and pathogenesis of these deaths may, it is hoped, be expected to lead to a reduction in their number. There is clearly cause for concern about the role of the pathologist in the investigation of maternal deaths.

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Management of minor illness

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It has frequently been asserted that general practitioners spend too much of their time dealing with minor illness that could be treated adequately by home remedies.¹ Studies of patients' demands for care carried out in this department over the past decade have shown that nearly half the general practitioners' work load is concerned with the continuing care of chronic disease,² which will probably increase with the increasing life span and changing pattern of illness. It is therefore important to determine whether new demands for care can be reduced. We found in an earlier study that for children aged under 16 years, over half of new demands for care were concerned with six common symptoms—stuffy or runny nose, sore throat, cough, vomiting, diarrhoea, and minor trauma. Clearly the appearance of these symptoms in children provokes parental anxiety, and high anxiety scores measured by a standard questionnaire are related to high levels of patient-initiated consultations.³

In an attempt to help parents manage these common symptoms a booklet was produced to inform them about the meaning of these six symptoms, the appropriate type of medication, and guidance on when a doctor should be consulted. The whole book consisted of just 16 pages, containing a separate chapter on each symptom, and was illustrated with cartoons. Written by one of us (DM), the book was edited by the leader writer of the *Daily Mirror*, and was tested in a group of young mothers in a different district for acceptability and comprehension. In addition to the symptom chapters a section of the book described how the general practitioner could be contacted in an emergency and gave advice on stocking the home medicine cupboard. An important feature of the book was that it was presented to the mothers of young families as a service provided by the partners of the practice.

Objectives of study

A study was then designed to measure the effect of this booklet on the pattern of medical demand of patients registered with a group practice with an attached health visitor providing medical care for a

population of about 8500 in the London Borough of Lambeth. The study was designed as a randomised controlled trial to test three hypotheses:

- (1) That the patient-initiated consultation rate of members of those families receiving the booklet would be lower than for a control group of families not receiving the booklet;
- (2) That the consultation rate for those symptoms described in the booklet would be lower for the study group than for the control group;
- (3) That patients receiving the booklet would on questioning show better knowledge of the management of the conditions described in the booklet than the control group.

This paper is concerned primarily with the first two hypotheses and refers only briefly to the third.

Method

The sampling frame for the study consisted of all the families in the practice with at least one child under the age of 5 years and identified from the attached health visitor's records. The advantage of using such records for the sampling frame is that they are much more sensitive to patients moving in and out of the practice than the age/sex register. There were 284 such families containing 999 individuals.

The families were allocated at random to the study and control groups. The study group received a copy of the booklet with a covering letter from their own general practitioner explaining that he hoped that the booklet would help them to manage the common symptoms of illness in the family. The practice records of all the family members of both the study and control groups were marked with a red label but the doctors in the practice did not know which patients were in which group. At each consultation with a patient whose record carried a red label, the doctor recorded the date and place of the consultation. He identified each consultation as either doctor- or patient-initiated according to a definition used extensively in previous studies in this practice.² For all patient-initiated consultations he recorded the presenting symptom according to a previously tested definition,⁴ the duration in days of the symptom before the consultation, the diagnosis, and the treatment prescribed. At the end of every consulting session in the practice, a research assistant examined all the records from that session and extracted the prescribed information for each patient. If the information was not recorded the doctor responsible was contacted within 24 hours to make good any deficiencies.

The study started in December 1977 and ended in December 1978. For each patient in the study, the age, sex, and social class were recorded and consultation data extracted for every consultation during the study year. Social class was based on the occupation of the father or, in single-parent families, the parent. At the end of the year a random sample of 50 patients from the study and 50 from the control group was interviewed to test their knowledge of the symptoms described and the use they had made of the booklet.

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Results

Of 999 individuals in the study, 521 were in the study group and 478 in the control group. The purpose of the analysis was to determine how much the patient-initiated consultation rates differed between the study and control groups for those consultations at which the symptoms described in the booklet were presented.

There were two problems in handling the data. The first concerned the randomisation. The two groups produced by simple randomisation differed in terms of age, sex, and social class distribution. These differences were allowed for in the regression analysis. The second problem was that some individuals left the practice during the study year. It was possible to obtain an accurate date of their departure, and this was used to calculate an appropriate weight for the regression analysis. The data presented in the tables in this paper are weighted to take the latter factor into account.

The frequency distributions for all patient-initiated consultations were first examined separately in the study and control groups. These followed neither a Gaussian distribution nor, as was found for patient-initiated consultation data for the individual symptoms, a Poisson distribution. Given this feature, the weighted data were transformed using the formula $\log(n + \frac{1}{2})$, where n is the number of patient-initiated consultations, to provide frequency distributions following the Gaussian curve more closely. A standard least-squares regression analysis was then performed on the transformed data and not on the mean number of patient-initiated consultations displayed in table I.

TABLE I—Comparison of the mean number of patient-initiated consultations per patient year and percentage of patients initiating no consultations for the study and control groups*

Age group (yr)	Mean number of patient-initiated consultations		Percentage of patients initiating no consultations	
	Study group	Control group	Study group	Control group
0-4	3.01	3.53	12	12
5-14	1.74	1.86	21	29
≥15	2.16	2.23	25	23

*Figures adjusted to allow for patients who were at risk for only part of the study year.

After allowing for the differences in age, sex, and social class distribution between the study and control groups, the mean number of patient-initiated consultations did not differ significantly ($p > 0.1$). In both study and control groups about one-eighth of those under and about a quarter of those over the age of 5 never initiated a consultation throughout the study year.

An examination of the frequency distributions of the number of home visits in the study and control groups (table II) showed significantly fewer home visits in patients in the study group (Cox's test for trend, $\chi^2 = 16.33$, $p < 0.001$).

TABLE II—Frequency distributions of number of home visits in the study and control groups*

	Percentage of each group with a given number of home visits in one year									
	Nil		One		Two		Three		Four	
	%	No	%	No	%	No	%	No	%	No
Study group	88.7	443.2	9.7	48.6	1.3	6.7	0.2	1	0	0
Control group	81.5	370.4	14.0	63.5	3.3	15	0.9	4	0.4	2

*Figures adjusted to allow for patients who were at risk for only part of the study year.

Table III illustrates the mean consultation rate of each of the symptoms described in the booklet. For the purposes of comparison, the frequency distributions of patient-initiated consultations in the study and control groups were examined. (The regression analysis used age as an ungrouped variable, rather than the grouping shown in table III.) It was apparent that these frequency distributions followed a Poisson distribution reasonably closely. To test whether the observed differences in consultation rates for individual symptoms between study and control groups were greater than could have occurred by

TABLE III—Comparison of the mean number of patient-initiated consultations for six symptoms described in the booklet for study and control groups*

Symptom	Age group (yr)	Mean number of patient-initiated consultations		Significance level
		Study group	Control group	
Sore throat	0-4	0.16	0.27	$p < 0.05$
	5-14	0.19	0.23	
	≥15	0.11	0.13	
Diarrhoea, vomiting, or both	0-4	0.33	0.33	$p < 0.05$
	5-14	0.06	0.08	
	≥15	0.08	0.16	
Fever	0-4	0.12	0.31	$p < 0.005$
	5-14	0.05	0.05	
	≥15	0.03	0.03	
Cough	0-4	1.08	1.20	$p < 0.2$
	5-14	0.31	0.40	
	≥15	0.20	0.14	
Minor trauma	0-4	0.08	0.09	$p < 0.2$
	5-14	0.13	0.13	
	≥15	0.08	0.13	
Runny or stuffy nose	0-4	0.10	0.10	$p < 0.1$
	5-14	0.06	0.02	
	≥15	0.08	0.03	

*Figures adjusted to allow for patients who were at risk for only part of the study year.

chance, a series of linear regression models were fitted using a computer package called Genstat.⁶ This package has a special facility for analysing variables from a Poisson distribution. The study and control groups were compared using approximate χ^2 tests based on likelihood ratios. The probabilities (p values) that the differences observed occurred by chance are based on this test. For the symptoms sore throat, diarrhoea and vomiting, and fever the study group initiated significantly fewer consultations during the year ($p < 0.05$).

To examine the effect of the booklet on patient-initiated consultations for symptoms not described in it, frequency distributions, using the method described above, were compared for each of the three symptoms abdominal pain, rash, and sore eyes (table IV). For abdominal pain, the study group had significantly fewer patient-initiated consultations ($p < 0.05$). For the other two symptoms there was no significant difference.

The final questionnaire designed to test the knowledge of the study

TABLE IV—Comparison of the mean number of patient-initiated consultations for three symptoms not described in the booklet for study and control groups*

Symptom	Age group (yr)	Mean number of patient-initiated consultations		Significance level
		Study group	Control group	
Abdominal pain	0-4	0.02	0.04	$p < 0.05$
	5-14	0.06	0.06	
	≥15	0.10	0.17	
Rash	0-4	0.27	0.23	$p < 0.2$
	5-14	0.19	0.20	
	≥15	0.11	0.06	
Sore eyes	0-4	0.04	0.06	$p < 0.5$
	5-14	0.05	0.04	
	≥15	0.04	0.01	

*Figures adjusted to allow for patients who were at risk for only part of the study year.

and control groups of advice given by the booklet on the management of these symptoms described will be the subject of a further paper. In the present analysis it seemed important to ensure that the study group had recognised and used the booklet. In the sample tested 74% of the patients in the study group referred to the booklet, and 28% said that they had used it in the three months preceding the interview.

Discussion

The results of studies of health education are often disappointing. Using audiotapes in the general practitioner's waiting room to provide education messages, Clarke⁷ found that the uptake of the facility was poor. Whitfield⁸ undertook small group sessions on the treatment of minor illness in general practice and, using a randomised controlled design, did not show any effect on consultation patterns of those attending the groups compared with a control group. Lloyd⁹ experimented with a series of lectures in a group practice but reported poor

attendance, and those who did come were mainly those who least needed education.

Buck *et al*¹ studied 274 patient-initiated consultations in practices in London, Ontario, and estimated that 21% of such visits might be avoidable if patients had an acceptable manual of self care that described the treatment of minor ailments. In contrast, Berg and LoGerfo¹⁰ have argued, as a result of a study of such a manual in relation to patients' requirements for care, that the algorithms designed to help patients in self care may lead to a rise in the demand for care. Sackett *et al*¹¹ studied the problems of compliance with treatment and used a randomised controlled trial of educational strategies for improving compliance; they failed to show any improvement in compliance in those undertaking the programme.

The only encouraging report comes from Russell *et al*,¹² who showed that a group of smokers attending a general practice who were advised to give up smoking were more likely to have stopped smoking one year later than a control group (who had not been so advised) and that the effect of the advice could be almost doubled if they were provided with a leaflet to help them and which warned that they would be followed up.

In evaluating the Health Education Council's booklet *Treating Yourself*, Humphreys¹³ used a questionnaire to test the response of patients to it. About 70% thought that the booklet was useful, and she estimated that it had saved visits to or by the doctor. The results were based on a study of very small numbers and on patients' predictions of their behaviour. There was no objective evidence that the booklet produced a change in consulting patterns.

As general practitioners, we became aware that a few common symptoms of illness caused patients much anxiety and led to many consultations. It seemed possible that specific information on the significance and management of these symptoms might allay this anxiety.

The results of this study do seem to show a consistent change in consulting behaviour by those patients who received the educational booklet. For five of the six symptoms described in the booklet the mean consultation rate of the study group was lower than in the control group. The difference was statistically significant for three of these symptoms. The change in the pattern of demand for home visits is particularly arresting. Possibly the anxiety caused by these symptoms is more important in provoking a house call than a surgery consultation.

The analyses carried out so far have not, however, been sufficient to show that the booklet does not deter patients from seeking care when this is desirable. Further study of the data indicating the time lapse between the perception of symptoms and the consultation, the diagnosis recorded, and the drugs prescribed may clarify this issue.

It may well be that direct confrontation with the patient requesting care for minor illness and a change in prescribing policy as described by Marsh¹⁴ is more potent in changing

patient behaviour. Such an approach is not, however, acceptable to all general practitioners, and other methods of health education may be of value.

In this study a booklet was prepared by the patients' own general practitioners and designed to help them to understand common symptoms of illness and how to manage them in the home. It included advice on when it is appropriate to consult the doctor. The results suggest that in this practice it does affect consulting behaviour.

We thank the many people who co-operated in this experiment: the partners in this practice, Dr H G Gage, Dr W S Marson, and Dr L I Zander, for completing the research record; Dr Sarah Darby for advice on the statistical design and data handling of the experiment; Miss M Evans for checking and extracting all the data; Mrs K Whitty for defining the sample and for organising the pilot study of the booklet; Miss Margaret Pattman for providing the cartoons; Mr David Tattersall of the *Daily Mirror* for editing the booklet; and Miss Alison Bunting for conducting the final interviews. The cost of the study was defrayed by the Health Education Council and the Department of Health and Social Security.

A copy of the educational booklet is available from the Health Education Council, 78 New Oxford Street, London WC1 1AH.

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Could occasional use of ibuprofen cause tinnitus?

Many drugs are known to be ototoxic, and not infrequently the first symptom of ototoxicity is tinnitus. This symptom is usually associated with a measurable loss of hearing, even when there is no subjective deafness, and tinnitus and hearing loss have both been reported during the administration of ibuprofen. In 1968 Janasi *et al*,¹ in a comparative clinical study of the analgesic and anti-inflammatory properties of ibuprofen, aspirin, and prednisone in rheumatoid arthritis, reported transient episodes of dizziness and buzzing in the ear in one of nine patients treated with ibuprofen. Similar symptoms occurred when she was taking aspirin. In 1971 Collum and Bowen,² in a paper on its ocular side effects, included tinnitus and deafness in a table of "minor side effects of ibuprofen"; and deafness and tinnitus were also noted as possible side effects of this drug in the VIIIth volume³ of Meyler's *Side Effects of Drugs*. Dick-Smith,⁴ in a double-blind clinical trial of ibuprofen, aspirin, and placebo in 30 cases of rheumatoid arthritis, referred to deafness in two cases but made no mention of tinnitus.

Unfortunately, there were no audiograms in any of these papers. Aspirin, of course, may also be ototoxic, and when two or more potentially toxic drugs are used in combination or in series their side effects may be synergistic. Interestingly the tinnitus was exacerbated during the period 2-5 hours after taking the ibuprofen, and it would be helpful to know whether the inquirer has had audiograms done before, at intervals during, and after the ingestion of ibuprofen. If there were any measurable changes in the hearing even at only one or two frequencies, during the periods of exacerbation, this could have an important bearing on the genesis of tinnitus. I hope, too, that the experience has been reported to the Committee on Safety of Medicines.

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