Problem Orientated Medical Recording of Patients with Myocardial Infarction

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In the late sixties, Weed introduced a new approach to medical record-keeping—Problem Orientated Medical Records (POMR). His system organised patient data into a structured format keyed to patient problems. The logic of his concept, particularly when contrasted to the myriad personal styles which resulted from conventional recording, produced enthusiastic responses from people who were concerned that traditional record-keeping was not adequate for the purposes of modern medicine. By 1973 many proponents of POMR, perhaps frustrated by the demand of honest sceptics and reactionaries for proof that POMR resulted in better care, were marshalling behind a banner with revivalist overtones. Goldfinger[1] called for a more dispassionate reporting of the outcome of medical education and health care resulting from the use of problem oriented records. This sentiment was voiced elsewhere. Much time, effort and expense are required to convert to POMR and ‘eventually the purported benefits of such systems must be put to the test of controlled observation and comparison against earlier standards’[2].

The use of POMR became hospital policy at Guy’s Hospital in 1974. We subsequently conducted a study of Guy’s ‘firms’ to measure the changes in the clinical management of patients between 1972 and 1975, before and after the introduction of POMR[3]. Data for that study were obtained from the medical records. Firms at two other London teaching hospitals were used as controls. Guy’s firms showed significant improvement in four of the seven diseases studied. There were no changes at the control hospitals. Early in 1975 a programme had been started to teach general medical and surgical house officers how to use the POMR system. Every week each house officer had a set of his notes reviewed for format only. The results were then returned to him. While we believed that the improvement in clinical performance was due to POMR, we were unable to refute the possibility of a Hawthorne effect, i.e., that clinical performance improved because the use of the format was being monitored at Guy’s.

There was a difference of opinion about the value of POMR among the consultants of the general medical firms at Guy’s after the system had been introduced. Half of the consultants were strong supporters and half were not. We found that where the use of POMR was permitted, house officers did significantly better with the format when senior staff approved of the system[4]. Data base scores were not different, perhaps because Guy’s had elected to continue with the traditional method of recording initial examinations rather than developing defined data bases. The differences were accounted for by scores on the prescribed format for initial plans and progress notes. The finding that consultant attitudes affected the use of POMR by junior staff was not surprising. Indeed, it is to be expected that a consultant’s preferences will exert a strong influence on all members of a firm.

In this article we examine the effect of using POMR on the clinical performance for patients with the diagnosis of myocardial infarction. The decision to divide the study group according to whether consultants did or did not approve of POMR was based on the premise that the system would be used better where consultants encouraged its use. Since only Guy’s firms were included, we can assume that the Hawthorne effect on performance was the same for all physicians. We asked two questions, using data for 1972 (before POMR) and 1975 (after POMR was introduced):

1. Was clinical performance better in 1975 in firms where consultants approved of POMR than in firms not favouring the system?
2. Was clinical performance in the approving firms better after the introduction of POMR than it had been previously?

We believed that if the answers to both were ‘yes’, the differences could be attributed to POMR.

Method

The basic variables on which all patients were assessed were the symptoms and signs of the infarction (shortness of breath, pain in neck, chest, arm or shoulder, sweating, nausea and vomiting, and cold extremities), pulse rate at discharge, education for smokers and obese patients about these risks, and activity level at the first out-patient visit. If the patient was re-admitted, or given emergency treatment prior to the first scheduled visit, activity level was scored as poor. Beyond the syndrome variables, any other acute conditions that individuals had in the course of the hospital stay were assessed in terms of whether they
were resolved as expected. The performance score awarded for each patient represented the percentage of occasions when the expectations for that patient had been met. Since the purpose of this measurement was to assess clinical performance, the focus of the design was on situations that were under the physician’s control. Evaluation did not extend beyond the first outpatient visit, in order to avoid the confounding effects of events unrelated to clinical care. Patients who were not seen following hospitalisation were excluded from the study, as were patients who had malignancies or died in hospital.

The validity of the scores was tested by asking a clinician with no knowledge of the scoring method to answer the following question about a sample of patients’ records, using a five-point scale to classify his judgments. ‘How nearly did the outcome for this patient approximate the outcome that you would expect the patient to achieve with good medical care?’ A correlation coefficient of 0.77 suggested strongly that our objective measurement was a valid one (99 per cent confidence limits: 0.48, 0.90).

Because a good clinical result is to some extent dependent on the patient, we adjusted the scores by those patient factors found to be significantly associated with lower scores for myocardial infarction patients in an earlier study[5]. Using the scores of 271 patients at Guy's and another teaching hospital in 1972 and 1975 as the dependent variable, a multiple regression had been run in which the following independent variables had been entered: age, sex, marital status, number of admissions in the previous year, the size of the smoking habit, the presence or absence of obesity, hypertension, anaemia, diabetes, liver complications, and renal complications. The variables that were significantly associated negatively with clinical performance are shown in Table 1.

Table 1. Variables significantly associated negatively with clinical performance. The accepted significance level for these variables was 10 per cent or better.

| Patient variables                          | Coefficients | T-Ratios | Significance (one-tailed) |
|--------------------------------------------|--------------|----------|--------------------------|
| Patient single, widowed, divorced          | -2.38        | -1.7     | <0.05                    |
| Age (mean = 58.9)                          | -0.09/year   | -1.4     | <0.10                    |
| above mean                                 |              |          |                          |
| Number of cigarettes smoked daily          | -0.78/10     | -2.0     | <0.025                   |
| additional                                 |              |          |                          |

The co-efficient determined the weight given to each variable. The scores of other than married patients were increased by 2.38. The score of each patient over the mean age of 58.9 was adjusted upward for each additional year of age by the amount of the coefficient and 0.78 was awarded for each ten additional cigarettes smoked daily. Following these adjustments clinical performance might be expected to be similar. This is, therefore, an analysis of the adjusted scores. As the distribution is skewed with a tail toward low scores we have used the Mann-Whitney U statistic to test the hypothesis. This rank-order statistic, somewhat less powerful than the t-test, does not rely on the assumption of a normal distribution.

Study Limitations

The consultants of the firms were the same in both time periods. The house officers and registrars, however, were not. We have assumed that the qualifications of the latter were similar in both years. All of the acute problems considered were serious enough to warrant recording; nevertheless, to avoid the possible bias of a return to normality that had not been recorded, a problem was assumed to be ‘resolved as expected’ if it was not mentioned at discharge and was not a problem at the first outpatient visit. If mention of any aspect of patient education was made, full credit was given for the education variable. We cannot know in cases which failed the education expectation whether education may have been given but not recorded. We do not view this as a study limitation since failure to educate the patient and to record what the patient was told about his smoking or obesity are failures of different kinds.

Results

The first step in the analysis was to determine whether there had been any difference in the performance scores of the two groups before the introduction of POMR. The mean scores were almost identical, 95.5 in the firms which would subsequently favour the system (n = 39) and 95.3 (n = 21) in the firms which would not. The Mann-Whitney test of the ranked scores showed that the scores were similar (P = 0.72, two-tailed), confirming our basic assumption of similar clinical competence in both groups. The picture was quite different in 1975, the year after POMR was introduced. The mean outcome score for the group favouring POMR was 100.7 (n = 34). The mean of the group not favouring POMR was similar to its mean in the ‘before’ year, 94.4 (n = 28). The test of the ranked scores of the two groups suggested strongly that the scores of the favouring group were significantly better in 1975 (P = 0.0187, one-tailed).

As a further check on this finding we wanted to know whether there had been improvement in the 1975 scores of the favouring group. The statistic (P = 0.0043, one-tailed) supported our hypothesis of a significant improvement following the introduction of POMR in firms where consultants were enthusiastic. There were no significant changes in the before and after scores of the other group.

There were six categories in which failure to meet clinical expectation occurred: shortness of breath, pain, abnormal pulse, hypotension at discharge, poor activity level at the first out-patient visit (or re-admission prior to the first visit) and education of patients who were obese or who smoked about the risks involved. There were 25 failures observed in both groups in 1972. In 1975 there were 18 failures, of which only three were in the group favouring POMR, two in education and one unresolved complication. The remaining 15 failures were in the non-favouring group.

Discussion

To the extent that the study of clinical performance for patients with one disease at one hospital can be evidence
of the effects of POMR in general, these results support the hypothesis that POMR improves the performance of the clinician. The data presented here, like most medical care studies done in hospitals, were obtained from events occurring in a natural rather than experimental setting. It is important to understand the climate of that setting in order to assess the impact of the findings.

The policy decision to convert to POMR at Guy's resulted in the provision of record stationery which was intended to facilitate recording in the POMR format. Change in recording practices, however, relied on persuasion rather than edict. A booklet Guidelines for the Preparation of the Problem Orientated Medical Record, was offered as well as assistance to individuals who might wish to have help in learning to use POMR. The project of stimulating house officers to use the format was undertaken by a research unit which had no mandate from the organisational hierarchy. Individual and firm scores were kept confidential. Even in the firms generally favouring the system, use of the format was not uniformly excellent nor was there any systematic clinical review of notes or pressure to use the system by senior staff in these firms. The conditions assumed to be prerequisites for POMR—'strong leadership and full commitment to the basic philosophical principles'[6], orientation to comprehensive care, and acceptance of clinical audit—were not present even in the firms where consultants believed POMR to be an improvement over the source-orientated records. In these circumstances the study findings, if not conclusive, must surely lend weight to the claim that the rational structure of POMR improves the quality of clinical care.

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**Bird Fanciers**

Physicians have a long tradition of bird watching. William Harvey mistook the sex of his wife's parrot but studied the embryology of the chick. 'I remember,' wrote John Aubrey, 'he came ... to George Bathurst who had a Hen to hatch Eggs in his chamber, which they opened daily to discern the progress and way of generation'. Sir Thomas Browne studied the birds of his native Norfolk, had theories about bird migration, discarding the idea that they flew to the moon, and wrote of hawks and falconry. He commended the ancients for their way of putting flesh on hawks; 'they commonly gave them Hogs Flesh, with Oil, Butter and Honey; and a decoction of Cumfory to bouze.'

Maybe it is not just by the accident of acquisition that the College library has so fine a collection of books on birds. The earliest book to show pictures of birds is a medical text, Hortus Sanitatis, the College copy being printed in Strasbourg in 1498. Dr Newman has pointed out one illustration of two abstract birds like eagles, holding horseshoes in their beaks. 'Of course, anyone knows that a bird eating horseshoes is an ostrich.' The digestive prowess of ostriches was a wonder to many a generation of physicians. There is a splendid letter from Edward Browne, PRCP, to his father Sir Thomas that begins: 'Last night the ostrich died.' The first catalogue of English birds was published in 1667 by Christopher Merrett, the first Harveian Librarian. He was a good compiler but not a keen observer. George Edwards, Bedel of the College and assistant librarian, published a four-volume work on birds (1743 to 1751). He drew and coloured the 210 illustrations himself. His dedication of the book shows a nice sense of precedence, the order being the College of Physicians, Sir Hans Sloane, the Royal Society, God.

Thomas Bewick's *History of British Birds* suffered from bad paper and printing in the first edition (1797 to 1804) but his illustrations are well reproduced in the edition of 1826; the College library has both editions. Bewick paid a particular compliment to Edward Jenner for his observations on the cuckoo: 'We owe the first satisfactory account of the singular economy of this bird in the disposal of its egg to Mr Edward Jenner.' Indeed, Jenner's work on the cuckoo was as good as his work on vaccination. His manuscript journal is in the library and in it he records his observations on the cuckoo, noting the large number of eggs to be found in its ovaries.

The library also has John Prideaux Selby's book on pigeons, notable for its illustrations by the young Edward Lear. Of course, there has to be a copy of Gilbert White's *Natural History of Selbourne* which Edward Wilson, explorer, naturalist and physician, so loved. Wilson was no mean artist, with his landscapes of Antarctica and his pictures of birds, notably for Yarrell's standard work on British birds.