

Computers in medicine: patients' attitudes

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SUMMARY. Data are presented from two surveys where a 26-item questionnaire was used to measure patients' attitudes to diagnostic computers and to medical computers in general. The first group of respondents were 229 patients who had been given outpatient appointments at a hospital general medical clinic specializing in gastrointestinal problems, where some had experienced a diagnostic computer in use. The second group of respondents were 416 patients attending a group general practice where there was no computer. Patients who had experience of the diagnostic computer or a personal computer had more favourable attitudes to computers in medicine as did younger people and males. The two samples of patients showed broadly similar attitudes, and a notable finding was that over half of each group believed that, with a computer around, the personal touch of the doctor would be lost.

Introduction

A FEATURE of general practice is that the relationship between doctor and patient can be of long duration, and it is perhaps in general practice where the impact of computers will be most felt by patients. Machinery is a familiar sight in hospitals but patients may be surprised to see a computer in the surgery.

Potter, writing in this *Journal*,¹ attempted to show patients' attitudes to the use of computers by general practitioners. Correspondents to the *Journal*, however, pointed out that the study had faults in its methods because all the questions were expressed negatively. Potter replied 'I await with interest a similar study undertaken in a neutral practice with an "unbiased questionnaire".'²

This paper describes the development of a questionnaire to assess patients' attitudes to the use of a computer in general practice and reports the responses to the questionnaire by two groups of patients—a group attending a hospital outpatient clinic and a group attending a general practice.

Method

In order to obtain a large number of statements expressing a wide variety of views about the use of computers in medicine, the literature was scanned and interviews were conducted with

patients who had experience of computer use in a hospital outpatient clinic.^{3,4} This groundwork produced 300 items from which 176 unsatisfactory items were eliminated, using Edwards' techniques of scale construction.⁵ The selected 124 items were rated against a nine-point scale by 18 psychologists for favourable or unfavourable attitudes towards the use of computers by doctors. Ambiguous statements were rejected, and the final list numbered 42 items.

The reduced list of 42 items, still covering a wide range of attitudes, was administered as a Likert-type scale to 141 first-year undergraduates at Sheffield University who were taking a course in psychology. The students were asked to indicate, on a scale of 0–4, the measure of their agreement or disagreement with each statement. Next, items failing to discriminate between the top-scoring 25 per cent and the bottom-scoring 25 per cent were eliminated, so that only those items which best differentiated favourable and unfavourable groups of subjects were retained.

The final scale contained 26 statements. Cronbach's coefficient of concordance, a measure of internal consistency, was 0.90 for the student group and 0.93 and 0.90 for the two groups of patients tested—all extremely high figures. The questionnaire statements still had many levels of favourability, although reliable neutral items were difficult to derive and the few that were derived did not discriminate favourable and unfavourable attitudes.

Analysis of the 26 statements suggested five main factors: 'positive' attitudes, 'negative' attitudes, concern about doctors' mistakes, concern that the doctor-patient relationship might be affected and, as a final factor, the financial implication of computers. Subsidiary scales based on these five factors showed reasonable reliabilities for the samples of patients. It was notable that 'positive' and 'negative' factors were distinct; this demonstrates that people can hold both positive and negative views about computers rather than take a simple 'pro' or 'anti' viewpoint overall.

In addition to the 26 items on the scale, two dummy statements were added to improve the perceptible balance since there were slightly more negative than positive items; the dummy additions were positive items that had not justified a scoring place during development of the scale.

The outpatient sample consisted of patients who had, within the previous two years, been referred to a hospital general medical clinic specializing in gastrointestinal problems. The hospital serves a mainly working-class community from a number of small towns and villages in South Yorkshire. Usable replies were obtained from 229 of the 302 patients who were surveyed by post in December 1980;³ 85 of the respondents had experience of a computer diagnostic aid being used at the clinic. The ages of the patients in this sample ranged from 12 to 89 years (mean age 44 years); 60 per cent of the sample was male.

The general practice sample consisted of all patients who attended, in one week in April 1981, a small health centre that formed one of the two locations of a group general practice serving the population of a small town on the outskirts of Sheffield. (The practice was about to take part in a research project assessing the value of computers in general practice, but the patients had not been informed of this.) Completed questionnaires numbered 416. The ages of respondents ranged

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Table 1. Results of the two surveys (percentage responses). In some cases percentages do not total 100 per cent due to rounding off.

Questionnaire statements (mean favourability rating in brackets, range 1-9)	Hospital outpatients (n = 229)			General practice patients (n = 416)		
	Agree	Disagree	Don't know	Agree	Disagree	Don't know
1. If doctors use computers, it will save a lot of their time (7.3)	81	9	11	70	7	23
2. I wouldn't be comfortable in a doctor's surgery if I saw a computer there (2.4)	30	52	18	23	54	23
3. Computers will mean that you see even less of the doctor than before (2.9)	48	37	14	35	41	24
4. It could save lives if doctors have computers (7.8)	61	13	25	53	12	34
5. With a computer around, you'll lose the personal touch of the doctor (2.9)	56	37	6	52	33	14
6. A computer could be a useful check against mistakes (7.2)	84	5	11	80	8	12
7. If doctors get computers, then prescription charges will go up (3.2)	39	22	39	32	23	45
8. I think that using computers in medicine is wonderful (8.6)	68	11	21	54	13	33
9. Computers are all right for specialists, but I wouldn't want my own doctor to use one (3.8)	41	43	15	21	52	27
10. Doctors will forget how to treat people if they get used to computers (2.4)	40	49	11	28	58	14
11. If computers are used a lot, we may soon have to pay to go into hospital (2.9)	38	33	30	21	39	40
12. Modern technology has to come, even to doctors (5.9)	84	4	11	89	6	5
13. Doctors will have to spend more time checking the computer than examining the patient (2.8)	39	48	14	30	45	25
14. I wouldn't believe what a doctor said if he used a computer (1.8)	20	58	22	14	64	22
15. I don't think science has advanced enough for computers to be used safely by doctors (2.4)	30	44	26	19	50	31
16. Computers could save money for the Health Service (7.3)	43	24	33	40	20	40
17. Doctors are overworked and need the help of a computer (6.9)	72	19	9	63	18	19
18. Doctors will make more mistakes if they have computers distracting them (2.1)	22	57	21	14	44	42
19. I don't believe that computers will ever catch on in medicine (3.4)	19	70	20	14	59	27
20. We'll get a better standard of treatment if doctors use computers (8.0)	42	29	29	33	27	40
21. The mistakes that doctors make couldn't be put right by a computer (3.7)	38	32	30	39	24	37
22. Computers should not be trusted with anyone's health (1.9)	35	47	18	35	40	25
23. Money spent on computers is money wasted (1.4)	15	71	14	11	67	22
24. If computers meant that you didn't have so long to wait to see the doctor, they wouldn't be a bad thing (6.7)	80	12	8	78	9	13
25. Doctors will make a better diagnosis if a computer helps them (7.7)	62	17	21	54	16	30
26. A computer is only a machine, so there's nothing to worry about (6.2)	55	23	22	34	25	31

from 10 to 89 years (average age 37 years); 73 per cent of the sample was female. The general practice patients were also asked about their occupation and the experience they had of computers; these patients were slightly more middle class on average than the outpatient group.

Both samples represented users of health services rather than the population as a whole. However, there seemed to be less relevance in knowing the views of potential consumers than in knowing what actual consumers think about issues which have reality for them. Hence the choice of patients rather than other groups of people.

Results

The percentage responses to each item in the questionnaire (excluding missing values) are shown in Table 1. Fitter and Cruickshank⁴ reported that hospital outpatients with experience of a computer had significantly more favourable attitudes than other outpatients, while general practice patients with direct experience of using a computer also had significantly more favourable attitudes than other general practice patients.

The maximum score was 104, made up of the 26 items scored 0-4 (where high scores are favourable). The sample of students used in the development of the questionnaire had a mean score of 71.0. The hospital outpatient group with experience of a computer being used scored 71.3, whereas the other outpatients scored on average 62.2. The general practice patients who had used a computer scored 73.9, and the remainder of the sample scored 64.0. Table 2 illustrates the degree of computer experience of the general practice sample.

Other differences observed were that males had more favourable attitudes towards computers than females, and the attitudes of patients aged over 50 years were less favourable than the attitudes of those under 50 years of age. This was also the case with the hospital outpatients. A multiple regression analysis found that the degree of experience of computers was the best predictor of attitudes towards their use ($P < 0.001$), but age and sex were also significant (both at $P < 0.05$). The data concerning occupation were less useful since many patients were retired, unemployed or housewives. However, the limited data showed (as might be expected) that a broad-brush classification of occupational category was a significant predictor of computer experience ($P < 0.001$).

Overall, outpatients agreed most strongly with suggestions that computers would save time for doctors (81 per cent), would be a useful check against mistakes (84 per cent) and would be 'a good thing' if as a result patients did not have so long to wait to see the doctor (79 per cent). Outpatients also felt that new technology was inevitable (79 per cent). Likewise, the general practice group agreed most strongly with these four items (70, 80, 78 and 89 per cent respectively).

Outpatients disagreed most strongly with suggestions that money spent on computers was money wasted (70 per cent), that computers would not catch on (61 per cent), that doctors would make more mistakes (56 per

Table 2. General practice patients' experience of computers.

	Percentage of responses ($n = 416$)
Have used a computer	19.7
Have not used a computer but have seen one being used in real life	28.2
Have seen computers only on television or film	47.1
Have never seen a computer at all in any form	5.0

cent) and that they would not believe a doctor who had used a computer (59 per cent). The general practice sample gave 67 per cent and 59 per cent disagreement to the first two of these items, and 64 per cent to the last, but instead of the third item they rejected more strongly the suggestion that doctors will forget how to treat people (58 per cent).

Despite these rejections, however, there were still fairly substantial proportions that agreed with some of these items. For example, 22 per cent of the outpatients thought that doctors would make more mistakes with a computer and 20 per cent felt that they would not believe a doctor who used one, while 28 per cent of the general practice patients thought that doctors would forget how to treat people if they used a computer. These proportions are perhaps more significant than they might appear at first sight since patients tend to give positive responses to satisfaction surveys.^{6,7}

The responses that might give the most concern to those planning to install computers are the 56 per cent and 52 per cent of outpatients and general practice patients respectively who agree that, with a computer around, the personal touch of the doctor will be lost. It is striking that in both groups of patients a majority accepted this suggestion. With this sort of expectation, it is hardly surprising that patients may be less than enthusiastic at the prospect of their general practitioner getting a computer.

Some of the other negative items attracted support from large minorities of patients. For example, 48 per cent of outpatients thought they would see less of the doctor than before (35 per cent of general practice patients had the same expectation); 38 per cent of outpatients thought that computers would not correct doctors' mistakes, and 39 per cent of general practice patients agreed with them; 35 per cent of both outpatients and general practice patients felt that computers could not be trusted with anyone's health. Again, in the context of other surveys and the 'passive patient' effect, these proportions are notable. The financial questions tended to lead to 'uncertain' responses from both sets of patients. Items on prescription charges, saving money for the Health Service, and paying to go into hospital were things that many people were uncertain about.

A few of the positive items were endorsed less than wholeheartedly. The general practice patients were sceptical about improvements to the standard of treatment (only 33 per cent agreed) and the outpatients were also dubious (42 per cent agreed), while the suggestion that a computer is 'only a machine, so there's nothing to worry about' was endorsed by only 34 per cent of general practice patients but by a somewhat higher proportion (55 per cent) of outpatients.

It can be seen that the patterns of responses for the two samples of patients were more similar than they were different. However, general practice patients used the 'I am uncertain' option more frequently than the outpatients had done. The only instance where the two samples appeared to disagree was the item which suggested that patients would see less of the doctor than before. Here, the outpatients agreed (48 per cent versus 37 per cent who disagreed) while general practice patients tended to disagree (35 per cent agreed and 41 per cent disagreed). However, both sets of figures are reasonably close, and in both groups a sizeable proportion of patients felt the suggestion was true.

Discussion

None of the items in this questionnaire study exactly paralleled the questions put by Potter to his patients.¹ However, comparison can be made between the 19 per cent of Potter's patients who agreed that they would be worried by the use of a computer and the 23 per cent and 25 per cent of this study's patients who disagreed with the statement 'A computer is only a machine, so there's nothing to worry about'. Similarly, Potter found that 27 per cent of his patients would be unwilling to speak frankly about personal matters to their general practitioner, and this survey found that 30 per cent and 23 per cent of patients would not be comfortable if they saw a computer in the surgery. These figures are of the same order as Potter's, suggesting that despite the shortcomings of Potter's methods his results reflected a genuine concern on the part of a (sometimes large) minority of patients.

With a background of researchers' concern about possible harm from the use of computers, the appearance of negative results of this size counterbalance or possibly outweigh the results of much larger magnitude which are favourable to the use of computers. For this reason, somewhat greater attention has here been given to negative responses than to favourable responses. It was pointed out earlier that subjects could hold both favourable and unfavourable views simultaneously, so even though the responses to some items were highly favourable there were over 50 per cent of patients who thought the personal touch would be lost with a computer in use.

It might be expected that future patients with experience of computers will be less negative in their attitudes to the use of a computer in general practice. To give an

analogous example, Kaim-Caudle and Marsh⁸ described the negative reaction of almost half their patient sample to the idea of home visits from a nurse when a doctor had been asked for, yet 74 per cent of patients who had experienced this happening were satisfied with the treatment and advice received. However, this does not reduce the importance of doctors' awareness of patients' initial worries.

Finally, an item of special interest to general practitioners was the suggestion that computers are all right for specialists 'but I wouldn't want my own doctor to use one'. Outpatients were divided over this statement but, while they were more uncertain, general practice patients tended to disagree. It will be noted that although acceptance of this statement was unambiguous, the opinions of those who rejected it may be represented by one of two positions. The alternatives are the belief that neither the specialist nor the general practitioner should use a computer and the belief that both should. However, in the light of the clear belief that 'Modern technology has to come, even to doctors', rejection of the suggestion that computers are all right for specialists but not for general practitioners can be interpreted as a cautious green light for computerization. However, general practitioners who plan to install a computer may wish to take note of the concern of patients for the 'personal touch' and its retention.

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