

A picture-based carbohydrate-counting resource for Somalis

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Abstract

Objective: Carbohydrate counting is essential for effective management of type 1 diabetes (T1D). Somali diet-specific carbohydrate-counting references are lacking, creating an additional barrier to effective diabetes control. We developed a picture-based carbohydrate-counting resource for Somalis with T1D.

Methods: Traditional Somali foods were selected using a variety of methods. Serving sizes and carbohydrate calculations were tabulated using the United States Department of Agriculture National Nutrient Database for Standard Reference. Carbohydrate contents of home-prepared foods were calculated by measuring the total yield and total carbohydrates of ingredients in the recipe divided by the number of servings to be consumed. When available, recipes were used for food preparation and analysis for more accurate carbohydrate estimation.

Results: Photographs of prepared Somali foods were compiled into a PDF file. While introductions are written in text, the resource is primarily picture-based to bypass limited literacy. The resource is shared free of charge via the following link: <http://journals.sagepub.com/doi/suppl/10.1177/0300060517718732>. The link will be updated annually with new information.

Conclusion: There is a necessity to tailor educational materials to address the needs of Somalis with diabetes. We have created a picture-based nutrition resource for carbohydrate counting of traditional Somali foods and have made this freely available to individuals worldwide.

Keywords

Type 1 diabetes, Somali, carbohydrate counting, dietary resource, traditional Somali food, visual-based reference

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Background

Managing type 1 diabetes (T1D) in children can be challenging, but immigrant children with T1D whose families come from resource-poor nations face special difficulties, including language barriers, variable levels of parental education with a high illiteracy rate (especially among females, who are often the primary caregivers), social barriers, and psychological stressors inherent to immigration.¹⁻⁴

Minnesota has the largest Somali population in the United States, with an estimated 38,500 individuals of Somali ancestry according to the United States Census Bureau.⁵ This number is believed by many in the Somali community to be an underestimation. T1D is relatively common in this population. In a previous study, we estimated that T1D affects about 1 in 400 Somali children and adolescents in Minnesota.⁶ Similarly, other investigators reported that Somali children in Finland, where a large influx of Somali immigrants have settled, have an incidence of T1D similar to that of the general pediatric population in that country.⁷ We and others have noted that metabolic control of T1D is poorer in Somali youth than in their non-Somali peers attending the same clinics.^{7,8}

Whether the environment in Western host communities has increased the risk of diabetes in Somali children cannot be determined because the incidence of diabetes in Somalia is completely unknown. A functional health care system is almost nonexistent in that country because of decades of war; health care statistics are not systematically reported, child mortality is high and usually unexplained, and a child with diabetes is most likely to die without having ever been diagnosed. Personal communication (A.M., a professor involved in teaching Somali medical students training in Gulu, Uganda) suggests that the prevalence of childhood diabetes within Somalia is indeed high, and patients and health care

professionals there are desperate to receive education materials.

We previously reported the results of an assessment of cultural beliefs and barriers to diabetes management in families of Somali children with T1D living in Minnesota.⁸ Difficulty performing carbohydrate counting for traditional Somali foods was identified as a particularly challenging problem that families felt interfered with attaining better diabetes control.⁸ These results are consistent with a recent *Lancet* article on the challenges encountered by a care team in Cleveland, Ohio, in providing relevant carbohydrate-counting resources to a patient of Arab descent with T1D.⁹ The article highlighted the need for culturally specific carbohydrate-counting materials.

Recognizing the cultural importance of food in the Somali community, the paucity of culturally specific carbohydrate-counting dietary resources, and the limited literacy of many people in this population, we created a Somali-specific carbohydrate-counting resource. Our goal was to develop a tool that would be widely available online to assist patients with T1D in our own clinics, patients living in other immigrant communities around the world, and patients with diabetes in Somalia itself.

Methods

The traditional Somali foods described in this project were selected using a variety of methods: information obtained by a registered dietitian and certified diabetes educator (C.B.) from hundreds of diet recalls during interviews with Somali adults and children over several years at the University of Minnesota Diabetes Education Program, discussions with a local Somali dietitian regarding cultural and traditional food habits, participation in home visits with Somali volunteers who prepared traditional meals with project staff, attendance at lectures on Somali food and culture given by

members of the Somali community, and visits to local Somali grocery stores and restaurants. In addition, the Internet was searched for Somali diet information and recipes. Co-author and dietitian C.B. personally prepared many of the traditional foods using a Somali cookbook¹⁰ or in the company of Somali volunteers.

With a few exceptions, the original food items used to prepare traditional Somali foods are familiar to American dietitians, and in this respect, carbohydrate counting was not difficult; it is the way in which these foods are combined in traditional Somali recipes that is unique and challenging. Serving sizes were based on standards from the United States Department of Agriculture (USDA) National Nutrient Database for Standard Reference,¹¹ and estimates of typical portions were used for those that were not available in the USDA database. Carbohydrate calculations were made using the USDA National Nutrient Database for Standard Reference and Nutrition Facts labels on food packages. The carbohydrate contents of traditional foods were calculated by preparing individual food items and measuring the total yield and total carbohydrates of all ingredients in the recipe, then dividing these values by the number of servings and serving size to be consumed. All prepared foods were measured using standard measuring cups or weighed on a digital scale for carbohydrate estimation. For foods that were purchased ready-to-eat without a nutrition facts label, the carbohydrate content was estimated using similar foods and weighed on a digital scale. When a recipe was available, the food item was prepared and analyzed for more accurate carbohydrate estimation.

Results

Photos of prepared Somali foods were compiled into a PDF file in two languages (English and Somali). While the introductions are

written in text, the focus was to make this resource primarily picture-based, where possible, to be useful to individuals with limited or no literacy. Additionally, the pictures are self-explanatory, and the ability to successfully use the resource is not contingent on reading the introduction.

The resource is formatted based on input from potential users in an easy-to-use pattern including grains and bread, fruit, milk and dairy, vegetables, meat, fats/oils, sauces, appetizers, spreads, desserts, and beverages. Each section contains photos of the food or drink item and a visual measuring unit to help provide a simple picture-based sense of portion size. The carbohydrate content per portion size is displayed. For some foods, two different portion sizes are displayed for both younger and older children. We have provided this resource to Somali parents of children with T1D followed in our clinic, and they have universally indicated their appreciation for the product and that they found it very useful. Over time, we will continue to evaluate whether this resource helps to improve glycemic control and reduce hypoglycemia in this population. We will administer a pre-resource knowledge assessment prior to providing the resource and a post-resource test 3 months later to assess improvement in knowledge. We will also assess whether the hemoglobin A1c level changes following provision of this resource.

The resource is shared free of charge for open access to the general public via the following link: <http://journals.sagepub.com/doi/suppl/10.1177/0300060517718732>. We will update the link annually with new information.

Discussion

Health disparity with worse metabolic control of diabetes in ethnic minorities is a reality facing providers and patients alike. This is particularly problematic in immigrant populations. The aim of the present

study was to meet the need for a culturally appropriate, visual-based reference guide for Somali families to use for carbohydrate counting of traditional Somali foods, with the hope of making this task less intimidating and more effective for Somali children with T1D and their parents.

Meals are a significant component of cultural identity in every population, and the importance of the traditional Somali diet to Somalis who have migrated has been well described.¹² The traditional Somali diet encompasses a wide variety of food elements including carbohydrates (such as rice, spaghetti, and breads), protein (commonly goat and lamb, but also beef, chicken, and fish), vegetables, and fruit. Although the diet shares many food ingredients with Western diets, it also contains some specific ingredients not generally consumed by Westerners, such as teff and sorghum.¹³ In addition, the methods of food preparation and the selection of which foods are served together can differ from typical Western diets. For example, a common practice in the Somali community is to consume a banana as part of the main meal and to drink heavily sweetened beverages with meals, such as Somali chai (tea) or juice with added sugar.¹⁴ True to acculturation, many Somali households consume a combination of American food and traditional Somali food,¹³ with the younger generation of Somalis being more likely to eat American food alongside their traditional Somali food. This expected adoption of some features of the host country's diet has also been described in other parts of the world.¹⁵

Members of the Somali community typically enjoy meals together as families despite the challenges of adapting to the pace of life in Western societies, which makes this custom harder to achieve.¹⁴ The common practice of eating food directly from a communal dish may make it difficult to count carbohydrates for an individual with diabetes. This makes visual cues for portion

size even more critical. In the authors' experience, it is common practice for Somali immigrants in Minnesota to eat from individual plates rather than from a communal dish. Therefore, the resource in the present study was formatted to focus on demonstrating carbohydrate counts in individual plates for practicality.

Nutrition resources that are informative, educational, and nicely descriptive of the Somali diet are currently available.^{13,16} However, they do not include critical data on carbohydrate content. For individuals with T1D in well-resourced nations, counting carbohydrates to determine the insulin dosage using an insulin-to-carbohydrate ratio forms the basis of basal-bolus insulin therapy and allows dietary flexibility. For those in under-resourced nations, who are generally on fixed doses of human insulins that do not allow the same degree of dietary flexibility, carbohydrate counting can still ensure that appropriate quantities of carbohydrates are consumed at the right time of day in relation to human insulin peaks, minimizing both hyperglycemia and hypoglycemia. This information is therefore vitally important to T1D management in all settings, and it is imperative that patients and their families are able to understand the information and apply it to the foods they commonly eat. We have developed a resource that shows the carbohydrate content per serving of the foods that are very popular in the Somali community. It provides a visual sense as well as measurable portion sizes and allows individuals with diabetes to enjoy traditional meals while not overlooking an important aspect of their diabetes control, namely carbohydrate counting.

In conclusion, pediatric diabetes management is particularly challenging in immigrant populations. Identifying areas of diabetes care that require improvement and tailoring interventions and educational materials to meet the specific needs of this

population is necessary. We have created a nutrition resource for carbohydrate counting to assist families of Somalis with T1D so that they can enjoy their traditional Somali cuisine without compromising their diabetes control.

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Declaration of conflicting interests

The authors declare that there is no conflict of interest.

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Supplementary material

The supplementary file is available at <http://journals.sagepub.com/doi/suppl/10.1177/0300060517718732>.

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