Effectiveness of educational interventions on the improvement of drug prescription in primary care: a critical literature review

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Authors' objectives
To determine the effectiveness of educational programmes to improve prescription practices in ambulatory care.

Searching
MEDLINE, ERIC, IME (the Spanish Medical Index) and ICYT (the Spanish Science and Technology Index) were searched from January 1988 to December 1996. The search terms for MEDLINE and ERIC included 'prescription', 'prescribed', 'physician*', 'practitioner*', 'general-pract*', 'primary-care', 'primary-health-care', 'family practice', 'doctor*', 'prescrib*', 'health-cent*', 'educat*', 'information*', 'intervention*', and 'recommend*'. In addition, manual searches of journals, particularly those less likely to be indexed, and the bibliographies of retrieved articles were used to identify further studies. Only studies published in English or Spanish were eligible for inclusion.

Study selection
Study designs of evaluations included in the review
There were purposely no inclusion criteria based on study design. Observational, randomised and non-randomised experimental studies were included.

Specific interventions included in the review
Studies describing non-commercial and non-regulatory educational strategies were eligible for inclusion. The interventions were grouped into the following categories: dissemination of printed or audiovisual education materials; group education, including group sessions rounds, conferences, lectures, seminars and tutorials; feedback on physician prescribing patterns, or feedback on patient-specific lists of prescribed medication; individual outreach visits (i.e. the use of a trained person who meets individually with providers in the practice setting to provide information); reminders at the time of prescribing; educational computer software; and formulary-control. The interventions were grouped as active or passive. Active interventions were those in which the physician was involved in developing the intervention and/or there was personal contact. Passive interventions were those in which the physician received unsolicited information and there was no participation or personal contact.

Participants included in the review
Studies of interventions targeted at general practitioners in ambulatory care settings were included. Studies of interventions aimed at trainees (residents) and patients were excluded.

Outcomes assessed in the review
The studies had to measure the change in the prescribing behaviour of physicians using prescribing indicators obtained from objective sources, such as issued prescriptions and clinical histories.

Studies measuring the intervention effect using non-prescribing indicators or subjective data sources (such as surveys) were excluded.

How were decisions on the relevance of primary studies made?
The authors did not state how the papers were selected for the review, or how many reviewers performed the selection.

Assessment of study quality
No formal quality assessment was undertaken. However, studies with a high degree of evidence were defined as a randomised controlled study design with contamination control aimed at comparing pre- and post-intervention values between groups, or comparing changes of values pre-and post-intervention between groups, through the use of statistical tests.
Data extraction
The authors did not state how the data were extracted for the review, or how many reviewers performed the data extraction. Data were extracted on: study design (existence of control group, randomisation of study groups and unit of assignment); target prescription drugs; type of intervention; duration of pre- and post-intervention evaluation periods; statistical analysis and statistical tests used; and results.

For studies with statistical analyses, the results were considered positive if differences between all outcome measures were reported as statistically significant. For studies without statistical analyses, the results were considered positive if the authors reported it so. Partial positive studies were those that reported positive effects from some dependent variables and negative effects from others. The rest of the studies were considered as negative. A summary of the data extracted from each study was sent to the author of that study to obtain their consent and to verify the information.

Methods of synthesis
How were the studies combined?
A narrative synthesis of the studies was presented.

How were differences between studies investigated?
The studies were grouped according to whether they tested active, passive, or reinforced active strategies. Active and reinforced active strategies were further grouped into individual versus group sessions. A sensitivity analysis looked at only the higher quality studies among those that had no intervention control groups.

Results of the review
Fifty-one studies met the inclusion criteria; the size of the studies was not reported.

Forty-three studies compared one or more interventions with no intervention. Seven studies evaluated active strategies, four of which reported positive results. Eight studies assessed passive strategies, three of which reported positive results. Of the 28 studies that evaluated reinforced active strategies, 16 reported positive results for all variables and three reported negative results.

Eight studies were classified as providing a high degree of evidence. Three looked at passive strategies; none of these reported positive results for all variables and one produced negative results for all variables. One study assessed an active strategy and reported positive results. Four studies assessed active reinforced strategies: two reported positive results for all dependent variables and none reported negative results.

Eight studies compared various intervention strategies with each other. Six studies were randomised controlled trials, three of which reported positive results. Two of the studies found differences among the intervention groups in favour of the active strategy.

Authors' conclusions
The results suggested that the more personalised strategies are, the more effective they are. Combining active and passive strategies resulted in a decrease in the failure rate.

CRD commentary
The review had clear inclusion criteria that appear to have been appropriate, albeit broad. The search for published literature included several relevant sources. However, as inclusion was restricted by language and unpublished research was not sought specifically, relevant studies might have been missed and bias introduced into the review. Some aspects of study quality were addressed and used to some extent in the analysis. The report lacked details of how the review was conducted, so the potential for reviewer bias and errors cannot be judged. Details of the included studies were tabulated, but the tables did not show each study's actual results. The narrative synthesis was appropriate given the apparent differences between the studies, but classifying studies of complex interventions as positive or negative is
arguably too simplistic to inform conclusions about best practice.

**Implications of the review for practice and research**

Practice: The authors recommended that a study be carried out to test combining passive and active strategies before implementing such a programme on a large scale.

Research: The authors stated that future studies should be randomised controlled trials that control for the potential contamination of groups, measure baseline information, assess the effect of potential confounding variables, and measure the efficiency of the strategy. They also stated that it is important to publish all results, even if they are negative.

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