healthline; Dissertation Abstracts; and Psychological Abstracts; and bibliographies from review articles. Contact was made with experts identified through authorship and presentations at scientific meetings. A first search was conducted through 1990 and a second identified citations from 1990 through 1993. Search terms are specified.

Study selection
Study designs of evaluations included in the review
Published and unpublished studies that measured the effect of any education or counselling intervention on a preventative health behaviour were included if they fulfilled the following criteria: a research design with high internal validity through use of an investigator assigned control group, whether randomised or not; proportion lost to follow-up < 40%; 15 or more subjects per group at post-test; analysis by intention to treat with no imputation of values for subjects lost to follow-up. Studies reporting means without standard deviations or standard errors were excluded unless exact sample sizes and t-values were also reported.

Specific interventions included in the review
Education or counselling interventions on a preventative health behaviour provided in a clinical setting in developed countries were included. The range of settings included office-based care, home health care, worksite and school clinics, nursing homes, and inpatient medical services. Prevention areas were grouped according to the following classification of behaviour: addictive, subtractive behaviours including smoking and alcohol misuse; non-addictive, subtractive/substitutive behaviours including nutrition and weight control; and other behaviours including contraception, breast self-exam, injury prevention, stressor reduction and exercise.

Participants included in the review
The participants were apparently healthy individuals of the following three types: from a general population for which disease was to be prevented; from a population with identified risk factors for disease who were at higher risk than the general population; and victims with acute problems (eg injury) for which future occurrences of the acute events were to be prevented. Excluded were patients with diagnosed disease and patients with extremely specialised learning needs.

Outcomes assessed in the review
Outcome measures of preventative health behaviour (such as weight loss and stopping smoking) that allowed a calculation of effect size were assessed. The behaviour could be measured directly by self-report, with or without objective verification, or indirectly by a physical measure.

How were decisions on the relevance of primary studies made?
At least two members of the research team scanned retrieved abstracts and reports. Reviewers were not blinded to authorship, journal or other information.

Assessment of study quality
The following validity criteria were used: study design (randomised or not), and objectivity of outcome measure (low medium or high). Other criteria of validity were incorporated into inclusion criteria. The authors do not state how the papers were assessed for validity, or how many of the authors performed the validity assessment.
Data extraction
Three types of variables were coded: characteristics of intervention including use of principles of education, intervention orientation, number of patient contacts and channel of communication; type of behaviour classified as addictive subtractive, non-addictive subtractive/substitutive, and other; and study characteristics including design, objectivity of outcome measure, follow-up period described as > 30 days or not, number of research sites (single or multiple), principal subject characteristics, and risk status. Intercoder reliability was supported by extensive training and monitoring of coders with discrepancies in coding being resolved by consensus. The effect size of continuous measures was calculated as the difference between the post-test means of the experimental and control groups divided by the pooled standard deviation. For studies reporting proportions a logit transformation was used to convert the data to comparable units of effect size. The effect sizes were adjusted based on number of study subjects. Formulas used are defined in the Appendix.

Methods of synthesis
How were the studies combined?
Study findings were summarised with a common unit of effect size. The weighted average effect sizes and 95% confidence limits were calculated using a random-effects model.

How were differences between studies investigated?
Homogeneity was estimated for the entire set of studies and for each behaviour separately. A weighted average effect size was estimated for each level of the intervention and control variables. A weighted least squares multiple regression model was constructed to evaluate the relative influence of the intervention characteristics, while controlling for the methodological characteristics of the studies. Outlier studies were omitted from regression models to produce homogeneity.

Results of the review
39 studies were of addictive subtractive behaviour. These included: 35 studies of smoking (N = 24,627 subjects); and 4 studies of alcohol (N = 734 subjects).

17 studies were of non-addictive, subtractive/substitutive behaviour. These included: 12 studies of nutrition (N = 13,844 subjects); and 5 studies of weight (N = 198 subjects).

18 studies were of other behaviours. These included: 6 studies of contraception (N = 945 subjects); 3 studies of breast self-exam (N = 1502 subjects); 6 studies of injury prevention (N = 1669 subjects); 2 studies of stressor reduction (N = 164 subjects); and 1 study of exercise (N = 120 subjects).

Characteristics of primary studies are tabulated.
Overall the 74 studies were heterogeneous (Chi-squared = 621.5; P < 0.001).

The heterogeneity within behaviour groups is presented graphically.

Analysis by behaviour group: Addictive subtractive (smoking and alcohol): overall effect size = 0.61 (95%CI: 0.45, 0.77). Non-addictive, subtractive/substitutive (nutrition and weight): overall effect size = 0.51 (95%CI: 0.20, 0.82).

Other (contraception, breast-self exam, injury prevention, stressor reduction and exercise): overall effect size 0.56 (95%CI: 0.34, 0.77).

Effect sizes are presented separately for intervention and control variables by behaviour group. Higher scores on the Principles of Education Factor, Behaviour Change Support Factor and the use of self-monitoring were associated with larger effects. Having multiple sites was associated with smaller effects. Inconsistent directions across the behaviour groups were found for other intervention characteristics. Regression models for the three behaviour groups were homogeneous after removing outlier studies.
Details of the effects on the final sample of studies of applying inclusion criteria are reported elsewhere (see Other Publications of Related Interest).

**Authors' conclusions**
Patient education and counselling contribute to behaviour change for primary prevention of disease. Some techniques are more effective than others in changing specific behaviours.

**CRD commentary**
The aim of the review and the inclusion criteria are clearly stated. Both published and unpublished studies were sought from a number of sources. Certain validity criteria were used to select studies with others being incorporated into the data extraction process. Methods used to select primary studies and extract data are described. Some details are presented of the primary studies. Effect sizes of individual studies are presented graphically. Investigation of the heterogeneity found among studies was undertaken. The discussion includes mention of the following limitations of the review: the number of studies was small given the diversity of study methods, prevention areas, and intervention approaches; the inability to include all the interventions tested in studies with more than one intervention group; the exclusion of 8 studies when fitting the regression models; gaps in the distributions of intervention characteristics of interest; study characteristics differed substantially across prevention areas; objectivity of outcome measures varied; and length of follow-up varied.

Though the authors state that brief descriptions of the studies located through 1991 have been published elsewhere fuller details of the included studies would have been helpful (see Other Publications of Related Interest). Meta-analysis may be considered inappropriate given the heterogeneity among studies.

It may be considered more helpful for clinicians to have information on specific interventions that are effective for specific behaviours.

**Implications of the review for practice and research**
Practice: The authors consider that a reasonable message for physicians and other clinicians, pending further studies, is to provide patient education and counselling for preventative behaviour change. The use of behavioural techniques especially self-monitoring is recommended as is the use of both personal communication and written or other audiovisual materials.

Research: The authors do not make any specific recommendations for future research.

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**Other publications of related interest**

This additional published commentary may also be of interest. Gerace TM. Review: patient education and counselling increase preventive behaviours. Evid Based Nurs 1998;1:116.

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