Patient Education: Low-Carb Substitutes for Pre-diabetes Management

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Problem Identification

- Estimated global prevalence of 425 million individuals with diabetes in 2017, expected to rise to 629 million by the year 2045 (Forouhi, 2019).
- Pre-diabetes has been linked to clinically significant cardiovascular disease before the progression to overt diabetes (Zand, 2018).
- Though pre-diabetes can be adequately managed via lifestyle changes, many physicians lack the time or training to provide specific advice in this regard (Dorn, 2021).

Description of Need

- Several available SmartPhrases for diabetes care via UVM Health Network Patient Instructions, but none that review low-carb alternatives to common foods.
- There are a variety of reasons folks might be unable to access nutrition services, including time, insurance, and understanding of the problem.
- For those unable to access these services, research on carb counting must be entirely self-directed.

Excerpt from SmartPhrase “Counting Carbohydrates: Care Instructions” from UVM Health Network Patient Instructions:

You don't have to eat special foods when you have diabetes. You just have to be careful to eat healthy foods. Carbohydrates (carbs) raise blood sugar higher and quicker than any other nutrient. Carbs are found in desserts, breads and cereals, and fruit. They're also in starchy vegetables. These include potatoes, corn, and grains such as rice and pasta. Carbs are also in milk and yogurt.

For most adults, a guideline for the daily amount of carbs is:

- 45 to 60 grams at each meal. That's about the same as 3 to 4 carbohydrate servings.
- 15 to 20 grams at each snack. That's about the same as 1 carbohydrate serving.

Public Health Cost

- The annual cost associated with diagnosed diabetes in the US is $327 BILLION (ADA).
- On average, those carrying a diagnosis of diabetes have a 2.3x greater health cost than those without the diagnosis (ADA).
- Randomized controlled trial has shown that individuals with prediabetes treated with intensive lifestyle modification alone had a 58% reduction in risk for type II diabetes compared to a 31% risk reduction in those treated with Metformin alone (Diabetes Prevention Program).

Community Perspective

"It's all grab-and-go. A lot of highly processed, high sugar stuff."

"A majority of my families come from two income households with both parents working long hours. They need quick/easy/non-perishable things to pack their kids."

"We had a grant for free breakfast/lunch this year, but few kids took advantage of it because they are such picky eaters."

- Katie Keenan, Kingergarten Teacher at Milton Elementary School on what she observes her students eating for lunch and snack

Community Perspective

"I think the biggest barrier to accessing nutrition services is time and maybe even fear that folks will be told they are not allowed to eat their favorite foods anymore."

"The available SmartPhrases tell the patients what carb counts are, but don't give any lower-carb alternative options."

- Melisa Gibson, MD, Family Medicine Physician at Milton Family Practice

Intervention and Methodology

- **Review available SmartPhrases to identify gaps in information**
- **Interview community members to understand background of disease burden and resistance to intervention.**
- **Collect information on carbohydrate counts of common foods via USDA.**
- **Produce short, easy to read tables presenting common foods and possible lower-carb alternatives.**

Results

SmartPhrase .CARBCOUNTS

There are three main types of carbohydrates in the foods that we eat: sugar, fiber, and starch. On most nutrition labels, the total carbohydrate level as well as the breakdown of dietary fiber, total sugar, and added sugar is presented. When choosing what foods to pick based on the nutrition label, pay special attention to the %DV (percent daily value). Remember, this percentage is based on a 2,000 calorie/day diet, so it may not perfectly align with your diet! Keep in mind also that these percentages are based on the reported serving size. A carbohydrate level of 5% DV or less is considered low, while a carbohydrate level of 20% DV or more is considered high.

The above information was retrieved from the following sources, which contain lots of useful information and tips:

https://www.myplate.gov/

https://www.diabetes.org/

https://www.cdc.gov/diabetes/index.html

	Food	Serving	Carbohydrate (g)
Avoid these at mealtime	Pasta	1 cup (cooked)	43 g
	Couscous	1/3 cup (dry)	40 g
	White rice	¼ cup (dry)	38 g
Use these instead as side dishes!	Whole grain pasta	1 cup (cooked)	37 g
	Quinoa	¼ cup (dry)	25 g
	Black beans	½ cup	22 g
	Sweet or white potato	1 potato	21 g
	Chickpeas	½ cup	20 g

	Food	Serving	Carbohydrate (g)
Instead of eating these fruits as snacks or with meals	Banana	1 whole fruit	18.2 g
	Blueberries	1 cup	15 g
	Pear	1 whole fruit	14.3 g
	Apple	1 whole fruit	12.4 g
Try these alternatives!	Cantaloupe	1 cup	12.3 g
	Peach	1 whole fruit	12.3 g
	Orange	1 whole fruit	12 g
	Kiwi	1 whole fruit	6.2 g
	Strawberries	1 cup (about 8 berries)	5.34 g

	Drink	Serving	Carbohydrate (g)
These contribute to carbohydrates without making you full	Lipton sweet iced tea	12 oz	48.5 g
	Coca Cola	12 oz (1 can)	39 g
	Mott's apple juice	8 oz	29 g
	Tru Moo chocolate milk	1 cup	19 g
These are a good go-to!	Water	N/A	0 g
	Seltzer water	12 oz	0 g

	Food	Serving	Carbohydrate (g)
Try trading these high-carb breakfast foods	Plain Bagel	1 bagel	48 g
	Raisin bran cereal	1 cup	46 g
	Old fashioned oats	½ cup (dry)	27 g
	Plain English Muffin	1 muffin	26 g
For these healthier options!	Avocado	1 fruit	12 g
	Whole wheat bread	1 slice	9.2 g
	Plain Greek yogurt	¾ cup	7 g
	Chicken sausage	1 link	4 g
	Eggs	1 large egg	0.6 g

Effectiveness & Limitations

Presented information regarding carbohydrates is more easily digestible than other currently available SmartPhrases

Many patients have questions regarding how many carbs or calories they should be consuming daily, which is notably absent in this discussion

This does not replace the need for nutrition services, and patients will still benefit from referrals

Recommendations for Future Projects

- Initiative to explain the effects of artificial sweeteners on pancreatic function and the development of insulin resistance
- Advocacy to have a Diabetes Educator, Registered Dietician, or Clinical Nutritionist available at Milton Family Practice for group education sessions offered to patients

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