General practitioners' use of cardiovascular risk calculators

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Background

This study was designed to investigate general practitioners' knowledge of absolute risk estimation, and whether they used it to guide their management of cardiovascular disease.

Method

A cross sectional postal self administered survey of GPs in the General Practice South Division in southern Tasmania.

Results

A total of 56–62% of responders correctly answered knowledge questions, which could be as low as 33–36% when corrected for nonresponse bias. A cardiovascular risk calculator was used by 72% (as low as 42% when corrected for nonresponse bias); of these, 93% used them to motivate lifestyle change and for education, and 66% used them to assist disease management. General practitioners who used risk calculators tended to rate some factors more highly as contributing to cardiovascular disease, such as Aboriginality and diabetes.

Discussion

Many GPs were using absolute risk calculators, and most used them appropriately as decision making tools, not just for education or motivation. Further education of GPs about cardiovascular risk is still indicated.

Keywords: heart diseases; guidelines as a topic; research; risk assessment

Cardiovascular disease (CVD) is the leading cause of death in Australia and elsewhere, accounting for 17% of all deaths in Australia in 2006.[1] The traditional approach to primary prevention has been to identify at risk individuals through individual risk factors, for example 'hypertension' and 'hypercholesterolaemia'. There are positive associations between the level of these individual risk factors and adverse cardiovascular events.[2] There also are effective therapies that have been shown to decrease these risk factors and the subsequent number of major adverse cardiovascular events (MACE). For example, antihypertensive drugs and statins have been shown to not only reduce blood pressure and total cholesterol respectively, but also to reduce the risk of MACE such as heart failure and stroke.[3,4]

However, adverse cardiovascular events also occur in those with an individual risk factor in the 'normal' range.[5] Thus hypertension and hypercholesterolaemia as disease states are misleading constructs based on arbitrary cut off points. This is especially true as treatment thresholds and targets have come down over time. For this reason, national and international guidelines for cardiovascular risk factor management recommend assessment of patients' absolute cardiovascular risk for identification of who to treat and how vigorously.[6–8] Absolute risk is the risk of an individual experiencing a cardiovascular event over a defined period of time, usually 5 or 10 years.[9] The New Zealand Cardiovascular Risk Calculator was the Heart Foundation recommended cardiovascular risk assessment tool for Australia at the time of our survey.[9,10] Since then, an Australia specific version has been released,[11] which is similar to the New Zealand calculator but includes calculations for Indigenous Australians.

Although absolute risk is a superior method to identify in whom to medically intervene, qualitative research suggests that in general practice, these tools are being used mainly for patient education and motivation rather than prompting general practitioners to act.[9] A systematic review found little evidence that use of cardiovascular risk calculation by primary care providers is actually leading to better patient outcomes.[12] No quantitative work has been published specifically on how GPs are using these tools. Our aim was to investigate GPs' concept of absolute risk, and their stated use of these tools in general practices throughout southern Tasmania.

Method

A survey instrument was developed for this project and the reliability of the instrument was tested by test/retest of 9% of responders. The survey consisted of GP demographic details, three knowledge items (two on absolute CVD risk and one on individual CVD risk factors on a 5-point Likert scale), and three items on absolute CVD risk calculator use. The instrument was mailed to all members of General Practice South, a division of general practice in southern Tasmania. The instrument was distributed by mail between March and April 2007 with two further mailouts 3 weeks apart to nonresponders. Response was by 'reply paid' envelope or facsimile.

This project received approval from the Human Research Ethics Committee (Tasmania) Network.

Statistical methods

Chi-square tests were used for comparisons of gender and age groups between GPs in urban and rural areas. In order to adjust the observed

proportion of correct knowledge based responses for nonresponse bias, a method proposed by Drane[13] was used. The underlying rationale is that those GPs who do not respond are different to those that do. Assuming exponential decay in response rates with each subsequent contact, the proportion of correct responses in nonresponders can be estimated by fitting a regression model to the observed response rates at each mail contact and summing over all extrapolated mailout responses (*Figure 1*). Responses on the Likert scale were treated as continuous and multivariable linear regression was used to determine the perception of risk factors between GPs who used a risk calculator and those who didn't. All models were adjusted for the possible confounders of age, gender and rurality. Residual diagnostics (for linear models) and goodness of fit (for logistic models) were examined to check model validity. Results, where appropriate, are reported with 95% confidence intervals. All analyses were performed with Stata version 10.0.

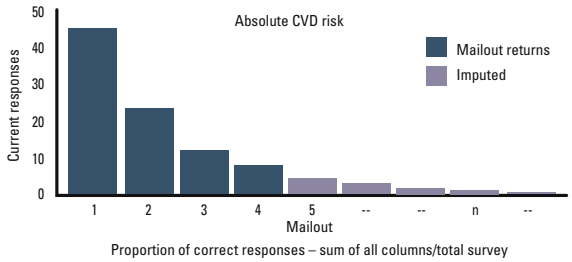

Figure 1. Exponential decay in response rates to the knowledge question about absolute cardiovascular risk, allowing correction for nonresponse bias

Results

GP demographics

Letters were sent to 276 GPs, of whom 16 were no longer at the listed address and three were not practising GPs; response rate 56% (145/257). Respondents demographics are shown in *Table 1* along with a comparison with national GP demographic data.[14] There was no difference in proportions in gender (p=0.15) or when comparing rural and urban GPs (p=0.38), but our sample contained more GPs aged over 35 years than the national data (p=0.016).

Table 1. Comparison of national GP statistics[14] to the study sample

	National data	Study sample	*p* value
Female GPs	9724 (38%)	64 (44%)	0.15
Urban GPs	18 262 (73%)	111 (77%)	0.38
GPs aged ≥35 years	23 256 (91%)	137 (97%)	0.02

Knowledge

Of the 145 GPs who responded, 56% selected the correct definition of the absolute risk of a CVD event, 62% correctly answered the question regarding individual cardiovascular risk. However, when nonresponse bias was accounted for, these proportions could be as low as 33% and 36% respectively. A higher proportion of GPs selected the correct definition of absolute risk if they used a cardiovascular risk calculator in their practice (63 vs. 39% among those who do not use a risk calculator).

Cardiovascular risk calculator use

Seventy-two percent of GPs reported using a cardiovascular risk calculator (*Figure 2*). Responders were permitted to have more than one response to this question. Of the 28% of responders who do not use a CVD risk calculator, 64% said they decided who to treat based on individual risk factors such as blood pressure, 61% decided based on clinical judgment, 50% decided by using guidelines, and 4% used other methods.

Risk calculators were reported to be used for patient education by 93% of responders, to motivate and change lifestyle by 93%, to assist decision making for drug treatment by 66%, and to establish treatment goals by 38%. Responders were permitted to choose more than one use for risk calculators.

Cardiovascular risk factor importance rankings

For almost all CVD risk factors, GPs who use a cardiovascular risk calculator are more likely to perceive them as more important predictors of CVD (*Table 2*). When asked to rate the importance of risk factors in their contribution to CVD, the highest rated were diabetes, personal history of CVD, high LDL cholesterol, hypertension and smoking. The lowest rated factors included CRP, depression, high fibrinogen and unemployment. There were significant differences in the ratings of some risk factors between those GPs who use a risk calculator and those who do not. General practitioners who use a risk calculator were more likely to rate Aboriginality, diabetes, family history of CVD, hypertension and high LDL cholesterol as more important contributors to CVD.

Instrument validation

Thirteen (9%) responders were retested for instrument validity. On average, Cohen's kappa was 0.53 indicating moderate agreement.

Discussion

Absolute cardiovascular risk is acknowledged by peak bodies as the best method for identifying high risk individuals for adverse cardiovascular events and therefore in whom to intervene and how vigorously.[6–8] However, little translational research on how effectively they are utilised has been done in general practice, where most of these decisions are made. Based on our survey results, cardiovascular risk calculators are used by most GP responders (72%), reducing to as little as 40% when corrected for nonresponse bias. The most commonly used calculator was the New Zealand Absolute Risk Calculator. As physicians are unreliable at estimating absolute risk it is important that these instruments be further promoted.[15] When cardiovascular risk calculators are used, many GPs are using them appropriately as a decision making tool and not just for patient education or motivation as a previous qualitative study had suggested.[9]

Approximately 60% of GPs that responded demonstrated a correct understanding of absolute and individual CVD risk, but taking into account likely nonresponse bias suggests that only a third of the approached GPs understood the concept. Therefore further education is likely to be required. Unsurprisingly, GPs who use

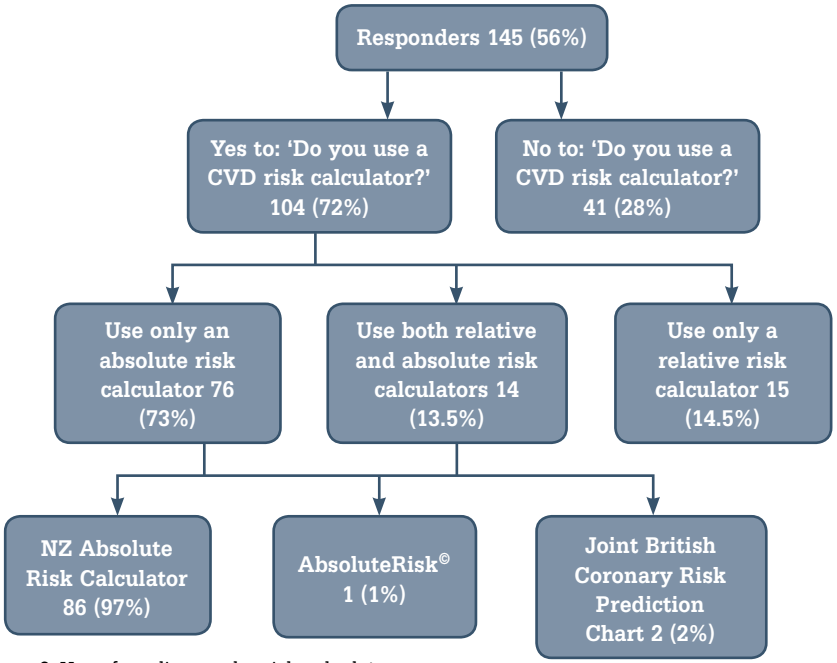

Figure 2. Use of cardiovascular risk calculators
Note: responders were allowed to select more than one answer to the question

cardiovascular risk calculators were more likely to correctly define absolute risk.

When GPs were asked to rate cardiovascular risk factors, the highest ratings were generally appropriately given to personal history of CVD and classic risk factors such as diabetes and smoking. However, the two most important drivers of cardiovascular risk are increasing age and male gender. These characteristics were ranked quite modestly, eighth and thirteenth by those who use risk calculators, and twelfth and thirteenth by those who do not (*Table 2*). This may indicate that age and gender do not enter into the informal risk stratification process when risk calculators are not used. Psychosocial factors such as stress and depression were probably appropriately rated as less important contributors. Aboriginality however, was ranked seventh and tenth by the two groups, which is a concern given the high prevalence and CVD burden in this community. It is unclear why increased risks in the indigenous population are under recognised, but it may be in part due to the perceived low indigenous population in Tasmania. Perhaps cardiovascular risks in this population may be better recognised in other parts of Australia. The new Australian cardiovascular risk guidelines do include separate calculations for Indigenous Australians, and this may lead to improved appreciation of the increased risks.

Table 2. Rated importance of cardiovascular risk factors

Risk factor	GPs who do not use a risk calculator (mean)	GPs who do use a risk calculator (mean)	*p* value*
Personal history of CVD	4.2	5.0	<0.001
High LDL cholesterol	4.2	5.0	0.001
High blood pressure	4.3	5.0	0.004
Smoking	4.1	4.9	0.001
Diabetes	4.1	4.9	0.001
Overweight/obesity	4.3	4.7	0.071
Aboriginality	3.9	4.6	0.015
Older age	3.9	4.5	0.004
High total cholesterol	3.9	4.5	0.013
Impaired glucose tolerance	4.0	4.4	0.059
Family history of CVD	3.6	4.4	0.001
Physical inactivity	3.7	4.3	0.003
Stress	3.9	4.2	0.180
Male gender	3.8	4.2	0.027
Unemployment	3.8	4.1	0.10
Microalbuminuria in diabetes	3.5	4.1	0.008
Low HDL cholesterol	3.6	4.1	0.030
Low socioeconomic status	3.1	3.6	0.014
CRP	3.4	3.6	0.42
Depression	3.3	3.5	0.32
High homocysteine	3.0	3.4	0.12
High fibrinogen	2.9	3.1	0.35

Note: Likert scale 1 = very unimportant to 5 = very important
* Adjusted for age, gender and rurality

Importantly, those who did not use absolute risk calculators, most of whom decided who to treat on individual risk factors, rated individual risk factors lower than those who did use calculators, and therefore are less likely to act on these individual risk factors.

Limitation of this study

Surveys conducted in general practice have a perennial problem of poor response rates and therefore nonresponse bias. Our response rate was modest and therefore we have used statistical methods to try and minimise this bias. Comparison of responders' demographic details with national data and statistical correction for response bias suggests we are able to draw reliable conclusions.[14]

Conclusion

Many GPs who responded to our survey are using cardiovascular risk calculators; the New Zealand Absolute Risk Calculator predominated. Risk calculators are being used to support

clinical decision making and patient education. Considering that nonresponse bias may indicate a usage of absolute risk calculators as low as 40%, further promotion of cardiovascular risk calculators and the value of using absolute risk for clinical decision making may be warranted.

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Conflict of interest: none declared.

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