CARDIOVASCULAR MEDICINE

Predictors of patients' preferences for treatments to prevent heart disease

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Objectives: To determine the relationship between expressed preferences for drug treatment to prevent coronary disease and several participant and general practitioner characteristics among patients attending coronary risk screening.

Design: Face-to-face interviews with patients. At the first interview, a researcher asked participants to imagine six scenarios representing different levels of pretreatment five-year coronary risk. In each case they were asked whether they would choose treatment that would reduce their coronary risk by 30% of pretreatment risk. At the second interview participants were told their coronary risk and asked whether they would choose treatment. Sociodemographic variables were collected to investigate their relationship to patients' treatment preferences.

Participants: Patients identified as likely to be at high coronary risk were invited to attend for risk screening and to participate in the study.

Setting: 13 practices in the West Midlands.

Results: Participants' preferences varied widely: at the first interview 112 (55.2%) of 203 participants preferred treatment at 3% five-year coronary risk but 31 (15.3%) preferred no treatment even at 30% five-year coronary risk. Age, sex, education and drug treatment history did not affect preferences, but lower social class was associated with preferring treatment at lower risk. Preferences expressed at the second interview were generally consistent with preferences at the first interview ($\kappa = 0.510$, 95% CI 0.380 to 0.639).

Conclusions: Patients attending for coronary risk screening express stable preferences for drug treatment to prevent coronary heart disease. Their preferences vary widely and may be associated with social class.

Coronary heart disease is a major cause of morbidity and mortality in the UK.¹ Effective preventive treatments require many patients to take drugs so that a few can benefit. As individual patients' attitudes probably vary—both to taking drugs and to their risk of coronary heart disease—their preferences for treatment are also likely to vary.

Any individual person's risk reduction with treatment is the difference between his or her pretreatment coronary risk and the coronary risk on treatment. Coronary risk on treatment is the product of the person's pretreatment risk and the relative risk associated with that treatment.² For two common preventive treatments, the relative risk is approximately 0.7: treatment with a statin and primary prevention with aspirin.³⁻⁴ For either of these treatments the benefit is therefore a 30% reduction in risk of coronary heart disease. The great majority of patients who take statins or aspirin do not experience adverse effects.⁵⁻⁶ The principal disadvantages of treatment are therefore medicalisation, the need to take drugs and the need to attend follow up appointments twice a year.

It is important to understand patients' preferences for a number of reasons. Guidelines for the use of statins are under review in the United Kingdom.⁷ Guidelines that fail to weigh up the benefits of treatment against the associated disadvantages may make recommendations that have a net detrimental effect on health. Patient preferences influence compliance and therefore influence the effectiveness of preventive treatments.⁸⁻¹⁰ Engaging patients in health care is both a policy goal and good practice.¹¹⁻¹²

Previous research on patients' preferences in relation to prevention of coronary heart disease has several weaknesses. A postal survey presenting benefits as numbers needed to treat found lay people less likely than professionals to prefer

treatment.¹³ A Canadian study assessed the preferences of patients already taking treatment,¹⁴ but its results may not apply to people deciding whether to start treatment. A UK study included both patients already taking and patients not taking treatment.¹⁵ However, participants were given no information on the magnitude of risk reduction that was plausible and were simply asked to indicate on a semilogarithmic scale the level of risk reduction at which they would consider taking a drug. This method of eliciting threshold risk reductions also relies on a gain framing: stating the outcome as an increased probability of healthy survival, rather than a decreased probability of illness. Gain framing is likely to decrease and loss framing to increase the uptake of a preventive intervention.¹⁶ A similar approach was used in a second UK study.¹⁷ None of the previous studies formally assessed participants' comprehension.

This paper reports the treatment preferences of patients considering starting drugs to prevent coronary disease. The study aimed at drawing participants from a population of patients likely to attend for cardiovascular risk screening, as this population's preferences are more relevant to clinical practice than those of the general population. The objective was to determine expressed preferences in a population typical of those seen by general practitioners who are identifying patients for primary prevention and to determine the main sociodemographic predictors of patients' preferences.

METHODS

Participants

In 13 general practices in the West Midlands, patients aged 35-74 years without diagnosed cardiovascular disease and not known to be taking preventive treatments were identified

from electronic practice records. This was typically a third of the patients on the practice register. To identify those most likely to benefit from treatment, patients were then ranked in descending order of age (for men) and age minus 12 (for women). Average coronary risk of women is about the same as that of men 12 years older.^{18, 19} This method therefore provided a list of patients ranked by their coronary risk. The highest 50 ranked patients in each practice were mailed a letter inviting them to attend the practice for coronary risk screening and to participate in the research study. If sufficient patients did not respond to the 50 invitations, further letters were sent until either a prearranged quota was reached for each practice or the practice felt unable to participate further. This resulted in a sample of participants similar to those likely to take part in cardiovascular risk screening.

Sample size

For the findings of multivariate analysis to be stable, 20 data points per degree of freedom are required.²⁰ The explanatory variables have seven degrees of freedom: the sum of two variables with one degree of freedom (sex, age), one with three degrees of freedom (ethnicity: white, South Asian, black, other) and one with two degrees of freedom (social class: three categories). This requires a sample size of at least 140.

First interview

Patients who agreed to participate in the study booked an appointment with the researcher on the same day that they visited the practice for coronary risk assessment. At this first interview, the researcher obtained written consent and participant characteristics: age, sex, ethnicity, social class based on the registrar general's classification,²¹ age at which the participant left formal education and whether the participant was already taking prescribed drugs.

Risk scenarios

Participants were then asked to imagine that their doctor was offering them a drug that reduced their pretreatment coronary risk by 30%. They were told the prognosis of a coronary event: three in 10 recover fully, five in 10 survive but are restricted in their usual activities (usually because of chest pain or shortness of breath), and two in 10 die. Prognostic information was based on data provided by the Framingham team at Boston University (L Sullivan, personal communication). Participants were informed that disadvantages of treatment were biannual clinic visits and annual blood tests, but that adverse effects were rare.

Participants were presented with six scenarios representing six levels of pretreatment five-year coronary risk. For each scenario they were asked to indicate whether they would accept treatment to reduce their risk by 30%. Information was presented in words and figures in the form of a PowerPoint presentation. Because the probability of a single event (such as 30% risk of a coronary event) is better understood when expressed as a frequency, all probabilities were expressed as frequencies in 100 patients.²² To mitigate framing effects—avoiding the charge that we were trying to influence the decision in one way or another—coronary risk was presented as both the number of people in 100 who would and the number who would not have a coronary event in the next five years. To take account of order effects, two counterbalanced presentations were prepared, one presenting the scenarios in descending order of coronary risk and the other in ascending order.²³ Participants were randomly allocated to receive one of the two presentations. The PowerPoint presentation was piloted and developed at one practice. Participants viewed the presentation alongside the

researcher, who provided brief explanations. At the end of each presentation, two questions tested participants' comprehension of the numerical risk information. Participants were asked to choose between two otherwise identical treatments that reduced coronary risk by different amounts. Participants who chose the treatment that reduced risk more on both occasions were judged to have understood the numerical information. (Details are provided in the appendix and in fig 2 in the appendix.)

Second interview

After the coronary risk assessment, participants returned to attend their practice to be informed of their coronary risk and to discuss possible treatment. After this visit they were interviewed again to determine whether they would accept treatment at their current five-year coronary risk. Participants who accepted treatment despite having a risk level below the level at which they declined treatment at the first interview (or who declined treatment at a risk above the level at which they accepted treatment at the first interview) were invited to comment on why they had changed their mind.

Data on patients' psychological characteristics and their views on treatment were obtained during semistructured interviews and are reported separately. Quantitative data were entered into SPSS V.11.0 (SPSS Inc, Chicago, Illinois, USA) and analysed by using appropriate non-parametric tests.

RESULTS

All main UK ethnic groups and social classes were represented among participants: the largest ethnic group was white at 81.3% (n = 165) and the largest social class was III manual at 39.6% (n = 80). Eighty-seven per cent (n = 177) of participants were men, and the median age was 65 years. In 49.7% (98 of 197) of participants five-year coronary risk was $\geq 7.5\%$, indicating a high prevalence of treatment eligibility according to British guidelines current at the time of the survey²⁴ (table 1).

Table 1 Characteristics of participants

Men	177 (87.2%)
Median age (range) (years)	65 (41–75)
Retired	126 (62.1%)
Mean (SD) age at which left full time education (years)	15.5 (3.6)
Long-term oral drugs	70 (34.5%)
Number to whom risk scenarios presented from high risk to low risk	108 (53.2%)
Ethnicity	
White	165 (81.3%)
South Asian	21 (10.3%)
Black	12 (5.9)
Other	5 (2.5%)
Social class (from 202 respondents)	
I and II	62 (30.7%)
III	14 (6.9%)
III manual	80 (39.6%)
IV	33 (16.3%)
V	13 (6.4%)
Comprehension score	
2	117 (62.6%)
1	34 (18.2%)
0	36 (19.3%)
Five-year coronary risk	
<7.5%*	99 (50.3%)
7.5–15%†	74 (37.6%)
>15%‡	24 (12.2%)

*Drug treatment not normally recommended under joint British recommendations.

†May be offered drug treatment under joint British recommendations.

‡Should be targeted for drug treatment under joint British recommendations.

Table 2 Cumulative numbers and percentages of participants stating that they preferred drugs in the first and second interviews

	Social class				
Five-year coronary risk	I & II	III	IV & V	Not known	Total
First interview					
3%	23 (37.1%)	55 (58.5%)	33 (71.7%)	1 (100%)	112 (55.2%)
6%	27 (43.5%)	58 (61.7%)	34 (73.9%)	1 (100%)	120 (59.1%)
10%	33 (53.2%)	67 (71.3%)	37 (80.4%)	1 (100%)	138 (68.0%)
15%	38 (61.3%)	73 (77.7%)	40 (87.0%)	1 (100%)	152 (74.9%)
20%	43 (69.4%)	77 (81.9%)	43 (93.5%)	1 (100%)	164 (80.8%)
30%	44 (71.0%)	83 (88.3%)	44 (95.7%)	1 (100%)	172 (84.7%)
Declined at 30%	62 (100%)	94 (100%)	46 (100%)	1 (100%)	203 (100%)
Second interview					
3%	17 (30.4%)	38 (44.7%)	21 (53.8%)	1 (100%)	77 (42.5%)
6%	23 (41.1%)	45 (52.9%)	24 (61.5%)	1 (100%)	93 (51.4%)
10%	29 (51.8%)	55 (64.7%)	31 (79.5%)	1 (100%)	116 (64.1%)
15%	36 (64.3%)	66 (77.6%)	36 (92.3%)	1 (100%)	139 (76.8%)
20%	41 (73.2%)	71 (83.5%)	37 (94.9%)	1 (100%)	150 (82.9%)
30%	41 (73.2%)	76 (89.4%)	38 (97.4%)	1 (100%)	156 (86.2%)
Declined at 30%	56 (100%)	85 (100%)	39 (100%)	1 (100%)	181 (100%)

First interview

Two hundred and three participants expressed preferences at the first interview: 112 (55.2%) said they would accept treatment at 3% five-year coronary risk (the lowest risk); and 31 (15.3%) declined treatment at 30% five-year coronary risk (the highest risk) (table 2).

Preference at the first interview was not associated with participants' age, sex or the age at which they left full-time education. It was not affected by the order in which scenarios were presented ($p = 0.563$ by Mann-Whitney U test); whether the participant was already taking prescribed drugs ($p = 0.347$ by Mann-Whitney U test); or comprehension score ($p = 0.830$ by Kruskal-Wallis test).

White and other ethnic groups were combined because of the small numbers in the "other" category. South Asian ethnicity was associated with a preference for treatment at lower risk than white or black African-Caribbean ethnicity ($p = 0.042$ by Kruskal-Wallis test).

Multivariate Cox regression analysis was undertaken, treating patients who preferred no treatment at 30% risk as censored data. When using this approach, a positive

coefficient indicates a greater probability of declining treatment at any given level of risk. Age, sex, social class and ethnic group were entered as covariates and non-significant ($p > 0.05$) covariates were eliminated in a backwards stepwise fashion (likelihood ratio method). Social class significantly predicted preference at a lower coronary risk, but South Asian ethnicity did not.

Second interview

Of 181 participants who had a second interview, 98 (54.1%) would accept treatment at their current five-year coronary risk. Seven participants who expressed a preference for treatment at 3% five-year coronary risk at the first interview were at less than this risk level. As we cannot know whether their preferences at the second interview were consistent with those at the first interview, their results were excluded in calculating κ scores. Of the remaining 174 participants, 132 expressed preferences at the second interview (after they knew their coronary risks) consistent with their preferences at the first interview. Cohen's κ was 0.510 (95% confidence interval 0.380 to 0.639) indicating moderate agreement. Of the 42 participants whose preferences at the second interview were not consistent with their preferences at the first interview, 26 declined treatment at a coronary risk higher than at the first interview and 16 participants accepted treatment at lower coronary risk. Participants who changed preferences at the second interview were not significantly different in age, sex, comprehension score or five-year coronary risk from those who did not change. The great majority ($n = 32$) of those who changed preference gave a reason for having done so: the most common reason was the advice of a health professional ($n = 10$).

DISCUSSION

Participants' preferences elicited after they knew their coronary risk were generally consistent with their preferences before they knew their risk. This suggests that participants' preferences were considered opinions and showed a degree of stability. Levels of comprehension were similar to those reported by nurses in a postal survey that used similar methods.²⁵ Nevertheless, preferences for preventive treatments varied widely among participants. Analogous findings have been reported for patients with angina, with considerable individual variation in their treatment preferences.²⁶

Most participants preferred treatment at the lowest coronary risk (3% five-year risk equivalent to 1% reduction in five-year risk) and the majority indicated that they wanted

Figure 1 Probability of preferring no treatment at each five-year coronary risk by social class (survival function).

treatment. As most men over 55 and women over 65 are at greater than 3% five-year coronary risk, it suggests that most older people who attend for coronary risk screening would accept treatment with aspirin, a statin or even a polypill.⁶ However, not all of these patients would have had treatment recommended under guidelines current at the time of the study.²⁴

The high preference for preventive treatments at a low level of risk contrasts with earlier studies. In these, median responses were to prefer treatment at five-year mortality reduction of 3%¹³ or five-year coronary risk reduction of 1.5% to 4%,¹⁴ 20%¹⁵ and 25%.¹⁷ Earlier studies provided different information about adverse effects. One study stated that long-term side effects were unknown¹⁷; two studies did not mention adverse effects^{13, 15}; and one study comprehensively described their frequency and nature.¹⁴ Some of these studies were on patients,^{14, 15} others were on non-patients,^{13, 17} but these differences do not explain their different results. One possibility is that participants responding to an invitation to attend for coronary risk assessment are a self-selected group who are more enthusiastic about treatment. The clinical (primary care) setting and use of face-to-face interviews may also have influenced responses.

Clinicians' preferences do not correspond to those of individual patients: 14% of clinicians recommend treatment at 3% five-year coronary risk.²⁵ Joint British recommendations pay little attention to individual preferences and it is unclear whether the risk threshold for treatment has been chosen on the basis of weighing up health effects alone or both health effects and resource costs.²⁴ There are clear tensions between a public perspective (using public resources to do the greatest good for the greatest number) and an individual perspective (to offer each patient what is best for him or her). Guidelines could usefully distinguish between the public perspective and the individual perspective. For example, a publicly funded service may offer free preventive treatment only to patients above a risk threshold but allow such patients to decide whether they prefer treatment. Patients below the risk threshold could choose to pay for their own preventive treatment.

The small scale of this study means that we cannot draw firm conclusions from the results. Nevertheless, although individual participants' preferences varied considerably, preferences were not predicted by age, sex, years of education or whether the participant was already taking drugs.

Among these participants social class was associated with treatment preference: one quarter of social classes I and II would decline treatment at twice the coronary risk specified in recent UK guidelines.²⁴ This is the risk of a 74-year-old man who smokes and has diabetes, blood pressure of 162/92 mm Hg and a raised total to high density lipoprotein cholesterol ratio of 6.0.²⁷ Our finding contrasts with the observation that suburban patients accepted treatment at lower risk levels than other patients.¹⁷ However, this study used somewhat different methods. Conventional views on social class and time preference do not explain these findings. The health benefits of preventive treatment have a low probability and occur in the future, but they are large. The disadvantages of treatment are smaller, are more certain and occur in the present. As higher social classes tend to defer gratification²⁸ we may expect them to show a greater preference for treatment. There are three possible explanations, each of which may play a part. Lower social classes may perceive the benefits of treatment to be greater, perhaps because of greater concern about or personal experience of illness or greater belief in the effectiveness of medical treatment. There is evidence that personal experiences and experiences of friends and relatives may weigh more heavily than information provided on risk.²⁹

Higher social classes may perceive the disadvantages of treatment to be greater, perhaps because of scepticism about the effectiveness of treatment. Social classes have differing perceptions of whether they are under a moral obligation to take preventive treatment: higher social classes may take more autonomous decisions and lower social classes may perceive that it is their duty to take treatment if it has health benefits. This pattern would concur with recent patterns of uptake of childhood measles, mumps and rubella immunisation among different social classes.³⁰

Our study was designed to obtain a sample of participants similar to patients attending for primary prevention of coronary heart disease in general practice. However, this confers some limitations. Patients invited to attend were mainly middle-aged and older men—not representative of the general population. Those who attended were sufficiently motivated to attend for coronary risk screening. We have no information about non-responders or their preferences for preventive treatments. This limits the generalisability of these findings to the wider population.

Conclusions

It is possible to elicit stable preferences from patients in relation to whether they wish to take treatments to preventive coronary heart disease. Patients' preferences vary widely and are not predicted by sex, age, education or experience of long-term drug treatment. Preferences may be influenced by social class and this merits further research. As patients' preferences vary widely, but can be elicited, it is inappropriate for guidelines to set a single risk level for treatment. Allowing patients to determine whether they prefer preventive treatment will result in more individually optimal treatment decisions.

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TM conceived the idea that was developed by SB, PG, SG and KG. KG collected the data. TM wrote the first draft and all authors contributed to the final version.

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APPENDIX

Participants were presented with six scenarios representing six levels of pretreatment five-year coronary risk. For each scenario participants were told the pretreatment risk, risk with treatment and reduction in risk due to treatment. A PowerPoint presentation was used to present pretreatment risk, risk reduction and risk with treatment in words and in numbers, supported by decision aids (bar charts) (fig 2).

Your chances of getting heart disease without treatment

If you do not take tablets

- The chance you will get heart disease in the next 5 years is about 20 in 100
- This means the chance you will **not** get heart disease in the next 5 years is about 80 in 100

Your chances of getting heart disease with treatment

If you take tablets

- The chance you will get heart disease in the next 5 years is about 14 in 100
- This means the chance you will **not** get heart disease in the next 5 years is about 86 in 100
- This means tablets reduce your chances of getting heart disease by 6 in 100

What may happen to 100 people like you over the next 5 years?

Figure 2 Decision aids to illustrate risk reduction with treatment.