

Examining the Effect of Food Accessibility and Availability on Glycemic Control and BMI in People with Type 2 Diabetes

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Summary

This article outlines the relationships between food accessibility and availability with glycemic control (lower hemoglobin A1c) and body mass index (BMI) in people with type 2 diabetes. The results show that people who spend more time shopping have better control of blood sugars and lower BMI. Two or more shopping trips per week to find items that were not available in their regular grocery store was also associated with lower BMI. In addition, people who reported spending more on meat alternatives (e.g., beans, lentils, tofu) after their diabetes diagnosis had lower hemoglobin A1c.

Key Terms

Hemoglobin A1c (HbA1c) - Hemoglobin A1c is a proxy or marker for tracking blood glucose levels over time. An HbA1c reading of less than 7% is considered healthy for diabetes patients.

Rising rates of obesity and type 2 diabetes can be partially attributed to the food environment in which we live; the food environment - where we shop, and where we eat - greatly influences people's food choices. Two components of the food environment include the availability and accessibility of foods.

- Availability is defined as the presence of the items, while accessibility is defined as the ease at which items can be obtained (Farley et al, 2009).

These two factors play a significant role in the food choices people make and may affect a person's ability to comply with their diabetic diet.

The focus of our research was on the accessibility and availability of items in the diet plan of people with type 2 diabetes living in Edmonton, and how this affected several health outcomes.



Methods

Participants recruited to the study completed questionnaires regarding their perceptions of food accessibility and availability. This questionnaire was adapted from the Community Food Security Assessment Toolkit¹ authored by the U.S. Department of Agriculture. Participants also completed a 3-day food record, a demographic questionnaire and measurements of body mass index (BMI, kg/m²) and hemoglobin A1c.

Results

Participants

The people recruited to this study were all type 2 diabetes patients, with an average hemoglobin A1c of $7.3 \pm 1.3\%$ and an average BMI of $33 \pm 7 \text{ kg/m}^2$. The average age was 60 ± 10 years and about three-quarters had an income of \$60,000 per year or greater. Nearly 60% of participants had a diploma, university degree or post-graduate education.

Food Accessibility Questionnaire

Food accessibility barriers were determined using data from the questionnaires.

- Equal numbers of participants travelled more versus less than 4 km to grocery shop but distance travelled did not affect health outcomes.
- Although one-quarter of respondents said there were food items in their diet plan not available at their regular grocery store, most people shopped at more than one store and this did not affect health outcomes. However, people who made 2 or more shopping trips per week to find foods not available in their primary grocery store, and people who spent more than 90 minutes per week shopping (including commuting time) did have lower A1c and/or lower body mass index.

¹ View the toolkit online at www.ers.usda.gov/publications/efan02013.

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Duration of Shopping Trips	Less than 90 min	More than 90 min
A1c (%)	7.8	7.1
BMI (kg/m ²)	34	31
Number of Trips to Another Store to Find Items not Available in Regular Grocery Store	Zero or One	Two or More
BMI (kg/m ²)	34	30

Another part of the questionnaire asked whether people with diabetes spend the same, less or more on certain food categories compared with a non-diabetic diet. Responses were compared with BMI and A1c.

The only significant finding was that people who reported spending more on meat alternatives (soy products, legumes) had lower A1c (6.6%) compared with people who spent less (8.4%). Eating less meat might correlate with reduced intake of saturated fat and increased intake of fibre. To determine if this were the case, the responses in the 3-day food records were compared with the spending on meat alternatives, but no significant relationships were found.

The food availability questionnaire was also analyzed but the majority of participants in the study did not report food availability as a barrier to coping with their dietary requirements.

Conclusions

This study provides an insight into the potential barriers in Edmonton faced by people with type 2 diabetes. People with diabetes who spend more time shopping may be reading nutrition labels, which might increase compliance with diet recommendations as well as lower energy intake, resulting in lower A1c and lower BMI. These participants might also have walked to the grocery store, which would increase the time spent on the trip and potentially have health benefits, but the questionnaire did not evaluate the method of travel. Extra trips to the grocery store might also translate into increased compliance with nutrition recommendations. Increased expenditure on meat alternatives was also related to lower A1c concentrations. Vegetarian and vegan diets may result in better glycemic control for patients with type 2 diabetes (Barnard et al, 2006) and meat alternatives like legumes are a good source of fibre and are low in saturated fat, which follows nutritional recommendations for people with diabetes.

This study provides a preliminary description of the effect of food accessibility and availability on glycemic control and BMI in people with type 2 diabetes in Alberta but its interpretation is limited by the small sample size (80 participants) who were mainly older, with reasonably good glycemic control, and higher levels of education and income. A study with a better demographic representation of people living in Edmonton would improve our understanding of the barriers faced by diabetic patients in Alberta. Studies should also be conducted in rural areas that may have more restricted food accessibility and availability. ↻

About the Authors

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About the Organization

The authors of this article are associated with the PANDA Research Project. For more information about the project, visit <http://www.ales.ualberta.ca/afns/Research/PANDAResearchProject.aspx>.

