Use of vitamin B-12 in Leicestershire practices: a single topic audit led by a medical audit advisory group

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Abstract

Objectives—To encourage active participation of Leicestershire general practitioners and their staff in audit; to examine the use of vitamin B-12 injections and to achieve a more appropriate use.

Design—Implementation of an agreed audit protocol, with central analysis and feedback of anonymous and aggregated data by a medical audit advisory group.

Setting—All 147 Leicestershire practices.

Main outcome measures—Participation in the complete audit cycle, comparison of actual use of vitamin B-12 injections with agreed criteria of use, and assessment of improvement in use.

Results—264 general practitioners (55% of all doctors from 49% of all Leicestershire practices) completed both phases of the audit cycle, and 321 (67%) completed phase 1 only. Twenty four (16%) practices failed to participate from the outset, and a further 58 (35%) dropped out at various stages. Only 10 of the 37 singlehanded practices completed the audit, although 34 initially agreed to participate. If singlehanded practices were excluded, 56% (61) of practices completed both phases of the audit cycle. In total 1714 patients received B-12 injections. Appropriate use increased from 62% in phase 1 to 72% in phase 2 of the audit; there was a 32% reduction in the number of patients inappropriately receiving B-12 (521 to 352), and the proportion of patients receiving B-12 at the correct frequency rose from 58% to 72%. The proportion of patients in whom all the diagnostic criteria for pernicious anaemia were established before treatment with B-12 was 27% in phase 1 and 28% in phase 2.

Conclusion—Our study suggests that single topic audits organised by a medical audit advisory group can encourage large numbers of general practitioners to participate and can bring about changes in behaviour resulting in improvements in standards of care. Nevertheless, advisory groups will need to devise strategies to encourage even higher levels of involvement, most particularly from singlehanded practices.

Introduction

Medical audit advisory groups were given the task of ensuring that all general practitioners were participating in medical audit by April 1992.¹ Although most general practitioners regard audit as effective in improving the quality of patient care and are willing to participate, actual participation in audit is low, and of those who do participate only a minority complete the cycle of audit.^{2,3} Accordingly, the Leicestershire Medical Audit Advisory Group decided to invite all practices in Leicestershire to participate in a single topic audit whose general aims were to:

- Encourage active participation of all general practitioners and their staff in a clinical audit

- Familiarise general practitioners and members of the primary health care team with the practicalities entailed in completing the audit cycle

- Demonstrate to participants the feasibility and utility of clinical audit

- Stimulate practices to initiate their own future audit exercises.

The use of vitamin B-12 injections was selected as the particular topic for several reasons. We thought it advisable to start with a relatively simple audit as participation was probably the first experience of audit for many practices. We also anticipated that most practices could cope with the expected small workload, although some change in clinical behaviour would be required.^{4,5} The audit would also entail medical, nursing, and clerical members of primary care health teams.⁶ Finally, a locally developed protocol was already available.⁷

The specific aims were, firstly, to examine the use of vitamin B-12 injections in all Leicestershire practices; and, secondly, to achieve more appropriate and efficient use.

Method

All Leicestershire practices (n=147) received postal invitations to participate. Non-respondents were contacted by telephone, and some were visited in response to invitations for further information and explanation. All practitioners within a partnership had to agree to participation before a practice would be accepted.

Participating practices identified patients who were receiving B-12 injections by reference to computerised or manual systems for repeat prescriptions and also by personal recollection by the members of the primary health care team. Patients' records were then reviewed to identify reasons for the use of vitamin B-12 and the extent to which diagnostic criteria were established and appropriate management and follow up undertaken. All details were entered on a specially designed form, and completed forms were returned to the medical audit advisory group for analysis. Individual practices were sent their initial results and anonymous comparative data from all participating practices (months 1 to 6).

An open meeting was then held (month 7) to present and discuss aggregated results of the first phase and to consider and agree suggested criteria for the use of vitamin B-12 (see below) before implementation of change.

Participants were then given time to implement necessary change before the second phase of data collection (months 7 to 15). Practices again returned their individual results to the medical audit advisory group for analysis and received a further personalised analysis of results and commentary (months 16 to 20). A second open meeting was subsequently held to discuss overall results (month 21). Criteria of accepted

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Criteria of accepted practice

Use of vitamin B-12 injections

- Of proved value in the treatment of pernicious anaemia (other conditions being rare in general practice in the United Kingdom)
- May be necessary in certain states after surgery and in malabsorption—for example, gastrectomy, resection of terminal ileum, and coeliac disease

Diagnostic criteria for pernicious anaemia

There must be evidence of:

- Macrocytic anaemia
- Low serum B-12 concentration with normal folate concentration
- A reticulocyte response to B-12 injections

Criteria for treatment and management

- Optimum maintenance dose is 1000 µg at intervals of 12 weeks
- Follow up annual blood count is required to avoid relapse

Operational efficiency

- A nurse should give all necessary injections
- The injections should be given at a health centre or surgery if possible

practice against which performance was judged were devised (box).

Results

Table I shows that 123 (84%) of all Leicestershire practices initially agreed to participate in the audit, with a range of 80% (two or three partner practices) to 92% (singlehanded practices). Ninety two (63%) practices completed the first phase with a gradient from 46% (singlehanded practices) to 79% (four or five principals). In total 321 general practitioners (representing 67% of all Leicestershire general practitioners) completed the first phase, and 264 general practitioners (55%) completed both phases of the audit within the timetable of the project. Although 92% (34) of singlehanded practitioners initially agreed to participate, only 27% (10) completed both phases of the audit. If we exclude singlehanded practices, 56% (62) of Leicestershire practices completed both phases of the audit cycle. (Three more practices completed the audit after the deadline but were not included in this analysis.)

Table II shows the reasons for the use of vitamin B-12. In phase I half of the patients were receiving it as replacement treatment for pernicious anaemia; this rose to 61% in phase 2. There was a 32% reduction in the number of patients receiving B-12 for non-valid reasons (from 521 to 352). Table III shows the most common non-valid reasons.

Table IV shows that a similar minority of patients had all three diagnostic criteria for pernicious anaemia established before starting treatment with vitamin B-12 in both phases (27% v 28%). For more than two thirds of patients, however, two or more diagnostic criteria for pernicious anaemia had been established. The absolute numbers of patients (n=52) receiving vitamin B-12 without previous establishment of any diagnostic criteria was reduced to 12 in phase 2, although the relative proportions were unchanged (8% v 9%).

Of the 1350 patients receiving vitamin B-12 in phase 1, over half (58%) had the recommended frequency of injections of 12 weeks, rising to 72% in phase 2 (table V). The proportion of patients with frequencies of injections of eight weeks or less dropped from 28% to 16%. Eleven per cent of patients continued to receive

injections at intervals of less than five weeks. Overall, 54% and 61% of patients had a blood count performed within one year in phases 1 and 2, respectively, although 9% and 6% had not had a blood count done for six years or more.

The proportions of patients receiving their injections at practice premises or at home remained

TABLE I—Practice participation in audit of vitamin B-12 by size of partnership. Figures are numbers (percentages)

Practice size (No of principals)	All Leicestershire practices	Practices initially agreeing to participate	Practices completing 1st phase	Practices completing both phases
1	37	34 (92)	17 (46)	10 (27)
2-3	54	43 (80)	34 (63)	28 (52)
4-5	38	32 (84)	30 (79)	24 (63)
≥6	18	15 (83)	11 (61)	10 (56)
Totals	147	124 (84)	92 (63)	72 (49)

TABLE II—Reasons for use of B-12 injections. Figures are numbers (percentages) of patients

Reasons for use	Practices completing phase 1 only	Practices completing both phases	
		Phase 1	Phase 2
Pernicious anaemia	865 (51)	671 (50)	780 (61)
After surgery and malabsorption	195 (11)	158 (12)	148 (11)
Non-valid reasons	654 (38)	521 (38)	352 (28)
Totals	1714 (100)	1350 (100)	1280 (100)

TABLE III—Non-valid reasons for the use of vitamin B-12. Figures are numbers (percentages) of patients

Reasons for use	Practices completing phase 1 only	Practices completing both phases	
		Phase 1	Phase 2
No reason found	167 (26)	128 (25)	56 (16)
"Vegetarian"/poor diet	143 (22)	106 (20)	69 (20)
Isolated low serum B-12 concentration	63 (10)	62 (12)	62 (18)
Debility/"tonic"	49 (7)	43 (8)	21 (6)
Multiple sclerosis	43 (6)	36 (7)	30 (8)
Diabetes	21 (3)	14 (3)	9 (2)
Other reasons	168 (26)	132 (25)	105 (30)
Totals	654 (100)	521 (100)	352 (100)

TABLE IV—Establishing diagnostic criteria for pernicious anaemia. Figures are numbers (percentages) of patients

Diagnostic criteria established	Practices completing phase 1 only	Practices completing both phases	
		Phase 1	Phase 2 (new cases only)
Three criteria	225 (26)	179 (27)	39 (28)
Two criteria	420 (49)	318 (47)	67 (49)
One criterion	157 (18)	122 (18)	20 (14)
No criteria	63 (7)	52 (8)	12 (9)
Totals	865 (100)	671 (100)	138 (100)

TABLE V—Frequency of injections of vitamin B-12. Figures are numbers (percentages) of patients

Frequency of injections (weeks)	Practices completing phase 1 only	Practices completing both phases	
		Phase 1	Phase 2
1-3	52 (3)	38 (3)	32 (2.5)
4	276 (16)	218 (16)	106 (8.5)
5-8	158 (9)	115 (9)	66 (5)
9-11	12 (1)	9 (1)	6 (0.5)
12	1006 (59)	788 (58)	923 (72)
≥13	179 (10)	155 (11)	139 (11)
Not known	31 (2)	27 (2)	8 (0.5)
Totals	1714 (100)	1350 (100)	1280 (100)

unchanged in both phases: 67% v 69.5% and 29% v 27%, respectively. Fewer than 190 (14.1%) venues were considered inappropriate. Nurses gave the injections on nearly all occasions (91% v 93%). Seven per cent of injections, however, were given by a doctor in phase 1, reducing to 5% in phase 2.

Discussion

Essentially, the Leicestershire Medical Audit Advisory Group had the twin aims of encouraging general practitioners to participate in audit and effecting improvements in the use of vitamin B-12. To a considerable extent both were achieved.

LEVELS OF PARTICIPATION

We have shown that a medical audit advisory group can stimulate large numbers of practitioners to take part in medical audit as general practitioners, representing over half of all Leicestershire general practitioners, completed the audit cycle. Furthermore, 321 doctors, representing 67% of all Leicestershire general practitioners, completed phase 1 of the audit. This compares favourably with the results of our survey of Leicestershire practices in 1991 (when the medical audit advisory group was first constituted), which showed that only 40% of responding general practitioners had taken part even in partial audit.⁸

On the other hand, 16% of Leicestershire practices failed to participate in the audit from the outset and a further 35% of practices dropped out at various stages of the audit cycle. Anticipating such non-participation and defections, we had commissioned the Eli Lilly National Clinical Audit Centre to carry out an independent, prospective study to identify the particular reasons and to inform future group strategy.⁹ It is evident, however, that singlehanded practices will require practical support as only about a quarter completed both phases of the audit, although nearly all had originally agreed to participate.

Nevertheless, it seems that a single topic audit organised by an audit advisory group is a useful method for familiarising large numbers of general practitioners with the practicalities of medical audit. As the audit was relatively uncomplicated, entailing an average of 20 patients per practice, it remains to be seen whether this will "change the culture" and encourage greater involvement in self initiated audit in the future. It is encouraging, however, that 194 general practitioners, representing 40% of all Leicestershire general practitioners, are currently participating in our second single topic audit on diabetes, which is a much more demanding activity. Notwithstanding, advisory groups will need to continue to seek ways to encourage involvement in audit by the current non-participants, most particularly singlehanded practices.

CHANGES IN THE USE OF VITAMIN B-12

When we consider the use of vitamin B-12 the first data collection phase included 1714 patients receiving B-12 injections from a population base of 606 000. Consequently, this study is the most extensive assessment of the use of vitamin B-12 in general practice yet reported. It has confirmed the findings of previous studies that vitamin B-12 is still used inappropriately.⁴⁻⁷

Nevertheless, involvement in the audit stimulated considerable change in behaviour among participating doctors, leading to subsequent improvements in their use of vitamin B-12. For example, the use of vitamin B-12 for correct reasons improved by 10% (62% in phase 1 to 72% in phase 2) resulting in a 32% reduction in the number of patients inappropriately receiving it (521 to 352). Indeed, some practices achieved dramatic change: one practice reduced the number of patients on B-12 injections from 53 to just two, whereas others achieved little or no change. The reasons for such a variable response are beyond the scope of this study. The proportion of patients receiving B-12 injections at the correct frequency also increased by 14% (58% to 72%), which resulted in fewer patients receiving unnecessary injections.

On the other hand, the establishment of appropriate diagnostic criteria for pernicious anaemia before starting treatment with vitamin B-12 remained virtually unchanged throughout: 27% in the first phase compared with 28% in the newly diagnosed patients in phase 2. Irrespective of whether patients are diagnosed as having pernicious anaemia in general practice or hospital, it would seem essential to establish such a diagnosis on a firm basis before embarking on lifelong treatment of such patients. Furthermore, almost 40% of patients were still not undergoing an annual blood count, 14% of patients were still receiving their injections in inappropriate venues, and doctors were still administering 5% of injections.

CONCLUSION

Although provision of feedback of results from individual practices with comparative data from peers can be a powerful tool for encouraging positive changes in behaviour, such change is not automatic. Nevertheless, our results suggest that single topic audits organised by an audit advisory group can encourage a large number of general practitioners to take part and provide further evidence that it can also bring about changes in clinical behaviour leading to improvements in standards of care.¹⁰

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Key messages

- Medical audit advisory groups were set up with the specific remit of ensuring participation in medical audit by general practitioners
- The groups have used various approaches to encourage involvement in audit
- This study shows that a single topic audit led by such a group can encourage large numbers of general practitioners to participate in audit
- It also provides further evidence that participation in audit can bring about change in clinical behaviour leading to improvements in standards of care
- The search must continue for ways of involving non-participating general practitioners, especially those who practice single handedly

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