General practitioners' tacit and stated policies in the prescription of lipid lowering agents

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SUMMARY

Background. *Research into general practitioners' prescribing behaviour with regard to lipid lowering agents has relied on survey methods which presume that doctors have insight into their prescribing behaviour and can describe it accurately.*

Aim. *This study set out to measure the tacit policies used by general practitioners in prescribing lipid lowering agents and to compare these with their stated policies.*

Method. *Effects of 13 separate cues on decisions to prescribe were examined. The cues included cholesterol levels and a number of associated risk factors for coronary heart disease. Doctors rated 130 imaginary cases presented by a computer. Thirty five general practitioners in the Plymouth area participated in the study. Their ages ranged from 31 to 55 years and all but four were men. The raw data in each case was a rating of the likelihood that the doctor would prescribe for the patient described. These were converted into statistical weightings by use of multiple linear regression. The pattern of (standardized) weights constituted the tacit policy for each doctor. Stated policies were measured in a subsequent interview by asking doctors to rate the influence of each cue.*

Results. *Both tacit and stated policies diverged widely between different doctors. Most doctors overestimated the number of cues that had actually influenced their decisions, and many believed that they had taken into account associated factors for coronary heart disease when they had not. On lifestyle related risks doctors were generally less likely to treat overweight people and most stated this as their policy. Most were also less likely to treat smokers but some had the opposite policy. Those less likely to treat smokers were also less likely to treat obese patients. There was also considerable variation in the extent to which the doctors took account of the attitude of the patient to receiving treatment.*

Conclusion. *Doctors' policies are highly variable and particularly inconsistent in the treatment of smokers. Relevant risk factors may be ignored — even though they are understood — because the risk assessment involved is too psychologically complex a task to be performed intuitively. Decision aids and clear protocols are needed in this area.*

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Introduction

THE decision to prescribe lipid lowering agents for patients with raised blood cholesterol levels involves a complex and difficult judgement requiring the doctor to weigh the risk of coronary heart disease against the continuing costs and possible side effects of long-term treatment.[1-4] There is evidence showing that doctors' assessments of cardiac risk may be quite inaccurate.[5] The assessment of risk is complicated by the need to consider a wide range of associated risk factors and the complexity of the medical evidence on the dangers of hyperlipidaemia itself.[1-4] In addition, there are some associated risk factors — particularly cigarette smoking — where the medical risks are well understood, but where there has been some well publicized disagreement in the general media about the policy of treatment which should be followed.

It is important to discover the policies which general practitioners currently follow in the prescription of lipid lowering agents, and the degree to which these policies are sensitive to the relevant risk factors. Previous research into this problem has relied on survey methods[6] which presume that doctors have insight into their prescribing behaviour and can describe it accurately. In contrast, the research described in this paper is based on the methods of social judgement theory[7] which derive tacit policies, in the form of statistical weights, by analysing decisions made over a large number of hypothetical cases in which cues are allowed to vary. Insight can be assessed by interviewing the subjects and asking them to identify the cues which they believe to be influencing their judgements. The method has been used quite widely in medical contexts with consultant groups and with general practitioners in other countries.[8,9] In general this kind of research shows that experts have widely differing policies and rather low levels of insight. Both findings have been demonstrated in a medical context by Kirwan and colleagues' studies of rheumatologists.[10,11]

It is important to explore the application of the methodology of social judgement theory to decision making in British general practitioners, especially in areas such as the treatment of hyperlipidaemia where complex judgements are required. The present study set out to discover both the tacit and stated policies of each member of a sample of British general practitioners in the prescription of lipid lowering agents. The aims were to determine what these policies were, the extent to which different doctors agreed and disagreed with one another, and the degree of insight that individual doctors had into their own decision making, as measured by the correspondence between their tacit and stated policies.

Method

Participating doctors

Thirty five general practitioners practising in or close to the city of Plymouth were recruited as participants in the study, which was conducted between March and June 1993. Recruitment was

achieved by a mailshot to all local doctors followed by personal visits by members of the research team to those who responded. Approximately a quarter of those mailed eventually participated in the study. The doctors varied in age from 31 to 55 years and all but four were men. They were recruited from a variety of different types of practice in both urban and rural settings.

Judgement task

The judgement task was administered via a portable Acorn A4® computer which was custom programmed by J E in BBC *BASIC 5*. Each case was displayed on a separate screen with a series of cue labels on the left (for example, sex, age) and corresponding cue values on the right (for example, male, 45 years of age). The doctors were given on-screen instructions informing them that they would receive 130 cases with information about blood cholesterol levels and a number of other factors. The instructions stated: 'You can assume that in each case you originally tested the patient's blood cholesterol level at least six months previously and have offered the usual advice on alterations to diet and have recommended, where appropriate, that the patient should give up smoking cigarettes. The blood cholesterol level given in the problem is the current one and reflects any changes in the patient's lifestyle that he or she has made or is likely to make.' Doctors were also told by the investigator (C H) to assume that the option of referral to a consultant was not available and thay they had to decide themselves whether or not to prescribe.

The doctors were told that they should indicate the likelihood that they would prescribe in each case by clicking with a mouse on a line between 0% and 100% shown at the bottom of the screen. After clicking, the screen cleared and the next case was presented. Each of the cases which followed provided information on 13 separate cues. These cues and the range of values for each are shown in Appendix 1. Although in real life some of these cues would be correlated with each other, the set of 130 cases which were presented to each doctor was devised by a process of random generation of cue values in such a way as to minimize their intercorrelation (the maximum r between any two cues was less than 0.20). This was done to simplify the interpretation of the weights derived in the subsequent multiple linear regression analysis. The cue values were generated prior to the study by a separate programme with each doctor receiving the same cases in the same order. The occupation cue was coded as social class 1 to 5 but displayed as an example occupation randomly generated from a set of alternatives.

The need for independence in the cues led to the decision to use total cholesterol levels without separate information on the balance between low density and high density lipoproteins which would normally be inspected prior to prescribing lipid lowering agents. The justifications for this were that levels of low density lipoproteins are highly correlated with total cholesterol levels and that doctors are in any case asked only to judge the probability that they would prescribe. Hence, the extra information which they would achieve from lipid profiles is one of the uncertainty factors which their judgements could reflect. No doctors objected to performing the task with the data presented.

Assessment of tacit policies

An initial check for consistency among the doctors was made by computing the Kendall coefficient of concordance (W) across the 130 raw judgements of each doctor. This statistic is a non-parametric test of multiple correlation and can range from 0 (no agreement) to 1 (perfect agreement).

Each doctor's judgements were then entered individually into a multiple linear regression analysis. This is an extension of the familiar regression analysis in which a model is derived in which one dependent variable (in this case the judgement made) is predicted as a function of a number of independent variables (in this case the 13 cues). The analysis results in a set of weights, each indicating the degree of influence of a cue. Where the cues are intercorrelated stepwise linear regression is often preferred. This was avoided here because such intercorrelations had been minimized and the analysis used facilitates comparison between doctors in their usage of cues. The 13 regression weights derived were standardized so as to remove the influence of differences in the original scale values. The weights could thus vary from –1 (maximum negative use of a cue) through 0 (no use of a cue) to +1 (maximum positive use of a cue, that is to the exclusion of all others).

The regression weights were also intercorrelated between cues and across doctors in order to see whether doctors who took account of a given cue were more or less likely to be influenced by another cue.

Assessment of stated policies

On completion of the judgement task the doctors were shown a list of the cues used. For each cue in turn C H described the two endpoints and asked the doctors which would make them more likely to prescribe or if the cue would make no difference. They were then asked to rate each cue to indicate how much of a bearing it had on their decisions from 0 indicating that it had no weight to 10 indicating that it had maximum weight. These weights were assigned a positive or negative sign by C H according to the previous indication of the direction in which the cue endpoints affected judgements. The sign of the subjective decision weights (as for the objective ones) is as indicated in Appendix 1. For example, a positive weighting for 'smoker' means that doctors were more likely to prescribe to a smoker whereas a negative weight means they were less likely to prescribe to a smoker and so on.

The stated policies were elicited by directly asking the doctors which cues they had used on the task just performed. Hence, the degree of correspondence with the objective regression weights is a direct measure of insight or self-awareness on the task.

Doctors were also invited to add any further comments about the task, their reasons for using or ignoring cues and about their general approach to the treatment of hyperlipidaemia.

Results

Objective decision weights (tacit policy)

The consistency check on raw judgements yielded a Kendall W of 0.25 which though significantly non-zero ($P<0.001$) indicates a substantial degree of variation between the doctors in the priority they assigned to treating the different cases presented.

Of the 35 doctors participating 33 provided usable data on the computer presented judgement task, and the results of the regression analyses are shown in Table 1. For each cue the number of doctors who had statistically significant weights (at $P<0.05$) in a positive or negative direction is shown and also the mean weight for all 33 doctors. The cholesterol level was the biggest single predictor of decisions to prescribe lipid lowering agents with a mean weight of 0.38 and a significantly positive weight for 31 of the 33 respondents. There was a considerable variation across the sample in the extent to which other cues were used (Table 1). For example, nine doctors were significantly less likely to prescribe to older patients but the majority were not influenced by the age cue.

Of the associated risk factors for coronary heart disease, only the presence of diabetes (mean weight 0.15) had a substantial effect on decision to prescribe and even here fewer than two thirds of the sample had a significantly positive weight (Table 1). Although the mean weights were positive for hypertension, evid-

Table 1. Objective (regression) and subjective weights given to cues.

Cue	Objective weights: Number of doctors[a] Significant negative direction	Not significant	Significant positive direction	Mean	Subjective weights: Number of doctors Negative weight	Zero weight	Positive weight	Median
Cholesterol level	0	2	31	0.38	0	0	34	9.0
Hypertension	1	25	7	0.06	5	2	27	6.0
Age	9	23	1	–0.07	26	8	0	–6.5
Sex	0	28	5	0.05	0	9	25	2.5
Occupation	0	30	3	0.03	7	24	3	0
Evidence of arteriosclerosis	0	27	6	0.09	0	6	28	6.0
Smoker	11	19	3	–0.09	19	4	11	–3.5
Diabetes	2	11	20	0.15	3	3	28	7.0
Compliance with advice on diet	2	25	6	0.03	1	11	22	5.0
Weight	8	25	0	–0.07	21	8	5	–3.5
Attitude to treatment	0	17	16	0.17	0	7	27	6.0
Family history of coronary heart disease	0	26	7	0.06	0	3	31	7.0
Personality	0	31	2	0	7	20	7	0

[a]Significance levels are computed at 5% two tailed.

ence of arteriosclerosis, family history of coronary heart disease and sex, they were low and each of these cues exerted significant positive influence on decisions for at most seven doctors in the sample.

There were several significant correlations between cues of which the most interesting was a correlation of $r = 0.334$ ($P<0.05$) between smoking and weight. In general, this means that the same minority of doctors who would be less likely to prescribe to smokers would also be less likely to prescribe to overweight patients.

Subjective decision weights (stated policy) and insight

The results of the post-task interview for 34 doctors are also shown in Table 1. These results should be treated as the stated policies of the doctors, that is what they believe to be the cues which determined their decisions. The data are broken down by frequency of negative, zero and positive weights with the median weighting for all 34 doctors also being shown. As with the objective weights, cholesterol level was the most important cue.

Figure 1 presents a scatter chart in which each point represents the subjective and objective weights given by a particular doctor to a particular cue (the scores of all 33 doctors are included). The result is a triangular pattern for both positively and negatively weighted cues. Many cues have both subjective and objective weights near zero, resulting in many points near the origin. As subjective weights rise towards maximum (+10 or –10), however, the distribution of objective weights becomes increasingly spread out. In simple terms, this means that if the doctors say they are not using a cue, they are likely not to be using it. If they say they are using a cue, they may or may not be using it.

Inspection of Table 1 shows that the pattern of insight is different for different cues. For example, while both evidence of arteriosclerosis and family history of coronary heart disease received high subjective weightings, they significantly influenced fewer than a quarter of the doctors' tacit policies. On the other hand, diabetes which received a similar subjective weighting influenced a substantial majority of the tacit policies. Thus, although this cue was much more influential in judgements, doctors appear to lack awareness that this is the case.

Comments of doctors

Table 1 shows that 19 doctors said they were less likely to treat smokers and 11 had significantly negative weightings in the regression analyses. Since smoking is a positive risk factor for coronary heart disease the comments offered in justification of these policies are of interest. The central theme appeared to be that they considered smoking to be a much more serious risk factor than hyperlipidaemia. This led some to say that it was a waste of money and effort to treat the lipid problems because this would be outweighed by the smoking. However, a number of doctors saw the hyperlipidaemia as an opportunity to control the patient's smoking by withholding treatment until their behaviour had been altered. Another commonly expressed view amounted to 'why help someone who is unwilling to help themselves?' On the basis of the reports it also appears that some doctors thought that an acute ethical dilemma was involved in the treatment of smokers whereas others apparently did not.

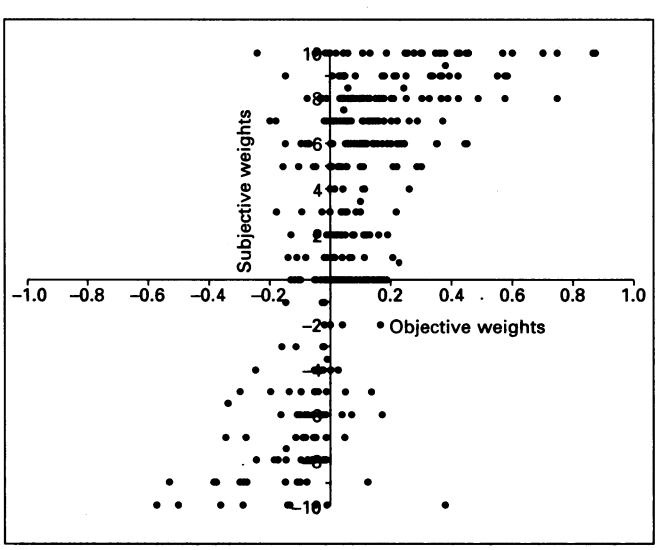

Figure 1. *A plot of subjective against objective weights for each of the 13 cues, for each of the 33 doctors.*

Doctor's comments on the use of protocols or decision aids for treatment of raised blood cholesterol are also of interest. The great majority commented either that they had no such protocol or that they did not follow the ones that were in their possession.

Discussion

This investigation of general practitioners' decisions to prescribe lipid lowering agents using the social judgement theory approach has produced findings broadly compatible with previous research using this methodology.[8] Wide variations between doctors in both their tacit and stated policies for prescribing and a fairly low level of insight have been found. In general doctors believed they used many more cues than they actually did. However, this lack of insight does not account for the policy differences. Even in stated policies, there was considerable variation between doctors in their beliefs about how information should be used with regard to prescribing.

For those associated risk factors for coronary heart disease which are not directly within the control of the patient, namely hypertension, evidence of arteriosclerosis, sex, diabetes and family history of coronary heart disease, while a substantial majority of doctors stated that they took these factors into account, with the exception of diabetes fewer than a quarter of the sample had significant objective weights for any of these cues. This disparity between tacit and stated policies is of considerable importance. A plausible interpretation is that while doctors know that these risk factors are medically relevant, the task of weighing all these factors when making their decisions to prescribe is simply too psychologically complex and defeats them. It is known from psychological research that people, including experts, can only consider a limited number of cues in making judgements[12] and that people have great difficulty in forming accurate assessments of risks and probabilities.[13]

Two associated risk factors which are lifestyle related are smoking and obesity. Both tacit and stated policies were markedly different for these factors compared with those considered above. No doctor was more likely to prescribe to an overweight patient and eight had significantly negative weightings, meaning that they were less likely to prescribe to an overweight patient who was equal on other risk factors (21 doctors also stated that this was their policy). The justification for this might be that the patient could lower his or her cholesterol level by losing weight, without the need for drug treatment. The case of cigarette smoking is more interesting, however, since smoking raises associated risk but does not affect the blood cholesterol level directly. Since smoking is seen as a choice of the patient, the doctor might decide not to prescribe lipid lowering agents simply because the smoking behaviour in itself takes the patient over some threshold level of risk. This would result in smoking being effectively ignored as a risk factor and given a zero weighting. In fact, three doctors had a significantly positive weighting for smoking, treating it as risk factor which increased the argument for drug treatment, 19 doctors ignored smoking as a factor and 11 had a significantly negative weighting. Subjectively, 19 doctors said they would be less likely to treat smokers, although 11 said they would be more likely to do so.

The suggestion of a moral dimension in doctors' attitudes is supported by the finding of a significant correlation between the doctors who were less likely to prescribe to smokers and those who were less likely to prescribe to patients who were overweight. Doctors therefore differed with respect to their treatment of self-inflicted risks. A variety of explanations were offered in the post-task interview by those doctors who penalized smokers. The other indication of difference between doctors on non-medical grounds was the way they responded to the 'attitude to treatment' cue. The sample was split in half here — 16 were more likely to prescribe to patients who were requesting the treatment while 17 ignored the wishes of the patient. The occupation and personality cues were largely ignored.

These findings have serious implications for medical practice in this area and the training of general practitioners. First, it is hard to reconcile both the wide variation in policy and the general neglect of associated risk factors that have been observed with a generally effective treatment of hyperlipidaemia by doctors. Secondly, it has been shown that while education by normal verbal communication (for example, lectures, textbooks) may increase doctors' awareness of relevant factors this may not necessarily impact on their actual prescribing decisions. There is a strong case for implementation of well defined clinical guidelines, preferably backed by risk assessment aids.

Appendix 1. Cues presented to doctors in order shown.

Cue	*Range of values (negative to positive)*
Cholesterol level	6.5–8.0 mmol l^{-1} (step 0.1mmol l^{-1})
Hypertension	No/yes, well controlled/yes, poorly controlled
Age	30–60 years (step 1 year)
Sex	Female/male
Occupation	Social class 1–5
Evidence of arteriosclerosis	No/yes
Smoker	No/occasional/regular/heavy
Diabetes	No/yes, well controlled/yes, poorly controlled
Compliance with advice on diet	No/some/yes
Weight	Under/normal/over/obese/very obese
Attitude to treatment	Opposed/cautious/open to advice/requesting treatment
Family history of coronary heart disease	No/second degree relative/first degree relative
Personality	Cooperative/passive/demanding

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