OVERVIEW OF THE DIABETIC PATIENT POPULATION AND REVIEW OF THE MANAGEMENT OF PATIENTS WITH DIABETIC NEPHROPATHY

By: Jess Polley

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Supervisor: Dr. Manish Garg

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Background: Pinawa is town of approximately 1,300 residents located 110km north-east of Winnipeg. Pinawa is known to be quite an active town with many recreational activities such as biking, golfing, hiking, fishing and kayaking in the warmer months. There is also a significant elderly / retirement community in Pinawa and the surrounding communities such as Lac Du Bonnet and Whitemouth. The average age in Pinawa is 53.7 years with 39% of its residents aged 65 and up, compared to Manitoba's average age of 39.2 and 15.6% of its residents aged 65 and up, according to 2016 statistics. http://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/details/page.cfm?Lang=E&Geo1=POPC&Code1=0645&Geo2=PR&Code2=46&Data=Count&SearchType=Begins&SearchPR=01&B1=All&TABID=1

During my 6 weeks in Pinawa, I had the opportunity to work with Dr. Garg in Pinawa 4 days a week and in Whitemouth once per week. Dr. Garg has a patient population from Pinawa, Whitemouth and Lac Du Bonnet, which all have unique needs. I decided to focus on the diabetic population within the several communities by analyzing four care providers patient population (Dr. Garg, Dr. Sayfee, Derek Edwards and Lisa Novakowski).

Statistics: As of 2016, the prevalence of diabetes in Manitoba is 9.2% https://www.diabetes.ca/getmedia/513a0f6c-b1c9-4e56-a77c-6a492bf7350f/diabetes-charter-backgrounder-national-english.pdf.aspx and proportion of people with diabetes generally increases with age. The prevalence of diabetes peaks at age 75-79 at 25.5% according to the Public Health Agency of Canada (http://www.phac-aspc.gc.ca/cd-mc/publications/diabetes-diabete/facts-figures-faits-chiffres-2011/chap1-eng.php#Pre). According to the Canadian Community Health Survey in 2007, only 74% of respondents with diabetes indicated they received a urine protein test within the last year. http://www.phac-aspc.gc.ca/cd-mc/publications/diabetes-diabete/facts-figures-faits-chiffres-2011/chap2-eng.php#Kid Diabetes is the leading cause of kidney disease in Canada (http://guidelines.diabetes.ca/Browse/Chapter29) and in 2009, diabetes accounted for 34% of incident cases of end-stage renal disease (chapter 2 reference from PHAC). Also, about 1/3 of diabetic patients, whether type I or type II, will develop diabetic nephropathy with its peak incidence after 15 years of the duration of illness (https://www-ncbi-nlm-nih-gov.uml.idm.oclc.org/pubmed/?term=2008+May%3B54(5)%3A488-93.)

Procedure: For each provider, patients were selected if they had a hemoglobin A1C (HbA1C) greater than or equal to 6.5 (an objective measurement for diabetes), as not all providers label their patients as

diabetic in EMR. The epidemiology of each care provider's population was also used for comparison when noting the prevalence of diabetes in the communities. For a more in-depth analysis, I audited Dr. Garg's patients labelled as diabetic in EMR, as well as using hemoglobin A1C for absolute lab values. A population deemed as high risk (HbA1C ≥7.5) was used as sample population to audit for diabetic nephropathy. The independent variable analyzed was the urine albumin-creatinine ratio (ACR) and the dependent variable was the use of Angiotensin Converter Enzyme Inhibitors (ACEIs) or Angiotensin Receptor Blockers (ARBs). An ACR ≥ 2mg/mmol was an indicator for the use kidney protective agents (ACEIs or ARBs). As per guidelines, patients were also screened for their most recent urine ACR, as it should be done once per year (http://guidelines.diabetes.ca/Browse/Chapter29)

The report is presented in order from general overview of patient population and diabetics to the specific analysis of Dr. Garg's high risk diabetic population as mentioned above.

Patient Summary by Provider

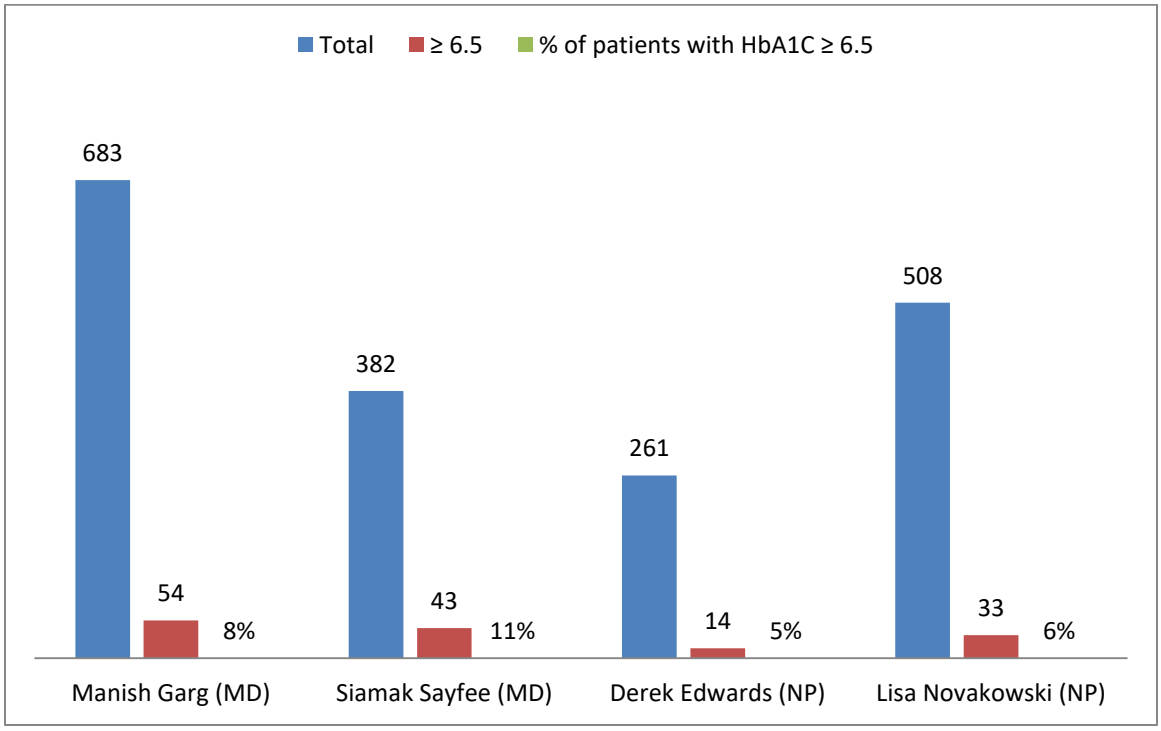

Figure 1: Summary of Patient with HbA1C ≥6.5 by Care Provider

Proportion of Diabetic Patients by Provider

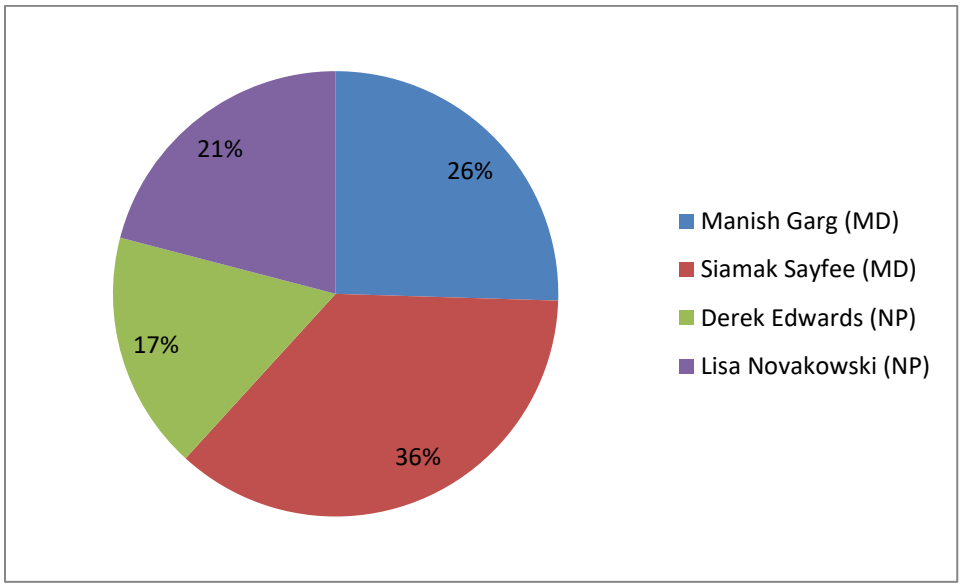

Figure 2: Proportion of Total Patients between All Care Providers with HbA1C ≥ 6.5

Epidemiology of Care Providers Patient Population

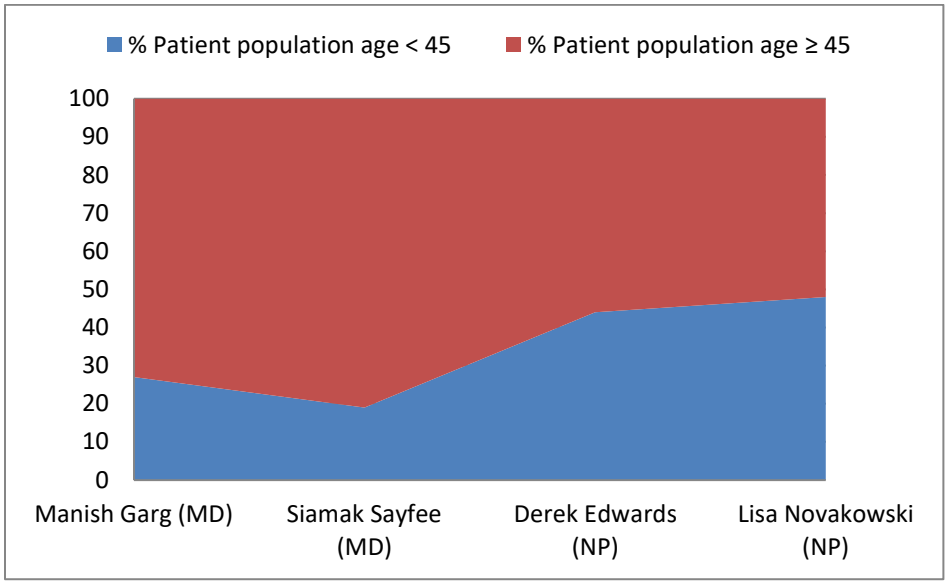

Figure 3: Providers Patient Population by Age

According to Figure 1, Dr. Garg and Lisa Novakowski have a greatest patient population, but Dr. Garg and Dr. Sayfee have the greatest proportion of diabetic patients (standardized as HbA1c ≥6.5). Together, Dr. Garg and Dr. Sayfee account for more than 60% of total patients diagnosed with diabetes (Figure 2). The increased prevalence of diabetes at an older age accounts for the difference in proportion of diabetics, since Dr. Garg and Dr. Sayfee generally have an older patient population than the nurse practitioners (Figure 3). Coincidentally, this observation also shows that younger patients tend to see a nurse practitioner (NP), whereas older patients generally see physician as their primary care provider.

Overview of Dr. Garg's Patients Identified as Diabetic

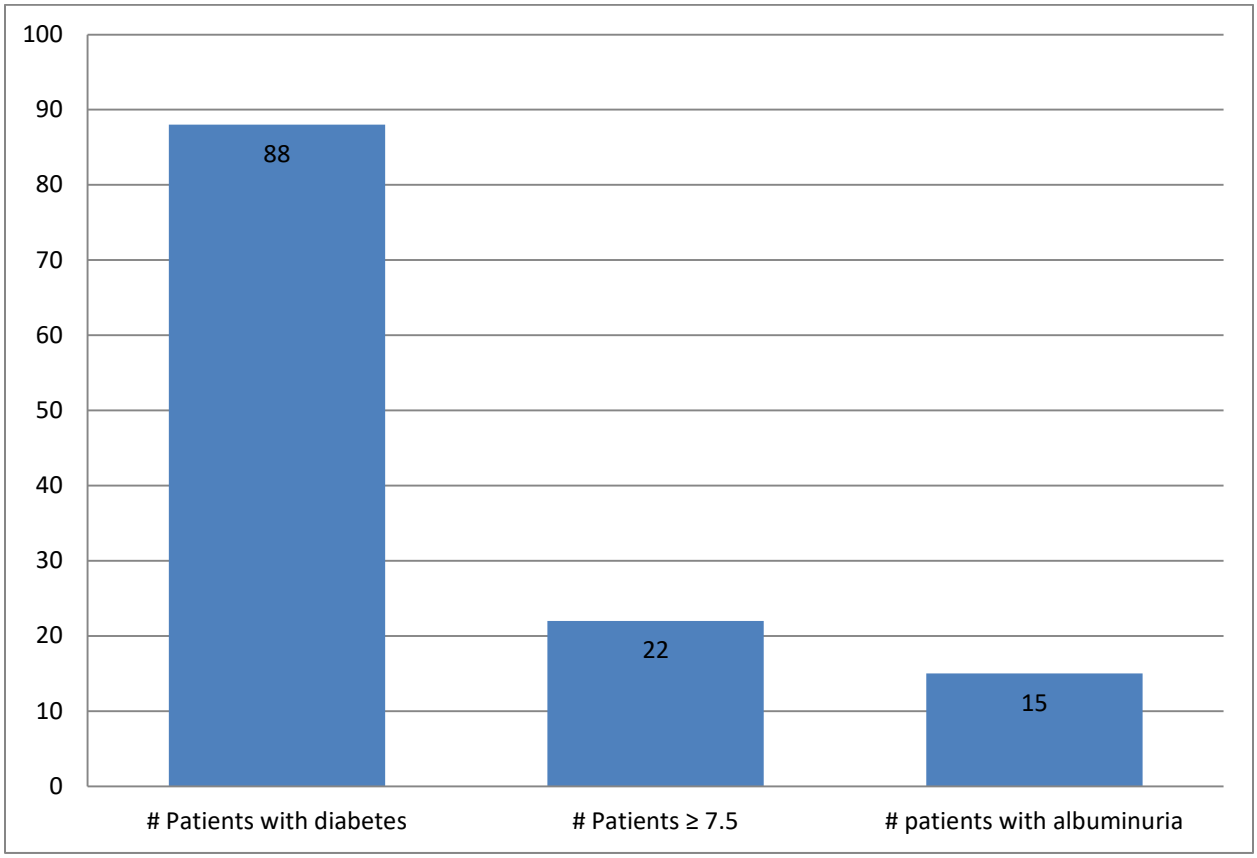

Figure 4: Summary of Dr. Garg's Patients Identified as Diabetic, HbA1C ≥7.5 or with albuminuria (ACR ≥2).

Prevalence of diabetics with nephropathy is approximately 17% in Dr. Garg's patient population. If we were only to include the subgroup of those with HbA1C ≥6.5 (total 54 patients), the prevalence would increase to about 30%. However, this subgroup is not a random sample, so conclusions cannot be drawn with significance.

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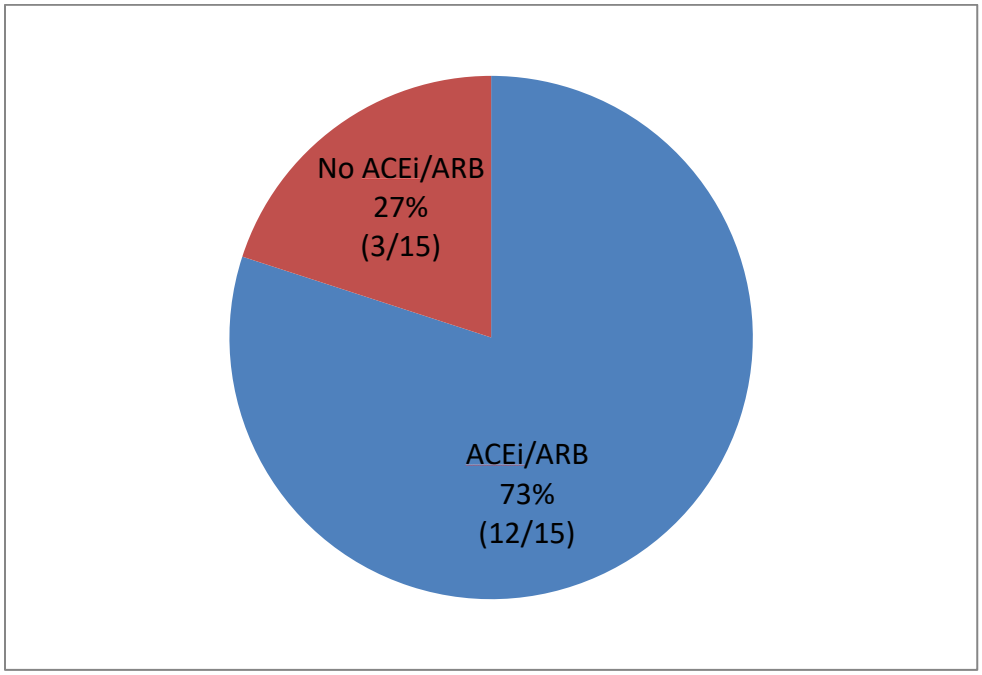

Figure 5: Percentage of Patients prescribed or not prescribed an ACEI or ARB with an ACR >2mg/mmol. Total patients with ACR >2mg/mmol is 15.

Conclusion

At the time of study, 1 patient had not undergone nephropathy screening (since completed) and 1 patient had an outdated screening result (request sent). Out of 15 patients with an HbA1C ≥7.5 and nephropathy, 3 were not on kidney protecting agents. These patients were followed up, educated and advised the use of ACE Inhibitors / ARBs in order to optimize their current therapy. Overall, the majority of Dr. Garg's patients deemed high-risk were effectively managed, but the data suggests that his lower risk patients should also be screened for diabetic nephropathy (even those effectively managed), as they may account for the remaining diabetics with nephropathy (based on statistics). I would suggest screening his elderly diabetic population (regardless of HbA1C), as they are more likely to develop diabetic nephropathy due to the likelihood of having diabetes for a duration greater than 15 years.

Recommendations

- To screen the elderly diabetic population, as their risk of diabetic nephropathy is increased due to the longer duration of diabetes.
- To ensure your diabetics receive a yearly screen for nephropathy using the ACR as per recommendations.
- To re-evaluate your current diabetics to see if their diabetic therapy can be optimized through the use of kidney protective agents.
- To educate your diabetic patients about diabetes and kidney disease to allow them to make informed decisions.
- In the future, to further investigate the efficacy of diabetic management by general practitioners compared to chronic disease nurses or endocrinologists and whether their needs are met.