The effect of a computer-generated patient-held medical record summary and/or a written personal health record on patients’ attitudes, knowledge and behaviour concerning health promotion

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Objective. The aim of the study was to examine the effect of a computer-generated patient-held medical record summary (CHR) and/or a written personal health record (PHR) on patients’ attitudes, knowledge and behaviour concerning health promotion.

Method. It was conducted in five general practices in Oxfordshire. Patients aged 25–65 years in each practice were randomly assigned to receive either a CHR plus PHR, CHR only, PHR only, or no personal record. Patients were recruited by mail (one practice) or opportunistically by nurses (four practices). Health checks were carried out using the randomly assigned record, which the patient retained. Attitudes to patient-held records, and pre- and post-intervention knowledge and behaviour concerning health promotion, were assessed using questionnaires. Only those who responded to ‘before’ and ‘after’ questionnaires were included in the analysis.

Results. A sample of 261 patients was obtained from mail recruitment and 103 from opportunistic nurse recruitment. Patients receiving a CHR as part of mail recruitment were significantly more likely to attend for a health check ($P = 0.016$). Those receiving both PHR and CHR were more likely to keep ($P = 0.014$) and use ($P = 0.029$) the record. Those receiving PHR as part of the package improved their knowledge of health promotion and became more aware of and more likely to change their life-style ($P = 0.022$).

Conclusions. The effectiveness of a computer-generated patient-held health summary and an explanatory booklet together is greater than either separately in changing patients’ knowledge attitudes and behaviour concerning health promotion.

Keywords. Patient-held record, primary care, health promotion, computerized medical record.

Introduction

It is widely agreed that patients should be increasingly involved in managing and maintaining their own health. This is increasingly advocated by patients’ societies and representatives, but it is also a key element in quality improvement methodologies. A critical element in enabling this involvement to progress is making patients’ records accessible to them. At a political level a great deal has been achieved by the UK Access to Health Records Act (1991), but this is usually implemented in a situation of confrontation. A facility for patients to have increasing and ongoing access to their records is a cultural and educational issue which must be addressed by health professionals.

Attempts to achieve this are not new, but have usually been carried out in time-limited situations (such as antenatal, paediatric, or terminal care records) or for narrowly defined areas of care (such as asthma or diabetes). Such attempts have used two alternative forms of records: paper-based or computer-generated. Paper-based patient-held records have been reported as acceptable to patients and producing change but, except in some time-limited situations such as antenatal care, have failed to gain widespread acceptance or have
been considerably criticized because of the time required for professionals to complete the record using double entry. On the other hand, computer-generated records are easy to produce and have been used in management of both health promotion and chronic disease, but they tend to be unattractive and less intelligible to patients.

In 1991 the Health Education Authority (HEA) developed a personal health record which contained a great deal of information concerning health promotion, and which on field testing was popular with patients but did not gain approval for adoption because of its cost and the usual time problems relating to the use of paper-based records. The authors have extensive experience in using patient-held computer-generated health records both in the UK and Australia. Since the HEA record has a pocket in the back cover which conveniently holds a folded computer printout, this seemed a good opportunity to test the effect on health promotion of issuing patients with both types of records simultaneously, using the paper record to provide advice and general information and the computer record to provide personal details (Figure 1).

By mailing the records to the patients we were able to assess the effect of different types of record on patients' attitudes, knowledge and behaviour concerning health promotion.

Method

A controlled trial was conducted in which patients were mailed or opportunistically recruited to a health check using one of four different types of health record: (i) the HEA's personal health record (PHR); (ii) a printout of the patient's computerized medical summary (CHR); (iii) both the PHR and CHR; and (iv) neither the PHR nor CHR.

Practices were recruited in the vicinity of Oxford. To be suitable for recruitment a practice needed to have a computer system with a suitable health promotion template (including blood pressure, smoking habit, height, weight, body mass index, alcohol consumption, immunizations). The practice nurses needed to be undertaking health checks, and the practice had to be willing for their nurses to carry out health checks using the study protocol. The selection of practices was non-random: those using computers supplied by the VAMP or EMIS companies were approached until five had been recruited. One practice was then allocated to mail recruitment and four to nurse recruitment. A questionnaire was designed which enquired about patients' attitudes to access to their health records, and their main sources of information concerning health promotion, and it also included ten knowledge questions on health promotion.

Mail recruitment

A total of 1000 patients aged 25–65 were randomly selected from the practice age/sex listing. Since the invitation was to a health check patients were only selected if they had not had a blood pressure recording within the previous 3 years. The general practitioners (GPs) then reviewed the list and excluded any patients that they knew had left the list or felt were not appropriate for recruitment to a health check. The remaining 954 patients were sent the questionnaire, and those responding were invited to a health check within the following 3 months. The invitation consisted of a letter together with one of the four types of medical record listed above—patients receiving neither the PHR nor CHR received the letter of invitation only. When patients attended the health check the nurse conducted the check according to her usual procedure, but in addition if patients had a CHR with or without a PHR the nurse updated the records and gave the patient a new CHR; if they had a PHR with or without a CHR she referred to it where appropriate for education; and if they had a PHR but no CHR she entered the preventive care data into the PHR before returning it to the patient. If they had neither a PHR nor a CHR she conducted the health check according to the practice's usual procedures. Patients with
adverse risk factors were invited to make changes and receive follow-up according to the practice's usual procedure.

Nurse recruitment
Nurse recruitment was opportunistic, targeting patients aged 25–65 who were attending for a routine health check. On recruitment patients were requested to complete the questionnaire, and were allocated to one of the four intervention categories (PHR; CHR; PHR and CHR; neither), by the use of randomly sequenced sealed envelopes. The nurse then conducted the health check as described above for mail recruitment.

Follow-up
Six months after the intervention the patients were mailed a follow-up questionnaire. Those in the mail recruitment category were asked whether they had attended a health check as a result of the invitation. For all patients the knowledge questions about health promotion were repeated. Those that had received a PHR or CHR or both were asked whether they had kept and looked at it; whether their awareness of beneficial lifestyle changes had increased; and whether they had made any lifestyle changes. Two sociodemographic questions were also asked: ethnic group and age at completion of full-time education.

Analysis
Responses to the patient questionnaires were analysed using EPI-INFO. Differences between groups were compared using the chi-square test and differences in level of knowledge compared using Wilcoxon's two-sample test.

Results

Recruitment
In the mail recruitment practice, following review by the GPs of the list of eligible patients, 954 patients were mailed with the initial questionnaire (Table 1). One hundred and fifty mailings were returned as 'gone away', and of the remaining 804 patients 414 (51%) replied and were invited to a health check. After 6 months 261 (63%) replied to the follow-up questionnaire.

A total of 137 patients were recruited opportunistically to nurse health checks and completed the initial questionnaire, and 103 returned the follow-up questionnaire (75%).

The mean age of respondents was 41 years, and 54% were female and 6% non-Caucasians. Those returning the questionnaire after receiving different records showed no significant differences in their characteristics.

Sources of information
For blood pressure and immunizations, 68% and 72% of respondents respectively said that their most important source of information was from their GP or practice nurse (Table 2). But for topics relating more to life-style—diet, alcohol, smoking and exercise—only...
19–26% regarded doctors and nurses as their most important source, while 54–67% used the media or pamphlets.

**Attitudes to sharing health information between patient and doctor**

Only 30% of patients left all health issues to their doctor (Table 3), while 61% would have liked more information about their health. Almost half believed that to have a summary of their medical record would be a good idea.

**Response to receiving a personal health record**

Patients who were mailed only their computer summary (CHR) were significantly more likely to attend for a health check, 48% attending \( (P = 0.016) \) (Table 4).

If patients received both PHR and CHR they were significantly more likely to keep and look at them, 96% \( (P = 0.014) \) keeping and 56% \( (P = 0.029) \) looking at them. Those who received the CHR alone were least likely to keep and look at it.

Those whose mailing included a PHR were significantly more likely to say that their awareness of beneficial life-style changes had increased, although this was not significant statistically. Those who received the CHR were less likely to report increasing awareness of life-style change, and were significantly more likely to say that they felt no need to change \( (P = 0.022) \).

A significant effect of the type of record on behaviour change was only reported for alcohol (not for smoking, exercise, diet or having a blood pressure check). Those receiving a PHR were significantly more likely to report drinking less alcohol, while those who received the CHR alone were less likely to report this change \( (P = 0.026) \).

Patients returning questionnaires did not answer every question. The above data were based on the answered questions (each question was answered by about 85% of the 261 patients). When the data were re-analysed assuming the least favourable outcome for unanswered questions (i.e. record not kept, no changes made) then the differences in response to the various records were much more significant (attended a health check, \( P = 0.006 \); kept the record, \( P = 0.0005 \); looked at the record, \( P = 0.002 \)).

**Knowledge concerning health promotion**

The number of questions answered correctly was compared before the intervention and after 6 months. For patients receiving mailed records there was no significant difference in knowledge score for the four different categories of record used. For patients being recruited opportunistically to the nurse, there was a significant improvement in knowledge score \( (P = 0.016, \text{ Wilcoxon two-sample test}) \) if the nurse based the health check on the PHR, with or without a CHR.

**Discussion**

This study took place during 1993–1994, in the period following the government’s decision to switch the funding of health promotion in general practice from payment for health promotion clinics to payment on the basis of obtaining target levels for the reporting of several risk factors. As a result most GPs were reluctant to encourage extended health checks by practice nurses because their concern had been shifted towards multi-risk factor recording by nurses in brief consultations. In addition, general practice morale was low following the imposition of the 1990 contract, and staff were very busy meeting statutory requirements and targets. These factors affected recruitment of practices,

<table>
<thead>
<tr>
<th>Question</th>
<th>PHR+CHR</th>
<th>PHR</th>
<th>CHR</th>
<th>Neither</th>
<th>( P )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Attended for a health check</td>
<td>16 (30)</td>
<td>12 (21)</td>
<td>28 (48)</td>
<td>19 (29)</td>
<td>0.016</td>
</tr>
<tr>
<td>2. Kept the record</td>
<td>79 (96)</td>
<td>61 (82)</td>
<td>54 (84)</td>
<td>46 (56)</td>
<td>0.014</td>
</tr>
<tr>
<td>3. Looked at the record</td>
<td>46 (56)</td>
<td>32 (43)</td>
<td>22 (34)</td>
<td>57 (70)</td>
<td>0.029</td>
</tr>
<tr>
<td>4. More aware of ways of staying healthy</td>
<td>57 (70)</td>
<td>51 (67)</td>
<td>40 (59)</td>
<td>32 (43)</td>
<td>0.367</td>
</tr>
<tr>
<td>5. Reduced alcohol intake</td>
<td>19 (24)</td>
<td>23 (33)</td>
<td>8 (13)</td>
<td>19 (24)</td>
<td>0.026</td>
</tr>
<tr>
<td>6. Felt no need to change</td>
<td>37 (53)</td>
<td>22 (35)</td>
<td>33 (59)</td>
<td>37 (53)</td>
<td>0.022</td>
</tr>
</tbody>
</table>

Question 1 was addressed to those (261) patients recruited by mail. Questions 2–6 were addressed to all (261) patients receiving a patient-held health record. (It was chance that both groups contained the same number of patients.)
and also doctors' and nurses' attitudes to health education. The study was therefore conducted in an atmosphere hostile both to extra work and to health promotion.

Of the 954 patients mailed the first questionnaire, 150 (16%) were returned by the post office as 'gone away'; of the remaining 804, 414 (52%) replied. This response may appear low, but a criterion of recruitment was that the patient did not have a blood pressure recording on the computer within the past 3 years. This would tend to select both patients who prefer to keep away from doctors and patients who might have remained on the practice register but had really moved away. Indeed, on the basis of studies when non-attenders have been followed up, it is likely that the envelopes returned by the post office represented only a part of those who had gone away.12

Nevertheless, the data are adequate to support the hypothesis that patients need both accessible data about themselves and a more informative type of record in order to enhance their health promotion activity.

The CHR was significantly associated with patients deciding to attend for a health check, in other words, with patients taking action. Having both records was strongly associated with keeping and looking at the records. The PHR was associated with realizing the need to change life-style to bring health benefits, and improved knowledge about health promotion. In other words the PHR appeared to be associated with the patient understanding why change is required and what to do.

Previous work has shown that written personal records have failed because of the recording involved, other than for certain time-limited or narrow topics. The advent of extensive record keeping by primary care teams on computer opens the possibility of most GPs being able to provide patients with subsets of their notes, with minimal extra effort and renewable over a long period of time. This paper suggests that to give patients such a printout without the enhancement of a booklet to help with interpretation of information will be to lose a major element of health benefit, whilst providing both the printout and an explanatory booklet significantly increases patients' likelihood of keeping and using the record.

We would advocate the continued production of a booklet along the lines of the HEA personal record for use together with patient-held computer records. The booklet could be used for informing the patient about beneficial behaviours, as an aid during consultation, and for interpreting the computer health record. No double entry would be required, and up-to-date personal information could be obtained by requesting a further computer printout from the doctor. We would anticipate that this finding is likely to be applicable to records concerning other areas of care, for instance medication or chronic disease.

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References