ASSESSMENT OF THE PRIMARY PREVENTION OF CARDIOVASCULAR DISEASE IN A RURAL FAMILY PRACTICE USING THE FRAMINGHAM RISK SCORE

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Introduction

There are number of tools that have become very important in the care of patients by family physicians. One of the best ways in which family physicians can care for their patients is by utilizing a preventative approach. The Framingham Risk Score (FRS) is an essential tool in any family doctor's practice, in order to thoroughly assess and care for their patients using preventative measures. The FRS was developed as a method to look at the risk of developing cardiovascular disease (CVD) in the primary care setting. It was developed in order to predict the 10-year risk of cardiovascular events or death in asymptomatic patients ages 30-74.[1] It has become an important part of the clinical toolkit, and calculators have been developed to allow easier use. The FRS's use has allowed primary care physicians and nurse practitioners to evaluate the need for lipid lowering medications. I was interested to see the level with which it is applied in a rural family practice in Pinawa Manitoba and assess whether there are any patients who could yet stand to benefit from it's assessment.

Methods

For this project I collected a full patient list from Dr. Siamak Sayfee at the Pinawa clinic and selected out all patients ages 30-74. From these patients I used a random number generator to select 100 patients to assess. By going through each chart, these patients were then divided into those who are already on statins, and those who were not. Looking then at those individuals who were not on statins, I used the charts to see whether their blood pressure and lipids have been checked, and whether a FRS had already been calculated for them recently. I then divided the patients who were not on medication into those that haven't had their blood pressure or lipids checked and those who had. Then using the 10-year

cardiovascular risk FRS calculator from the Framingham Heart Study website I calculated the FRS for each patient.[2] This calculator takes into account the sex of the patient, age, blood pressure, HDL, total cholesterol, whether they are being currently treated for hypertension, whether they smoke, and whether they have diabetes. For those that lacked cholesterol lab values in their chart, but had their weight and height recorded, I used the alternative calculator on the Framingham Heart Study website, which utilized BMI.[2] In order to use the calculator exclusively using charted information, I made the assumption that if there was no record of a history of diabetes, smoking or other items, then the patient had no history of such.

Once each patient had been evaluated using the FRS, I categorized them into groups based on their percent chance of having a cardiovascular event in the next 10 years. These groups were based on recommendations from the Canadian Cardiovascular Society (CCS). Low risk patients had an FRS less than 10%. Intermediate patients had an FRS between 10% and 19%. High risk patients had an FRS of 20% or higher.[3] Using this risk stratification system, I then assessed whether treatment should be initiated for each patient, using low density lipo-protein concentration (LDL-C), according the guidelines from the CCS (Table 1). For the patients who were not in need of statin initiation, I determined whether there were any other recommendations relevant to them. This included lifestyle modifications such as, smoking cessation, exercise and diet, or control of blood pressure.

Table 1: Canadian Cardiovascular Society Treatment initiation guidelines

Risk Level	Initiate Treatment If:
High FRS≥20%	Consider treatment in all
Intermediate FRS 10-19%	LDL-C ≥ 3.5 mmol/L For LDL-C <3.5 mmol/L consider if: - Apo B>1.2 or Non-HDL-C ≥4.3 mmol/L
Low FRS<10%	LDL-C ≥5.0 mmol/L Familial hypercholesterolemia

Note: Reprinted From Genest, J., McPherson, R., Frohlich, J., Anderson, T., Campbell, N., Carpentier, A., Couture, P., Dufour, R., Fodor, G., Francis, G., Grover, S., Gupta, M., Hegele, R., Lau, D., Leiter, L., Lewis, G., Lonn, E., Mancini, GB., Ng, D., Pearson, G., Sniderman, A., Stone, J., Ur, E. 2009. 2009 Canadian Cardiovascular Society/Canadian guidelines for the diagnosis and treatment of dyslipidemia and prevention of cardiovascular disease in the adult – 2009 recommendations. *Can J Cardiol.* 25(10): 567-579.

Of the patients who were not on any lipid lowering medications and whose charts lacked enough information to calculate their FRS I made recommendations. If the patient was less than 40 years old, with not family history of cardiovascular disease (CVD) there was no need to formally check their FRS yet. If the patient was over 40 years old or had a family history of CVD then I recommended that the patient should have an appointment to discuss the need for checking lipids, and why the FRS can help with prevention of cardiovascular events.

Results

In this sample of patients from Dr. Sayfee's rural practice 49 were ages 60-74, 30 were ages 45-60 and 21 were ages 30-45 (Figure 1). Of the sample of 100 patients, 38 were already taking a statin, 45 had their blood pressure and lipids checked but were not on statins, and 17 lacked enough information in their chart to apply the FRS (Figure 2).
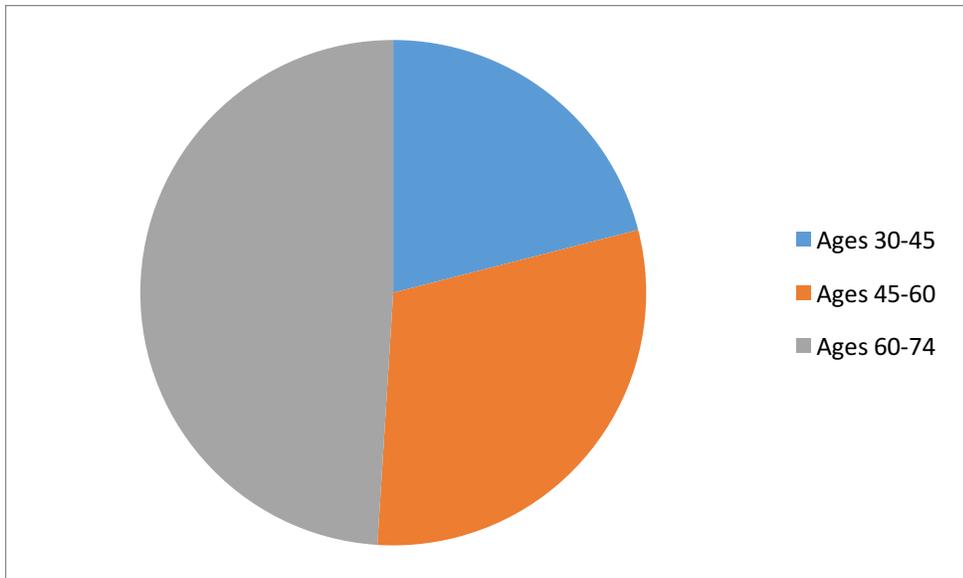
Figure 1: Age groups of the 100 patients ages 30-74 whose charts were used to look at the utilization of FRS in prevention of CVD
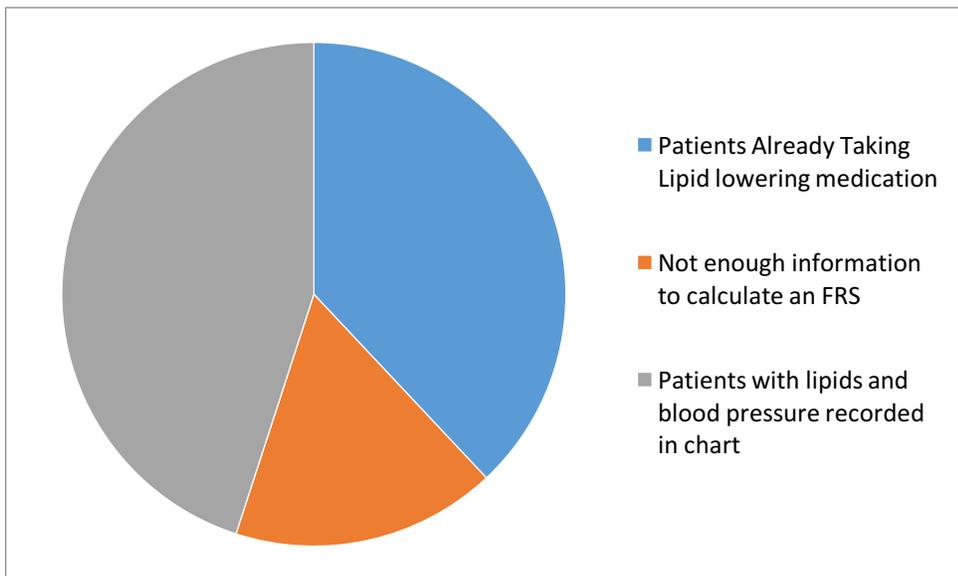

Figure 2: Proportion of patients already taking lipid lowering medication, patients whose lacked information in their chart to calculate an FRS, and patients who have their lipids and blood pressure recorded in their chart.

Most of the patients ages 61-74 were already taking a statin (28, compared to 6 who were not), and all the patients who were taking statins were over the age of 45 (Figure 3).

Of the patients who were not taking a statin and lacked information in their chart to check their FRS 3 were ages 60-74, 4 were ages 46-60 and 10 were ages 30-45 (Figure 3). Five of the patients were under the age of 40 and had no family history, so no recommendation was necessary. One patient was a 38-year-old male with a family history of coronary artery disease and a history of smoking, so it was recommended that he come in to order labs for his lipids and check his FRS (Table 2). It was recommended that the 11 patients over the age of 40 who were lacking the information necessary in their chart, should have their FRS checked (Table 2).

Within the subset of patients who were not taking any lipid lowering medication, and who had the information in their chart necessary for a FRS, 53% were low risk 27% were intermediate risk and 20% were high risk. All but 3 of the patients currently not taking statins, who could be screened using their chart were 60 years old or younger (Figure 3).

There were 17 of the 24 low risk patients who did not need any recommendations, based on the CCS guidelines (Table 2). Of The low risk patients there were three that lacked LDL-C values, so no clear recommendation could be made (Table 2). There were no low risk patients who required any medical intervention.

Twelve patients were categorized as intermediate risk (Table 2). Three of these patients had LDL-C values greater than 3.5 and were thus candidates for starting starting statins. Seven patients had LDL-C values less than 3.5 and non-HDL less than 4.6, but there were no ApoB values in the chart to determine if medication should be started. CCS guidelines state to start

Table 2: The age, sex, FRS, and LDL-C for all that were not taking a statin, organized into low risk (green), intermediate risk (yellow) and high risk (red) categories based on their FRS, or no FRS calculated (Blue). Orange recommendations indicating some action being required (including rechecking lipids).

Age	Sex	FRS	LDL-C (mmol/L)	Comments and Recommendations
30	F	0.60%	LDL<5.0	Don't Initiate medication
69	F	1.30%	LDL<5.0	Don't Initiate medication
49	F	1.40%	LDL<5.0	Don't Initiate medication
47	F	1.70%	LDL<5.0	Don't Initiate medication
43	F	1.90%	LDL<5.0	Don't Initiate medication
32	M	2.70%	LDL 3.0	Don't Initiate medication
46	F	3.10%	LDL 3.2	Don't Initiate medication
68	F	4.20%	LDL 2.5	Don't Initiate medication
45	F	4.70%	LDL 2.3	Don't initiate medication
39	M	5.80%	LDL unknown	Last Lipid panel 2014. Patient <40 years old. No familial hypercholesterolemia.
45	F	6.70%	LDL<5.0	Don't Initiate medication
32	F	7.00%	LDL 3.7	Don't Initiate medication
55	F	7.70%	LDL 3.8	Recommend Lifestyle modification as total cholesterol is high.
44	M	7.80%	LDL 3.2	Don't initiate medication
58	F	7.90%	LDL unknown	No lipid checks recorded. FRS calculated using BMI.
46	M	8.00%	LDL unknown	No lipid checks recorded. FRS calculated using BMI.
63	F	8.30%	LDL 3.1	Don't initiate medication.
35	M	8.60%	LDL 4.1	Recommend Lifestyle modification as total cholesterol is high.
53	M	8.60%	LDL 3.4	Don't initiate medication
69	F	8.60%	LDL 3.6	Recommend Lifestyle modification as total cholesterol is high.
65	F	9.00%	LDL 3.4	Don't initiate medication
47	M	9.30%	LDL 2.0	Don't initiate medication
48	M	9.40%	LDL 3.6	Recommend Lifestyle modification as total cholesterol is high.
57	M	9.50%	LDL 3.3	Don't initiate medication
45	M	10.60%	LDL 3.9	LDL>3.5 Initiate medication
60	M	11.90%	LDL 1.2	LDL<3.5 and Non HDL<4.6. Recommend smoking cessation.
70	F	12.10%	LDL 3.6	LDL>3.5 Initiate medication
64	M	12.20%	LDL 2.7	LDL<3.5 Non-HDL<4.6 No need to initiate medication if ApoB<1.2
58	M	12.30%	LDL 2.5	LDL<3.5 Non-HDL<4.6 No need to initiate medication if ApoB<1.2
70	M	12.70%	LDL 2.6	Patient not interested in Statin
64	F	13.20%	LDL 3.6	LDL>3.5 Initiate medication.

| Age	Sex	Risk	LDL	Note
61	F	14.20%	LDL 3.4	Patient not interested in Statin
62	M	14.60%	LDL 3.2	LDL<3.5 Non-HDL<4.6 No need to initiate medication if ApoB<1.2.
56	M	14.90%	LDL 2.9	LDL<3.5 Non-HDL<4.6 No need to initiate medication if ApoB<1.2
60	M	15.40%	LDL 3.1	LDL<3.5 Non-HDL<4.6 No need to initiate medication if ApoB<1.2
72	F	18.10%	LDL 3.8	LDL>3.5 Initiate medication
48	M	20.50%	LDL unknown	Initiate medication
70	M	21.60%	LDL 3.4	Initiate medication
66	F	22.30%	LDL 3.2	Initiate medication
67	F	27.10%	LDL 3.7	Patient not interested in Statin
68	M	27.30%	LDL 3.0	Lipids Normal. Patient has hypertension.
69	M	36.90%	LDL 2.1	Normal Total-Cholesterol and LDL. High Triglycerides, Low HDL. Initiate medication.
60	M	54.10%	LDL 2.3	Lipids Normal. History of hypertension, diabetes and smoking.
68	M	66.30%	LDL 3.2	Lipids Normal. History of hypertension and diabetes.
31	M	92.70%	LDL unknown	Initiate medication.
69	F	Not enough information		Age>40. Check lipids.
31	F	Not enough information		Age< 40. No family history.
31	M	Not enough information		Age< 40. No family history.
32	F	Not enough information		Age< 40. No family history.
34	F	Not enough information		Age< 40. No family history.
34	M	Not enough information		Age< 40. No family history.
38	M	Not enough information		Age<40. But family history of coronary artery disease and history of smoking. Check lipids.
42	M	Not enough information		Age>40. Check lipids.
42	M	Not enough information		Age>40. Check lipids.
43	F	Not enough information		Age>40. Check lipids.
44	F	Not enough information		Age>40. Check lipids.
49	M	Not enough information		Age>40. Check lipids.
54	F	Not enough information		Age>40. Check lipids.
57	F	Not enough information		Age>40. Check lipids.
58	M	Not enough information		Age>40. Check lipids.
64	M	Not enough information		Age>40. Check lipids.
64	F	Not enough information		Age>40. Check lipids.
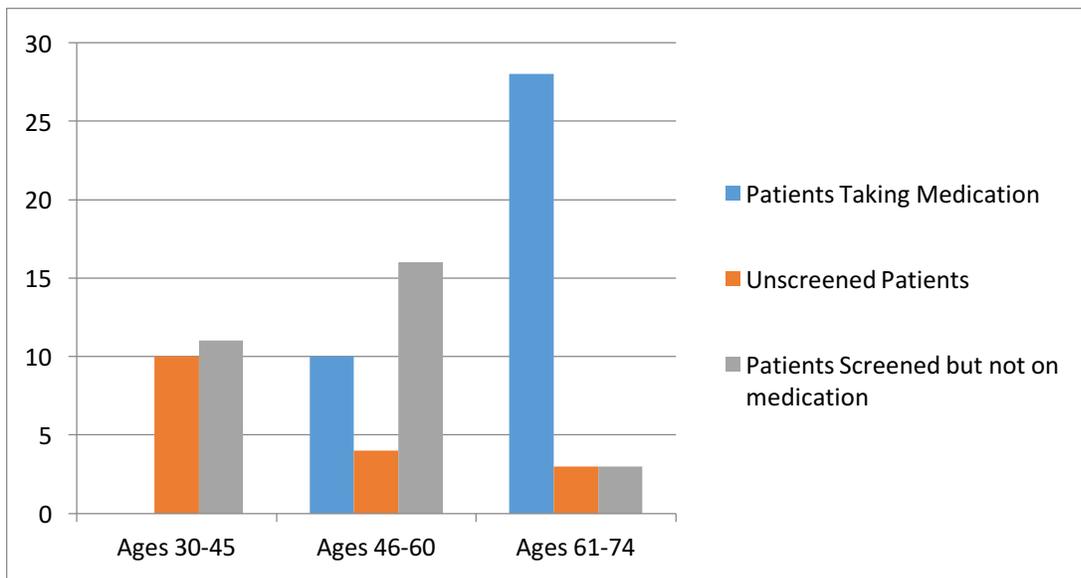
Figure 3: Patient categories for screening for CVD and prevention using medication (statins) divided into age groups 30-45, 46-60, and 61-74.

medication in this case if ApoB is greater than 1.2.[3] Two of these patients had been counselled on the possibility of starting statins at some point and had already expressed that were not interested in it, despite the benefits.

Nine patients were high risk for experiencing a cardiovascular event or death within the next ten years. The FRS scores ranged from 20.5% to 92.7% risk. One patient, with a FRS of 22.3% had already been counselled and was not interested in taking medication (Table 2). Four patients who were high risk had lipid levels within normal ranges, but had other risk factors which had increased their score, such as hypertension, smoking, and diabetes. The patient who had a score of 92.7% was called by Dr. Sayfee to arrange an appointment. After talking to this patient we found out that he had been started on statins in the ER a couple months ago, and this had not been entered into his chart.

Discussion and Conclusion

My goal in researching this subject was to see whether patients were being assessed and counselled appropriately in the primary care setting in a small town in eastern Manitoba, and to, catch some patients that could benefit from such an assessment in order to allow them to be counselled properly. The importance of maintaining a high standard for the prevention of CVD, is due to the high mortality rate caused by CVD.[4] One of the primary risk factors for CVD is elevated cholesterol as well as low density lipo-protein cholesterol (LDL-C).[4] These values can be lowered effectively with the use of statins by patients with high cholesterol, in concert with the lifestyle modifications. By screening patients using the FRS score it is possible to use a primary prevention based strategy in asymptomatic individuals to reduce their risk of CVD.[4]

With an aging population across Canada, it is all the more important that patients are being assessed thoroughly, as they are at a higher risk for CVD.[5] This study showed that most elderly patients in this particular clinical practice were already taking statins, either as primary or secondary prevention of CVD. Even those elderly patients, who were not currently taking statins, were for the most part being screened for various risk factors. Only 3 of the patients, whose charts lacked information for screening were over the age of 61 (Figure 3).

The importance of prevention of CVD is important form multiple angles. For one there is have a reduced quality of life for those suffering from CVD, and secondly there is a significant burden to the health care system in caring for those who suffer from CVD. In 2009 it was estimated that the cost in the United States of CVD was over 475 billion dollars.[5] In order to improve both of these aspects, it is essential that the primary care providers, working on the

front line, engage their patients in preventative procedures and education of the benefits of prevention.

In any family practice there can be patients that slip through the cracks of screening. This study showed over 20% of patients ages 30-74 were either intermediate or high risk for developing CVD in the next 10 years and were not taking statins. While this number does seem high it can be understood, by understanding the limitations of implementing the FRS. Some patients just may not be interested in taking statins (as was the case with 3 patients in this study), especially if they are already taking a multitude of medication on a daily basis. Other patients, may be taking statins, and the physician is just unaware of it at this time, such as with the patient with an FRS of 92.7% (Table 2). There may be patients that come to see their family doctor so rarely, that there is never an opportunity to review their chart and have a discussion with them. The patients with an intermediate or high risk FRS may not even have an elevated cholesterol, which is often what would trigger a physician to check their FRS. This study showed 4 high risk patients with FRS ranging from 27.3% to 66.3%, who yet had normal lipids. Despite this there is evidence that patients with high risk factors such as diabetes, or hypertension can stand to benefit from initiating statins as well.[4]

In conclusion, using the FRS I was able to see that a large majority of patients who can benefit from CVD prevention were either takin statins, or were being screened for the risk factors. It can be difficult to catch every case, especially for a new doctor taking over an existing practice, but this study suggests that CVD prevention is being considered by this rural family physician and steps are being taken where appropriate to counsel and help patients. It is important to acknowledge the limitations of this study. It did only look at 100 patients a sample

size that is relatively small. In addition, the study would have more value if it could have looked at the practices of multiple physicians. There may be benefit to further research that use these methods, not only to see if physicians are screening patients appropriately, but to catch patients that can potentially benefit from intervention.

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