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Printed educational materials: effects on professional practice and health care outcomes

[Review]

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Cochrane Effective Practice and Organisation of Care Group.
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Abstract

Background: It is often assumed that merely providing information in an accessible form will influence practice. Although such a strategy is still widely used in an attempt to change behaviour, there is a growing awareness that simply providing information may not lead to appropriate changes in the practice of health care professionals.

Objectives: To assess the effects of printed educational materials in improving the behaviour of health care professionals and patient outcomes.

Search strategy: We searched the Cochrane Effective Practice and Organisation of Care Group specialised register, reference lists of articles, and contacted content area experts.

Selection criteria: Randomised trials, interrupted time series analyses and non equivalent group designs with pre-post measures of interventions comparing 1. Printed educational materials versus a non-intervention control; and 2. Printed educational materials plus additional implementation strategies versus printed educational materials alone. The participants were any health care professionals provided with printed educational materials aimed at improving their practice and/or patient outcomes.

Data collection and analysis: Two reviewers independently extracted data and assessed study quality.

Main results: Eleven studies were included involving more than 1848 physicians. It proved impractical to examine the impact of interventions quantitatively because of poor reporting of results and inappropriate primary analyses. Nine studies examined comparison 1. Estimates of the benefit from printed educational materials ranged from -3% to 243.4% for provider outcomes, and from -16.1% to 175.6% for patient outcomes, although the practical importance of these changes is, at best, small. Six studies (seven comparisons) examined comparison 2. Benefits attributable to additional interventions ranged from -11.8% to 92.7% for professional behaviour, and -24.4% to 74.5% for patient outcomes. Two of the 14 estimates of professional behaviour, and two of the 11 estimates of patient outcomes were statistically significant.

Conclusions: The effects of printed educational materials compared with no active intervention appear small and of uncertain clinical significance. These conclusions should be viewed as tentative due to the poor reporting of results and inappropriate primary analyses. The additional impact of more active interventions produced mixed results. Audit and feedback and conferences/workshops did not appear to produce substantial changes in practice; the effects in the evaluations of educational outreach visits and opinion leaders were larger and likely to be of practical importance. None of the studies included full economic analyses, and thus it is unclear to what extent the effects of any of the interventions may be worth the costs involved.

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Background

While considerable effort has gone into establishing the effectiveness and cost effectiveness of clinical interventions in a growing number of areas, similar efforts have not been made to ensure that practice reflects the available evidence (Freemantle 1995). There has often been an implicit assumption that merely providing information in an accessible form will influence practice. However, there is a growing awareness that the simple provision of information may not lead to appropriate changes in professional performance (eg Ketley 1993). Nevertheless, such a strategy is still widely used in an attempt to change behaviour.

Health care professionals routinely receive information aimed at influencing their behaviour, through a variety of forms of distribution. The studies reviewed here include the evaluation of printed educational materials distributed by different programmes aimed at improving clinical practice, for example, by publication in journals or through targeted mailings. These include national programmes for guidelines development and distribution, as well as quality assurance activities carried out at a local level.

Objectives

To determine the effectiveness of printed educational materials in improving the behaviour of health care professionals and patient outcomes.

1. The main hypothesis tested is that the distribution of printed educational information does not improve practice and patient outcomes (educational materials versus no intervention).

2. A second hypothesis is that educational materials with additional implementation strategies are no more effective than educational materials alone (educational materials plus an additional intervention versus educational materials).

Criteria for considering studies for this review

Types of participants

Any health care professionals provided with printed educational materials aimed at improving their practice and/or patient outcomes.

Types of intervention

The distribution of published or printed recommendations for clinical care, including clinical practice guidelines and electronic publications (eg resource databases). The materials may have been delivered by hand or through personal or mass mailings.

More active intervention strategies were categorised according to the EPOC methods, and brief descriptions of those included are listed below (see METHODS USED IN REVIEWS under EDITORIAL INFORMATION in GROUP DETAILS):
Conferences (participation of health care providers in conferences, lectures, workshops or traineeships outside the providers' practice settings).
Outreach visits (use of a trained person who meet with providers in their practice settings to provide information. The information given may have included feedback on the providers' performance).
Local opinion leaders (use of providers nominated by their colleagues as 'educationally influential'. The investigators must explicitly state that the opinion leaders were identified by their colleagues).
Audit and feedback (any summary of clinical performance of health care over a specified period of time. The summary may also include recommendations for clinical action).
Marketing (use of personal interviewing, group discussion ('focus groups'), or a survey of targeted providers to identify barriers to change and subsequent design of an intervention that addresses identified barriers).

Types of outcome measures

Any objective measure of professional performance (such as number of tests ordered, prescriptions for a particular drug), or patient health outcomes (including blood pressure, number of caesarean sections). Measures of knowledge, attitudes or satisfaction are not included.

Types of studies

All studies that compared the impact of printed educational materials against a non-intervention control (Comparison 1), or that evaluated the impact of additional implementation strategies alongside printed educational materials, compared with printed educational materials alone (Comparison 2) were included in the review.

The following types of studies were included:
Randomised controlled trials (RCT).
In addition, the following designs are considered likely to provide useful evidence that may not be available from randomised trials (Cook 1979):
Interrupted time series analyses (ITS), where there is a clearly defined point in time when the intervention occurred and at least three data points before and three after the intervention;
Non-equivalent group designs with pre-post measures.

Search strategy for identification of studies

Relevant studies were located using the EPOC register (see SPECIALISED REGISTER under GROUP DETAILS). The EPOC register is kept up to date by electronic searches and hand searching. References have also been located through bibliographies of related topics (eg EHCB8 1994; Oxman 1995), and personal contact with content area experts. Out of 270 references held at the time of the last search for this review, 100 included the distribution of educational materials, however, only 11 met the entry criteria for Comparison 1 or 2.

Methods of the review

Each relevant study was assessed for inclusion in the review independently by at least two reviewers. Data extraction was also undertaken independently by two reviewers (NF/ELH). Discrepancies were discussed and resolved by the data extractors. Those that could not be resolved easily were referred to the rest of the authors. The authors followed standard methods described by the EPOC group, using a checklist developed for this purpose within EPOC (see METHODS USED IN REVIEWS under EDITORIAL INFORMATION in GROUP DETAILS). Relevant data on the quality and results of studies are summarised in the included trials and results tables. Studies so compromised by flaws in their design or execution as to be unlikely to provide reliable data, or for which data are unavailable, were excluded. The reasons for such exclusions are listed in the excluded trials table.

Although well designed and executed randomised trials provide the most reliable evidence on the effectiveness of interventions to change professional behaviour, these may not be possible in all circumstances (eg national guidelines programmes). Because interrupted time series analyses and non-equivalent group designs with pre-post measures may provide useful information, these designs were included where they met the inclusion criteria specified by the EPOC group. However, as these studies may provide biased estimates of effectiveness, the intention was to assess the relative contribution from their results through sensitivity analyses.

The intention was to estimate pooled of standardised weighted mean differences using random effects models, where this was possible given the data available and where the comparisons would make practical sense (Hedges 1985; DerSimonian 1986). Unfortunately, data were not available to undertake these analyses.

Description of the studies

Thirteen studies that met the inclusion criteria for the scope of the review were located (see included trials tables). One study (Cohen 1985) was excluded because outcome data for the study groups was not presented, and these data have not yet been made available by the authors. Another, was excluded on the basis of methodological weakness since it had only one data point post intervention (Kosecoff 1987) (see excluded trials table). Nine studies examined the impact of printed educational materials compared with a no intervention control group (Comparison 1) and six studies (seven comparisons) examined the impact of educational materials combined with a further implementation intervention against the impact of printed educational materials alone (Comparison 2). Four studies examined both Comparison 1 and Comparison 2.

It proved impractical to examine the impact of interventions quantitatively because of the inadequate reporting of data, and inappropriate primary analyses. Two potentially relevant subgroup comparisons may have been of particular interest given sufficient data, notably the impact of mailed radiological guidelines to general practitioners (Bearcroft 1994; Oakeshott 1994), and the impact of mailed educational advice on prescribing (Avorn 1983; Denig 1990; Bjornson 1990; Schectman 1995). However, errors in analysis and differences in comparisons undertaken within these broad headings preclude such analyses. Only one included study examined the impact of national guidelines implementation programmes (Lomas 1989), and this failed to use an appropriate form of analysis (Cook 1979).

Methodological qualities of included studies

The methodological characteristics of each study are described in the included trials table. The seven quality criteria applied to randomised studies, and the nine quality criteria applied to interrupted time series within EPOC are described elsewhere (see METHODS USED IN REVIEWS under EDITORIAL INFORMATION in GROUP DETAILS). Only one of the included studies was an interrupted time series, and no non-equivalent group designs with pre-post measures that met the entry criteria were located.

All of the randomised studies located had methodological limitations (see included trials table). Three studies had potential errors in analysis, with inappropriate units used for allocation to intervention group and analysis, therefore increasing the apparent precision of the estimates of effect. However, one of these (Lomas 1991) calculated the intra-class correlation coefficient and used these data to justify using different units of allocation and analysis. Only four studies (Dickinson 1981; Kottke 1989; Lomas 1991; Bjornson 1990) included power calculations, and the smallest effect size likely to be found on the basis of these calculations (with a predictive power of 0.8) was 5% (Kottke 1989). Only one study (Lomas 1989) was likely to have sufficient statistical power to estimate very small effect sizes with reliability. However, this interrupted time series used ordinary least squares regression to calculate estimates of precision - a method that assumes independence of individual time series estimates, and thus will overestimate the precision of effects (Cook 1979). Some of the other included trials may have had insufficient power to detect small but worthwhile effects. The interrupted time series analysis included met all but one of the quality criteria applied: protection of the intervention from secular change (and thus from the possible impact of other non-identified events) was not clear.

Results

The studies included in this review evaluate a variety of attempts to modify provider behaviour, including: attempts to modify prescribing practice; attempts to reduce the rate of inappropriate caesarean section; introducing smoking cessation programmes; encouraging appropriate radiological test ordering; and appropriate management of hypertension, irritable bowel syndrome and congestive heart failure. All percentages described in the results tables refer to relative changes attributable to the intervention, calculated on the basis of post-intervention differences for randomised studies, and differences in rates for interrupted time series analyses. Benefits from interventions (as defined by the original investigators) are described as positive

percentages, or in the case of Comparison 2, positive results indicate benefits attributable to the additional intervention.

Comparison 1: Effect of printed educational materials:

All nine studies in Comparison 1 presented estimates of the impact of printed educational materials upon provider behaviour, and five reported changes in patient outcome (see Results Table, Comparison 1).

Estimates of the benefit from printed educational materials ranged from -3% to 243.4% for provider outcomes, and from -16.1% to 175.6% for patient outcomes, although the practical importance of these changes was, at best, small. For example, the latter effect is derived from a reduction in the annual rate of 18.5 per 1000 caesarean sections. None of the 19 estimates of provider behaviour or nine estimates of patient outcome were statistically significant (using appropriate statistical tests) at the 95% level.

One study met all but one of the quality criteria (Lomas 1989). The interrupted time series analysis of caesarean section rates undertaken by Lomas et al (Lomas 1989) found reductions in the rates for women with previous caesareans or with breech presentations of 25 per 1000 in the annual rate, and a reduction in the overall rate of caesarean section of 1.3 per thousand.

Two studies met all but two of the quality criteria (Avorn 1983; Denig 1990). Avorn & Soumerai examined the impact of printed educational materials on the prescribing of pharmaceuticals judged to be inappropriate. This study estimated an effect upon prescribing of -3%. Although the study allocated doctors, 'units' were analysed; these are not independent, and thus this approach increased the apparent precision of estimates of effect. In spite of this bias, this result was not statistically significant.

Denig et al (Denig 1990) examined the impact of printed educational materials on the prescription of undesirable antispasmodics in family practice. A non-significant mean reduction of 3.4 defined daily doses per 1000 prescriptions was found. The practical importance of this very small change is uncertain.

In the subgroup of studies examining radiological guidelines in primary care, the overall percentage change in the number of radiological requests was 33.6% in Oakeshott et al (Oakeshott 1994) and the reduction in referrals contrary to guidelines in Bearcroft et al (Bearcroft 1994) was 30.5%. Neither of these estimates was apparently statistically significant, and the practical importance of such differences is uncertain.

In the subgroup of studies that examined prescribing, the effect of educational materials was estimated to be between -3.0% and 11.7% (Denig 1990; Bjornson 1990; Avorn 1983). None of these estimates were statistically significant, and again the practical importance of changes of this magnitude are uncertain.

Studies included in this comparison were undertaken in a variety of contexts. Six evaluations

took place in North America, two in England, and one in the Netherlands. Five studies took place in general/family practice, one in obstetrics, and one in paediatrics. The remaining two studies took place in mixed settings or the setting was unclear. Reimbursement also appeared very different across evaluations, but this was interpretable in only three studies (Oakeshott 1994; Bearcroft 1994; Avorn 1983), two of which took place in mixed reimbursement settings, and one in a primarily fee for service setting. None of the studies included in this comparison examined the cost effectiveness of the intervention.

Comparison 2: Educational materials combined with a further implementation intervention compared with the impact of printed educational materials alone:

All six studies included in Comparison 2 examined impact upon professional behaviour, and four examined the impact upon patient outcome (see Results Table, Comparison 2). Benefits attributable to additional interventions ranged from -11.8% to 92.7% for professional behaviour, and -24.4% to 74.5% for patient outcomes. Two of the 14 estimates of professional behaviour, and two of the 11 estimates of patient outcomes were statistically significant using appropriate analysis. All four were in a single study (Lomas 1991).

Avorn & Soumerai (Avorn 1983), and Lomas et al (Lomas 1991) met all but two of the quality criteria for this group. Avorn & Soumerai examined the additional impact of educational outreach visits on prescribing. This study found a 17.7% reduction in the prescription of targeted pharmaceuticals, but had a difference in the unit of allocation and analysis (Cornfield 1978) and it is unclear whether statistical significance was achieved.

Lomas et al found relatively large effects upon professional and patient outcomes from the use of opinion leaders (Lomas 1991). A 229 per 1000 (44.6%, p = 0.002) change in the number of patients offered a trial of labour, and 108 per 1000 (74.5%, p = 0.003) change in vaginal birth were found from the use of opinion leaders. These results were statistically significant when compared with the non-intervention control group and audit and feedback groups combined. A small 27 per 1000 (14.4%) and non-significant increase in unscheduled caesarean sections was also found.

Three studies examined the additional impact of audit and feedback (Dickinson 1981; Lomas 1991; Schectman 1995), with estimates of change in professional behaviour ranging from -3.0% to 9.7% for professional behaviour, and -24.4% to -1.2% for patient outcomes. None of these results were statistically significant, or appear likely to be of practical importance.

Results for the two studies examining the additional impact of traditional teaching methods (workshops and conferences) were also equivocal, with a range of -11.8% to 92.7% for professional behaviour, and -1.7% to 8.2% for patient outcomes (Maiman 1988; Kottke 1989).

Studies included in this comparison were undertaken in a variety of contexts. All six studies were undertaken in North America. Four included general/family practice settings, one obstetrics and one paediatrics. Reimbursement in one study was through Medicaid (Avorn 1983) and another through managed care (with both group and network model practitioners) (Schectman 1995).

Schectman et al (Schectman 1995) reported a subgroup analysis where group model physicians responded to feedback but network ones did not, although inferring cause on the basis of subgroups may be misleading.

One study (Avorn 1983; Soumerai 1986) included a partial economic analysis, which suggested that the direct costs of the intervention (outreach) were similar to the direct savings from reduced prescribing of apparently inappropriate pharmaceuticals.

Overall:

Only three of the studies included in this review based their intervention explicitly on sound evidence (Maiman 1988; Kottke 1989; Bjornson 1990). Interventions that are based on unreliable evidence may do more harm than good.

Discussion

The impact of printed educational materials on practice and patient outcomes, and any further impact that may be gained from combining additional educational interventions with printed educational materials, has been examined. The effects of printed educational materials compared with no active intervention appeared, at best, small across studies, and of uncertain clinical significance. However, the distribution of printed educational materials is likely to be a relatively inexpensive intervention, and the cost effectiveness of this approach cannot be assessed directly from these studies.

Overall, the quality of reporting of main outcomes and the appropriateness of statistical analysis were poor, a situation similar to that found in the clinical literature (Freemantle 1997). This seriously undermines the usefulness of these studies and of this review. Narrative review techniques without formal quantitative analysis risk bias through the subjective interpretation of results. All studies had avoidable methodological weaknesses, and in many cases the results were not reported adequately. None of these studies included full economic analyses, and thus it is unclear to what extent the effects of any of the interventions may be worth the costs involved.

Printed educational materials may have a predisposing effect for change, without being sufficient in themselves to achieve a substantial impact upon practice. However, we found no direct evidence to support or refute this.

The additional impact of more active interventions examined in Comparison 2 produced mixed results. Audit and feedback did not appear to produce substantial changes in practice (Dickinson 1981; Lomas 1991; Schectman 1995), and conferences/workshops also appeared to have only a small additional impact (Maiman 1988; Kottke 1989). The observed effects in the evaluations of educational outreach visits (Avorn 1983) and opinion leaders (Lomas 1991) were larger and likely to be of practical importance. However, the impact of all these strategies cannot be assessed reliably from this review, as they are a small subset of the available estimates of their effectiveness. Their usefulness should be determined from systematic overviews of all available rigorous research evidence on their impact. The contexts of these approaches were also very specific. For example,

Avorn and Soumerai (Avorn 1983) examined the impact of printed educational materials and outreach visits in areas of prescribing of acute pharmaceuticals in which the use of certain identified products was discouraged actively. Educational outreach in areas where a change in the mix of drug use (eg increases with one group of patients and decreases in another) and in areas of longer term prescribing, may produce smaller overall changes in prescribing. Nonetheless, such changes in patient care and outcomes may still be of practical importance.

All the studies reviewed are pragmatically designed (Schwartz 1967; Freemantle 1997) and thus provide estimates of the effects of printed educational materials in real world settings. However, they have poor construct validity (Cook 1979), providing little information on how interventions work. Only one study (Avorn 1983) attempted to examine the effects of different forms of educational material in a directly randomised comparison, however the study was woefully under powered, and could not have identified differences with statistical precision. As the effect sizes in the studies reviewed were consistently very small, it is not clear to what extent explanatory studies (with higher construct validity) may be practical.

The application of our decision rules meant that a number of studies in which educational materials were used were excluded because additional implementation strategies could not be disentangled from the educational materials intervention. For example, Evans et al (Evans 1986) examined the impact of educational materials for hypertension. All patients recruited to the study (elicited through mass screening) were asked to visit their doctor, and physicians received listings of their patient's blood pressures, thus incorporating patient mediated and reminder strategies. Similarly, Sibley et al (Sibley 1982) examined the impact of a mailed continuing education programme that contained audio visual materials and thus was excluded from this review. Sherman et al (Sherman 1992) examined the impact of a national guidelines programme. Many clinicians were either participants or observers (through video link) of the guidelines development process, and the impact of printed educational materials alone was not clear. Diwan et al (Diwan 1995) examined the impact of educational outreach visits. The printed educational materials used in the outreach group were not necessarily similar to those received by the control group, and the distribution of guidelines was not contemporaneous with the outreach programme. The results of these studies are not substantially different from those in this review, and broader a priori decision rules would not have led to substantively different conclusions.

The decision to include interrupted time series that met fairly rigorous methodological criteria in this review has not had an important impact, as only one study was found that met the inclusion criteria (Lomas 1989). The results of this study did not appear substantially different from those of other designs. The conclusion that national guidelines programmes have only a very small effect on practice should be viewed with some caution as it is based on only a single study with theoretically weaker design than others included. The empirical question of the precision and validity of estimates of effects from interrupted time series compared with randomised trials requires analysis in large data sets.

Conclusions

Implications for practice

Printed educational materials alone appear to have, at best, only a small impact on practice. The cost effectiveness of such programmes has not been assessed reliably, and as the small effects seen are achieved at relatively low cost, the distribution of printed educational materials alone may still be worthwhile. Rapid and substantial changes in practice, however, appear unlikely to be achieved from this approach.

Sparse data, poor reporting of trials and inappropriate analyses severely limited the usefulness of the studies included. Narrative review techniques are open to bias, and the conclusions drawn here should be considered tentative.

Additional active interventions may have increased benefits, but it is unclear from the available data which interventions may be most effective or cost effective in different circumstances.

One study attempted to achieve change in situations where practice was already near optimal (threshold effect) (Oakeshott 1994). Such approaches cannot achieve substantial changes and are unlikely to be helpful or an efficient use of resources.

Implications for research

It is surprising that only 11 rigorous studies of the impact of printed educational materials have been identified, as this is one of the most common approaches used in attempts to change practice. Further research is required, particularly to compare printed educational materials with more active interventions. The high cost and practical difficulties of randomised trials in this area suggest an important potential role for quasi-experimental designs. However, these must be of high methodological quality, and empirical work is required to examine the validity of their results. The absence of data on the cost effectiveness of interventions is a serious omission and should be addressed with some urgency.

Considering the enormous investment in research on the effectiveness and cost effectiveness of clinical interventions, the research base on means to put these into practice remains inadequate. Without effective methods to translate important findings into changes in clinical practice, potential benefits for patients will not be realised and research resources on clinical interventions will not be optimised.

Notes

The EPOC editorial team has decided to withdraw this review as it requires updating. We are taking steps to produce a new review. see the published protocol: Farmer AP, Legare F, McAuley LM, Thomas R, Harvey EL, McGowan J, Grimshaw JM, Wolf FM. Printed educational materials: effects on professional practice and health care outcomes.

Internal sources of support to the review

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None known.

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Synopsis

More research is needed into the effectiveness of printed educational materials for changing health care practice

Printed medical educational materials are a convenient and potentially cost effective way of distributing information to health care professionals. However, it seems unlikely that rapid and substantial changes in practice are achieved in this way. Better quality research may find support for additional active methods of education, such as outreach visits and the use of opinion leaders. More data is needed on the cost effectiveness of printed material interventions.

Table of comparisons

Fig 01 Effect of printed educational materials against a non-intervention control

01 Results

Table of comparisons

Fig 02 Additional implementation strategies plus printed educational materials, versus printed materials alone

01 Results

Characteristics of included studies

Study: Avorn 1983

Methods: RCT

Randomisation concealment: NOT CLEAR

Follow up:

providers: DONE

patients: DONE

Blinded assessment: DONE

Baseline: NOT DONE for EM group, DONE for outreach group

Reliable outcomes: DONE

Protection against contamination: DONE

Participants: 435 US physicians who were high prescribers of three drugs. Proportion of eligible providers who participated: 92% had at least one academic detailing visit.

Interventions: 1. EM (locally generated mailed over four months)

2. EM + Outreach Visits/ Marketing (two visits by trained pharmaceutical educators over six months)

3. No intervention

Outcomes: Process: Items prescribed for three target drugs

Patient: Not assessed

Notes:

Allocation concealment: B

Study: Bearcroft 1994

Methods: RCT

Randomisation concealment: DONE

Follow up:

providers: NOT CLEAR

patients: NOT CLEAR

Blinded assessments: DONE

Baseline: NOT CLEAR

Reliable outcomes: NOT CLEAR

Protection against contamination: DONE

Participants: 122 UK family physicians responsible for 2421 requests for chest radiography. Proportion of eligible providers who participated: 100%.

Interventions: 1. EM (single mailing of guidelines)

2. No intervention

Outcomes: Process: Adherence to guidelines recommendations; referrals with complete clinical history

Patient: Not assessed

Notes:

Allocation concealment: A

Study: Bjornson 1990

Methods: RCT

Randomisation concealment: NOT CLEAR

Follow up:

providers: NOT CLEAR

patients: NOT CLEAR

Blinded assessments: DONE

Baseline: NOT CLEAR

Reliable outcomes: NOT CLEAR

Protection against contamination: NOT CLEAR

Participants: 576 US physicians treating 576 patients with congestive heart failure. Proportion of eligible providers who participated: 100%.

Interventions: 1. EM (single mailing of journal article and example patient profile)

2. No intervention

Outcomes: Process: Complete or partial change in drugs prescribed in line with recommendations

Patient: Not assessed

Notes:

Allocation concealment: B

Study: Denig 1990

Methods: RCT

Randomisation concealment: NOT CLEAR

Follow up:

providers: DONE

patients: NOT CLEAR

Blinded assessments: DONE

Baseline: DONE

Reliable outcomes: DONE

Protection against contamination: DONE

Participants: 209 Netherlands general/family practice physicians providing treatment for irritable bowel syndrome. Proportion of eligible providers who participated: 66%.

Interventions: 1. EM (one delivery of a drug bulletin)

2. No intervention

Outcomes: Process: Prescriptions of antispasmodics

Patient: Not assessed

Notes:

Allocation concealment: B

Study: Dickinson 1981

Methods: RCT

Randomisation concealment: NOT CLEAR

Follow up:

providers: NOT CLEAR

patients: DONE

Blinded assessment: NOT CLEAR

Baseline: DONE

Reliable outcomes: NOT CLEAR

Protection against contamination: DONE

Participants: 41 US family physicians from four teams in a single centre treating 250 hypertensive patients. Proportion of eligible providers who participated: 100%.

Interventions: 1. EM (three self-instructional exercises over four months, including didactic materials and problem solving)

2. EM + Audit and Feedback (seven monthly listings of patient visits and blood pressures)

3. No intervention

Outcomes: Process: Appointments per patient per practice

Patient: Change in diastolic blood pressure

Notes:

Allocation concealment: B

Study: Kottke 1989

Methods: RCT

Randomisation concealment: NOT CLEAR

Follow up:

providers: NOT DONE

patients: NOT DONE

Blinded assessments: NOT CLEAR

Baseline: NOT CLEAR

Reliable outcomes: NOT CLEAR (apart from cotinine analysis - DONE)

Protection against contamination: DONE

Participants: 66 US family practice physicians providing health care to 6053 patients. Proportion of eligible providers who participated: 6%.

Interventions: 1. EM (recruitment brochure with smoking information plus 100 copies of 'Quit and Win- for use as instructors manual or patient self-help guide)

2. EM + Conferences (six hour workshop groups)

3. No intervention

Outcomes: Process: Patient asked if smoked; asked to quit; asked to set a quit date; being given a follow-up appointment; receiving supportive materials.

Patient: Patient agrees to quit smoking; patient reports not smoking; smoking cessation confirmed by cotinine analysis.

Notes:

Allocation concealment: B

Study: Lomas 1989

Methods: ITS

Protection against secular changes: NOT CLEAR

Sufficient data points: DONE

Test for trend: DONE

Protection against detection bias: DONE

Data collection: DONE

Intervention unlikely to affect data collection: DONE

Blinded assessment: DONE

Completeness of data set: DONE

Reliable outcomes: DONE

Participants: All except 16 Ontario hospitals undertaking caesarean section. 720,880 episodes of care. Proportion of eligible providers who participated: 100%.

Interventions: 1. EM (mailed individually to obstetricians and published in medical journals, produced under the auspices of a national medical specialty association).

Outcomes: Process: Diagnosis of dystocia; diagnosis of foetal distress.

Patient: Rate of caesarean section: overall; with previous caesarean section; with breech presentation

Notes:

Allocation concealment: D

Study: Lomas 1991

Methods: RCT

Randomisation concealment: DONE

Follow-up:

providers: DONE

patients: DONE

Blinded assessments: NOT CLEAR

Baseline: NOT CLEAR

Reliable outcomes: DONE

Protection against contamination: DONE

Participants: 76 Canadian physicians in 16 community hospitals treating 3552 deliveries. Proportion of eligible providers who participated: 100%.

Interventions: 1. EM (single mailed copy of guidelines + letter of endorsement from national professional association)

2. EM + Audit and Feedback (four meetings to discuss aggregated feedback over one year)

3. EM + Local Opinion Leaders (identified by peers, agreeing to multiple interactions with peers, receiving training and support over one year)

Outcomes: Process: Offered a trial of labour

Patient: Underwent a trial of labour; vaginal birth; caesarean section

Notes:

Allocation concealment: A

Study: Maiman 1988

Methods: RCT

Randomisation concealment: NOT CLEAR

Follow up:

providers: DONE

patients: DONE

Blinded assessments: DONE

Baseline: NOT CLEAR

Reliable outcomes: NOT CLEAR

Protection against contamination: NOT CLEAR

Participants: 90 US paediatricians providing treatment for 771 children with otitis media. Proportion of eligible providers who participated: 93%.

Interventions: 1. EM (one problem orientated journal type article)

2. EM + Conferences (two part tutorial totalling five hours)

3. No intervention

Outcomes: Process: Liquid/pill count per physician

Patient: Kept follow-up appointments

Notes:

Allocation concealment: B

Study: Oakeshott 1994

Methods: RCT

Randomisation concealment: NOT CLEAR

Follow up:

providers: DONE

patients: NOT CLEAR

Blinded assessments: DONE

Baseline: DONE for radiological requests conforming to guidelines, NOT DONE for number of requests and relevant positive findings at radiology

Reliable outcomes: NOT CLEAR

Protection against contamination: DONE

Participants: 170 UK family physicians in 62 practices requesting 2936 radiological examinations for 2578 patients. Proportion of eligible providers who participated: 100%.

Interventions: 1. EM (mailed guidelines based on those developed by national specialty association)

2. No intervention

Outcomes: Process: Requests for radiological examinations; requests conforming with guideline

Patient: Relevant positive findings at radiology

Notes:

Allocation concealment: B

Study: Schectman 1995

Methods: RCT

Randomisation concealment: NOT CLEAR

Follow up:

providers: DONE

patients: DONE

Blinded assessments: DONE

Baseline: NOT DONE

Reliable outcomes: DONE

Protection against contamination: NOT CLEAR

Participants: 30 group model physicians + 33 network-model physicians prescribing for dyspepsia, peptic ulcer disease, gastro-esophageal reflux in US managed care. Proportion of eligible providers who participated: 100%.

Interventions: 1. EM (two mailings of one page memo several weeks apart)

2. EM + Audit and Feedback (same two mailings of memo, the second also containing individual feedback of the number, type and costs of anti ulcer agents prescribed over previous six month period)

Outcomes: Process: Prescriptions for cimetidine as a proportion of anti ulcer drugs

Patient: Not assessed

Notes:

Allocation concealment: B

Characteristics of excluded studies

Study: Cohen 1985

Reason for exclusion: RCT

Process outcome data not available, patient outcome data not assessed.

Study: Kosecoff 1987

Reason for exclusion: ITS

Only one data point post intervention.

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Medical Subject Headings (MeSH): Humans; *Education, Medical, Continuing; *Health Personnel/ed (education); Outcome Assessment/hc (Health Care); *Physician's Practice Patterns; Quality of Health Care; *Teaching Materials/sd (standards)

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