

Cardiovascular risk scores:

qualitative study of how primary care practitioners understand and use them

Abstract

Background

The National Institute for Health and Care Excellence guidelines and the Quality Outcomes Framework require practitioners to use cardiovascular risk scores in assessments for the primary prevention of cardiovascular disease.

Aim

To explore GPs understanding and use of cardiovascular risk scores.

Design and setting

Qualitative study with purposive maximum variation sampling of 20 GPs working in Oxfordshire, UK.

Method

Thematic analysis of transcriptions of face-to-face interviews with participants undertaken by two individuals (one clinical, one non-clinical).

Results

GPs use cardiovascular risk scores primarily to guide treatment decisions by estimating the risk of a vascular event if the patient remains untreated. They expressed considerable uncertainty about how and whether to take account of existing drug treatment or other types of prior risk modification. They were also unclear about the choice between the older scores, based on the Framingham study, and newer scores, such as QRISK[®]. There was substantial variation in opinion about whether scores could legitimately be used to illustrate to patients the change in risk as a result of treatment. The overall impression was of considerable confusion.

Conclusion

The drive to estimate risk more precisely by qualifying guidance and promoting new scores based on partially-treated populations appears to have created unnecessary confusion for little obvious benefit. National guidance needs to be simplified, and, to be fit for purpose, better reflect the ways in which cardiovascular risk scores are currently used in general practice. Patients may be better served by simple advice to use a Framingham score and exercise more clinical judgement, explaining to patients the necessary imprecision of any individual estimate of risk.

Keywords

primary health care, cardiovascular diseases, risk assessment, qualitative research.

INTRODUCTION

Cardiovascular risk scores are used to predict a person's risk of developing a cardiovascular event in a specific time period from risk factors determined from history, physical examination, or investigations. They have received increasing attention by policy makers and practitioners in recent years. GPs in the UK are incentivised by the Quality and Outcomes Framework to use an 'agreed risk score' in all patients to inform their decision to prescribe medication for the primary prevention of stroke or heart attack.¹ However, it is no longer clear what risk score is 'agreed'. The clarity of the early guidance on what risk scoring system to choose and how to apply it in practice has been lost; for example, in 2010 the National Institute for Health and Care Excellence (NICE) withdrew their firm recommendation to use a Framingham-derived score.² Moreover, both formal and informal medical literature has questioned the usefulness of the 10-year risk scores in common use. The *BMJ* has devoted substantial space to QRISK[®] and in August 2011 the newspaper *Pulse* reported that a score based on lifetime risk was now favoured by both NICE and the responsible expert committee.³⁻⁶

Informal discussion with GP colleagues suggested that a score based on a study done 50 years ago in another country must be out-of-date. Additionally a commonly

expressed view was supported by a previous study reported in this journal:⁷ that any risk score based purely on physiological measurements and reported smoking habit would underestimate the real cardiovascular risk in areas of social deprivation. However, these informal views did not appear to be based on a very clear understanding of the differences between the cardiovascular risk scores or how they had been derived. They also revealed a substantial variation in the way that colleagues used the risk scores in their consultations. This is a formal qualitative study to explore and expose these important issues.

METHOD

This study involved one-to-one, semi-structured interviews of GPs working in Oxfordshire, UK. Postal invitations were initially sent out to 222 practitioners from a list compiled from the Thames Valley Primary Care Agency and practice websites; those who volunteered to be interviewed were also asked to suggest potentially interested colleagues to whom a further invitation was sent by e-mail. Recruitment continued until data saturation, a theoretical point achieved when no additional data is being found,⁸ which was achieved after 20 interviews. Participants were aged 32-61 years; four were female. Most participants were profit-sharing partners in the practice, three were

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How this fits in

All GPs in the UK are now required to use cardiovascular risk scores in their clinical practice but informal discussion suggested variability in how they are interpreted and used. Only one previous qualitative study outside the UK has explored this issue and the findings suggest considerable confusion in understanding and variability in practice. National guidance does not appear to be fit for purpose as it has become increasingly complex while failing to reflect how practitioners are actually using the scores and the advice that they need. Patients would be better served by simple advice to practitioners to use a Framingham score and exercise more clinical judgement, explaining to patients the necessary imprecision of any individual estimate of risk.

salaried partners and one was a registrar. All participants used on-desk computers for record keeping in the consultation and so had access to electronic versions of the risk scores.

Data collection

Interviews were conducted at the participant's workplace or home depending on their preference. The interviews lasted between 30 to 60 minutes, were audiorecorded and transcribed verbatim using study codes to keep the identities anonymous. An interview guide was used with a list of open-ended questions covering broad themes (Appendix 1). Participants were allowed to diverge into new directions with interesting diversions followed up by further exploration from the interviewer. An iterative approach was used whereby later questioning was informed by the use of answers from earlier interviews. The interviews were conducted by a GP who was not practising in the UK and therefore unfamiliar with local practice.

Data analysis

The transcripts were checked for accuracy. After repeated reading of the transcripts, the text was coded independently under different headings by two coders, using a thematic approach to analysis. The few discrepancies in coding were resolved by discussion. Once coding was finished, a written and graphical summary of the issues was created for each code using the OSOP (one sheet of paper) method⁹ where every section of data relevant to that code from all the different interviews is noted. Analysis was performed by two researchers, one clinical (the non-

UK GP) and one non-clinical. The software package NVivo9 facilitated the analysis of themes and systematic comparison across transcripts. Given the volume of data and the main objective of this study, detailed analysis focused on the use of cardiovascular risk scores to inform treatment decisions.

RESULTS

What do practitioners say the risk scores predict?

All the participants expressed that they perceived the calculated risk to be the patient's risk prior to any modification by treatment or lifestyle change, and that this is what they communicate to patients:

GP7: *[This is the risk] over the next 10 years [if he remains] as he is, that's what I've taken it to be. If he stays as he is. And if we can change some of those things, we can reduce that risk for him.'*

GP10: *'I suppose I would see it as the risk if no intervention was made, if there was, you know, assuming these parameters, this blood pressure, and this lipid profile, if that is unmodified, this is your risk over the following 10 years.'*

However, when encouraged to reflect on whether the scores did in fact assess this unmodified risk, when many of such scores had been derived from populations whose identified risk had been treated, considerable uncertainty was expressed by participants:

GP3: *'It's obvious when you think about it, that there's an issue about how treatment is going to change outcomes. And that'll interfere with prediction.'*

GP6: *'People being treated while they're being observed — even just lifestyle treatment can make a huge difference. And we're all far more health conscious than we were 50-years-ago. So yes, I think that is a strong case in favour of the older [risk scores].'*

GP8: *'So you take your population at year zero, you follow them all through but you don't actually know who's been treated. Oh gosh, yes, so that actually brings huge inaccuracy into the risk scores then.'*

Two of the participants explicitly reflected on the difficulties faced by those constructing risk scores in allowing for the effect of treatment in modern study populations. One of them noted the impossibility of having the perfect risk score, calling it a 'Utopia':

GP17: *'I kind of assumed that, maybe naively, that the data is updated ... I wouldn't pretend to understand ... I think intuitively it makes*

sense that the older data is probably going to be more useful but I don't know.'

GP18: *'If someone's on blood pressure treatment, do you say that treatment of blood pressure reduces [the assessed risk] by two thirds and therefore you need to modify for the third as not being attenuated? It's all very, very grey, isn't it?'*

Do practitioners use risk scores in patients already on treatment?

The participants expressed conflicting views on whether the risk scores could be used in patients who had already received risk factor lowering treatment or lifestyle advice. Some felt that the risk scores were not designed for this use and therefore not valid. One doctor, who also worked with a private healthcare provider alongside his GP work, mentioned that the private organisation specifically instructed its doctors not to use the risk scores in patients who were already on treatment:

GP6: *'No ... I say, "This is your risk ... Let's lower your blood pressure, let's lower your cholesterol and see how you go". End of story is carry on with the treatment.'*

GP7: *'Once they're on it, I ignore, I don't do it. Well, it doesn't work afterwards anyway. Once you're on treatment, it's no longer valid, is it?'*

However in the past GPs have used cardiovascular risk charts to show how changing risk factors may influence risk (for example, using the charts in the back of the *British National Formulary* to show how they would be in the green rather than red zone if they were a non-smoker rather than smoker) and one participant said explicitly that he used the risk scores to help patients on treatment to 'understand' cardiovascular risk, although he added that 'the evidence behind that is less clear, isn't it?'

Participants also seemed to discriminate between assessing initial risk in patients who may have received prior treatment or lifestyle advice, and using risk scores to monitor the effect of treatment on risk:

GP4: *'[Risk scores are] more useful in determining whether you start somebody on treatment, not to monitor. Once you've got somebody on treatment, you can't really use it to work out their risk.'*

GP13: *'Obviously it gets quite complicated when you talk about, you know, is the risk the same if you're on treatment. But I tend to look at it that this is the risk that depends on your cholesterol level, your blood pressure whatever, whether or not you're on treatment.'*

How do practitioners take account of treatment?

A number of participants felt that when they used the risk scores in patients who had already received treatment they should make some adjustment to the assessed risk:

GP1: *'I do a sort of rough adjustment when that situation arises.'*

GP3: *'That's something I've never clarified. Do you use their pre-treatment blood pressure or their treated blood pressure and once they're on treatment, is their treated blood pressure all you need to know, or should you also put in they're hypertensive and that? Well, you do put that in. I don't know.'*

GP11: *'So what number should you put in? Should you put their pre-treatment cholesterol in?'*

Participant GP4 believed that the worst blood pressure and cholesterol reading should be used to work out the risk. Another participant felt that using pre-treatment values was unfair because treatment decreases risk with time even though he recognised that the true risk may be higher due to a history of exposure to higher levels of risk factor:

GP14: *'I know some people advocate using baseline, you know, pre-treatment values to calculate it. I think that's slightly unfair because I think your risk does fall with ... the whole reason we treat is your risk does fall with time if you're established on treatment and I don't think I have the time or energy to say "Well, this person has been on treatment for 6 years but that person's only been on treatment for 2 weeks". So I mean, it's a murky compromise using actual readings but that's what we do.'*

How do practitioners choose which score to use?

A number of participants said that they used a Framingham-derived score for patients who were not treated and QRISK for those on treatment. Some participants believed that Framingham could only be used on those who were treatment naïve whereas QRISK could or should be used in those who were already on treatment:

GP1: *'Well, I know the Framingham is supposed to be a pre-treatment risk. I think QRISK is different in that it gives you the risk on that specific day treated.'*

GP19: *'And also importantly, it [QRISK] also includes patients that have got treated hypertension and in practice, a big prescribing*

decision obviously is when patients are already on hypertensive treatment, about making the decision about whether they should go on and have statins etc. And again the problem with the Framingham risk score is not being able to do that, whereas with QRISK obviously, that takes that into account.'

However, most participants expressed uncertainty about which risk score to use. Participant GP19 quoted immediately above went on to ask whether his belief that Framingham was not supposed to be applied to treated patients was correct.

Do practitioners think score accuracy matters?

Although a number of participants were very concerned about what they perceived to be a lack of clarity in the application of risk scores, others took a contrary view. They saw a risk score as something simple to use pragmatically and expressed little interest in taking account of treatment or any other perceived complexity in its application:

GP15: *'I probably do it at an even more basic level than that [taking account of treatment] ... I kind of use it really as a very simple decision making tool at that kind of level, rather than trying to go into as much detail as you're sort of implying.'*

GP 19: *'My understanding is much more simplistic. It is what their current level of risk is at this precise moment.'*

This emphasis on pragmatic simplicity rather than accuracy may seem surprising as the risk is communicated to patients who take it at face value. However, it may reflect practitioners' understanding of the limited power of any risk score to make an individual prediction of risk highlighted in some guidelines.

DISCUSSION

Summary

The main finding of this study is the variation, and considerable confusion, among GPs in the use of cardiovascular risk assessment scores. GPs use them primarily to estimate (and communicate to their patients) their risk of a vascular event if they remained untreated. Therefore they want the best possible estimate of pre-treatment risk and need simple guidance on how to adjust this estimate for any existing drug treatment or other prior modification of risk. The current guidance does not appear to address very effectively these difficulties experienced by practitioners in using the scores in everyday practice.

The current situation, where NICE has withdrawn its guidance to use a Framingham-derived score to allow practitioners to make their own decision, is challenged by this study's findings. The simplicity of a national recommendation to use a score derived from an untreated population to estimate and communicate untreated risk has been lost. The participants were very unclear about the differences between scores and the benefits and drawbacks of more recent scores derived in partially treated populations. They also exhibited substantial variation in opinion about whether they could legitimately use any risk score to show patients the change in risk from treatment and, if so, how best to do that. The recommendation of new scores predicting lifetime rather than 10-year risk seems likely to further complicate what is already a poorly understood choice.

The uncertainty expressed about the use of risk scores in patients on treatment may reflect changes in advice over time. The guidance by the Joint British Societies' risk charts first published in the *BMJ* in 2000 stated simply that risk scores 'should not be used to estimate risk after treatment of hyperlipidaemia or blood pressure has been initiated'.¹⁰ However, the two-page 'How to use the risk prediction charts' section in the *British National Formulary* reflects the 2005 Joint British Societies guidance to estimate cardiovascular disease risk retrospectively, stating that 'unless recent pre-treatment risk factors are available it is generally safest to assume that [cardiovascular disease] risk is higher than predicted'.¹¹ Criticism about the potential inaccuracy of estimated risk has also led to an increasing number of qualifications in guidance about the use of risk scores in different sub-groups which may have exceeded the attention span of many users.

Strengths and limitations

The use of a qualitative approach in this study allowed practitioners to express the issues that were important to them, flagging up in particular their uncertainty about how to use risk scores when patients had already modified their risk to some extent through lifestyle modification or treatment. It also allowed exploration of the thorny issue of choice between risk scores and whether doctors believed they were communicating to patients the risk before or after risk modification. It is unlikely that the same issues would have been highlighted if a quantitative approach had been used.

The weakness of the study is that all participants were from practices in Oxfordshire (where general practice is well

staffed), came from a restricted demographic group (mainly white males and profit-sharing partners), and probably agreed to participate because they found the issue of interest. So despite the intention to purposively sample to obtain a maximum diversity sample, this was achieved only in terms of age and practice size. It seems likely that participants would have been more enthusiastic and knowledgeable about cardiovascular risk scores than the average GP in the UK or elsewhere. A true maximum variability sample is likely to have discovered less enthusiasm for risk scores and more misunderstanding.

Comparison with existing literature

This is the first study that specifically looked at the issue of treatment in cardiovascular risk assessment. Studies in this area have mainly concentrated on determining the percentage of doctors who use the risk scores and therefore have been mostly large surveys of doctors.¹²⁻¹⁵ There have been a few qualitative studies on cardiovascular risk score use but these concentrated on looking at barriers to its use. A common barrier was the difficulty for both doctors and patients to understand the concept of risk and in interpreting the numerical information such as relative and absolute risk.¹⁶⁻¹⁸ GPs in a mixed methods study with survey and focus groups in Berlin challenged the accuracy of risk scores developed in population studies in predicting individual risk and this was a barrier to use.¹⁹ This placed more emphasis than expressed by this study's participants on the importance of accuracy in individual risk prediction.

Implications for research and practice

Some GPs would argue that cardiovascular risk scores have gone past their sell-by date: individual risk prediction may be cost-inefficient and should now be superseded by a broader approach to cardiovascular disease prevention, offering a polypill to all over a certain age on a 'fire and forget' basis.²⁰ However, we should not forget that when risk scores were introduced they were welcomed for three reasons: 1) they showed very effectively the interaction between risk factors and supported holistic decisions based on assessment of cumulative risk; 2) they allowed practitioners to demonstrate to patients the potential benefits of risk modification; and 3) they were simple. The older authors practising at the time certainly saw them as an heuristic aid to prescribing and communication rather than a mechanism for accurately predicting individual risk. They were particularly liked by health policy makers concerned with

directing scarce resources to those most likely to benefit and the accuracy of individual risk prediction was unimportant for this purpose.

The findings suggest that pursuing a perfect cardiovascular risk prediction score is helping neither doctors nor patients. The participating GPs were clear that they wanted to know the untreated risk, both to guide treatment decisions and to educate and assist patients about risk. NICE should therefore consider reinstating its recommendation to use a single risk score that reflects pre-treatment risk, such as the Framingham-derived score, and simplify its message. No risk score has the potential to estimate accurately individual risk, however demonstrating the impact and interaction of untreated risk to an individual patient is a simple and worthwhile activity in general practice which is in danger of being lost.

Others have already called for a simplification of guidelines.^{11,12} This is not simply a call to address the likelihood that two pages of introductory qualifications and refining algorithms are unlikely to be read and implemented in practice. It is also a call for communicating clarity of purpose. Risk scores were being used by the participants, with varying appropriateness, to assess and communicate four different things:

- unmodified risk;
- risk after partial treatment;
- the potential benefit of treatment; and
- the effect of treatment.

No single score or guidance to modify a risk estimate will be optimal for all four tasks.

This research has highlighted important issues but the findings cannot be generalised to other GP populations. Quantitative methods such as a questionnaire survey may be useful to confirm the findings in GPs throughout the country. Also, although simplification of guidelines appears to be the likely answer to this problem, further research is needed to confirm this theory.

GPs use risk scores mainly to communicate untreated risk. To do that simply and effectively they need simpler guidance and advice on how to use a Framingham-derived score. The knowledge that the estimates are based on an archaic population is probably helpful in reminding practitioners and patients that the score provides only a very approximate estimate of individual risk which, as everyone agrees, is no substitute for a holistic clinical judgement taking full account of non-cardiovascular comorbidity and the wishes of the patient.

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Oxfordshire Research Ethics Committee (10/H0605/42).

Provenance

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Competing interests

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Discuss this article

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Appendix 1. Cardiovascular risk scores interview guide — healthcare professionals

Study Title: Cardiovascular Risk Scores

Protocol Ref: PIS Qualitative Interviews HCP

Date and Version: 23072010 Version 002

Oxfordshire REC B: 10/H0605/42

Part 1: Participant

1. Can you please tell me about your background in general practice?

Part 2: Cardiovascular (CVD) risk scores

2. What do you understand by the term 'cardiovascular risk scores'?
3. We are interested in your experience in using CVD risk scores. Have you used the risk scores in practice? (If yes) When was the last time you used a CVD risk score with a patient? Can you describe the experience to me?
4. What role does CVD risk play in the decision making process?
5. In your opinion, what are the advantages of using CVD risk scores?
6. What are the disadvantages of using CVD risk scores?
7. What has influenced your opinions or shaped your beliefs about CVD risk scores?
8. What are the factors that lead or would lead to your successful adoption of CVD risk scores?
9. What would be barriers that you face or might face in using CVD risk scores?
10. What would help to overcome these barriers?
11. Have you heard of recommendations or guidelines about CVD risk scores use in clinical practice? What do you think about these?
12. How would you communicate risk to a patient? (Ask participant for a real example or use given scenario if participant is unable to give an example)
13. In your opinion, should the risk communicated be the risk that the patient faces if he is left untreated or if he is treated? Or do you think that it does not matter?
14. Which group of patients would you use the CVD risk score on? Why?
15. Anything else that you would like to tell me or think that I should have asked?
16. We are trying to get a wide variety of opinions and views about CVD risk score use by GPs. Is there a GP that you think I should interview?