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Advancing Cultural Competencies: Applying the Dietary Exchange List System to Jamaican Foods

Janice Goldschmidt[1*], Kavitha Sankavaram[2] and Margaret Udahogora[2]

[1]Director of Nutrition Services, Community Support Services, Inc. 9075 Comprint Court Gaithersburg, MD 20877, USA

[2]Department of Nutrition and Food Science, University of Maryland, College Park, USA

[*]**Corresponding author**: Janice Goldschmidt, Director of Nutrition Services, Community Support Services, Inc. 9075 Comprint Court Gaithersburg, MD 20877, USA, Tel: 301-438-0385; E-mail: Jgoldschmidt@css-md.org, Janicebg9@msn.com

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Abstract

The relationship between diet and a number of chronic health conditions has been well established. One of the most widely utilized tools for mediating this relationship is carbohydrate counting and dietary exchange systems. At the same time, nutrition and dietetics professionals have begun to stress the importance of cultural competency by encouraging all professionals to develop a comfort level with the ethnic, religious and contextual background of their patients. This paper is intended to support that movement by introducing nutrition professionals to the most common Jamaican foods as interpreted through the exchange list system. Across the entire Caribbean, trends have demonstrated increasing rates of type 2 diabetes mellitus (T2DM) accompanied by elevated rates of obesity. At present in Jamaica, T2DM is the second most common non-communicable chronic disease. Rates among immigrants and individuals of Jamaican heritage in the United States are unknown but are believed to mirror these trends. Understanding the food choices of this population will be vital to providing appropriate and meaningful nutrition treatment options. This paper addresses an important need and serves as a model for how to introduce other cultural traditions in cuisine to professionals in the fields of nutrition and dietetics.

Keywords: Cultural diversity; Diet; Nutrition

Introduction and Objective

Diet is strongly linked to a number of chronic health conditions, including diabetes and cardiovascular disease [1]. It is the responsibility of the Registered Dietitian Nutritionist (RDN) to assist their clients in understanding this relationship and achieve greater self-efficacy in making wise food choices. Though a variety of dietary programs and instruments have been developed to facilitate this process, the most widely utilized tools are carbohydrate counting and the food exchange system for diabetic meal planning [2]. This food list technique was developed jointly by the American Diabetes Association (ADA) and Academy of Nutrition and Dietetics (AND) formerly known as the American Dietetic Association [3].

Self-care practices, such as adequate nutrition and medication compliance, are vital for the control of type 1 (T1DM) [4] and type 2 diabetes mellitus (T2DM) and the prevention of short and long-term complications [5]. The updated ADA-AND Choose Your Foods: Food Lists for Diabetes, formerly known as Choose Your Foods: Exchange Lists for Diabetes, have been designed to translate evidence based dietary recommendations into food choices that promote a healthy eating pattern [6]. This nutritional program serves as both a reference guide as well as a tool to design calorie-controlled meal plans. Additionally, the revised version of the food list stresses greater cultural diversity as well as food items that are commonly available in most communities [6].

In the Food Lists for Diabetes, foods are categorized by type and users can switch out items that they prefer within a grouping. The products or choices found within the same food categories have comparable amounts of calories and macronutrients based on the portion size stipulated. Aside from composite dishes, there are eight food categories including starches; fruits; milk and milk substitutes; sweets, desserts, and other carbohydrates; non-starchy vegetables; meat and meat substitutes; fats and alcohol. By controlling their food choices, individuals with diabetes are empowered to approximate their carbohydrate intake so as to have better glycemic control over their blood sugar. In this way the food exchange system can be an effective means for increased control over blood sugar levels [7].

Due to the fact dietary exchanges offer tremendous flexibility along with promotion of both self-efficacy and autonomy, they are also currently utilized for other means including weight loss and enhancing dietary quality [8,9]. There is, however, a greater appreciation of late for the need to adapt these generic exchange approaches to specific

community needs including cultural, ethnic, religious beliefs and practices [10]. Development and incorporation of such cultural components into nutrition materials may also increase the level of commitment and motivation by clients to dietary change [11].

This also follows from the general trend in health care that encourages cultural competency across all professional domains [10,12]. Cultural competence is intended to signify a comfort level with the ethnic, religious and contextual background of patients and supports the application of that knowledge. In reference to nutrition and dietetics, this might include appreciating the role of culture in diet and the ability to note the distinctions between culture, race and ethnicity [12].

Though there is an incomplete understanding at present of the ways that culture informs nutritional choices, it is widely accepted as an important factor in the choices individuals make in reference to consumption [13]. Thus, the promotion of cultural competency in health care requires that professionals become aware of sociocultural differences and adjust care to accommodate them. The development of culturally appropriate materials for use in health care is one means of accomplishing this [12].

The unique traditions of cooking that characterize immigrant communities in the United States offer an important component of the necessary cultural understanding required for RDNs. Helping clients adapt to the use of a food exchange system, for example, requires that professionals have an adequate familiarity of the specific foodstuffs that are common as well as the nutrient makeup.

The objective of this study was threefold:

To determine the culturally specific foods most common in the diets of Jamaican immigrants living in the United States and to assess the macronutrient and energy composition of these various items.

To develop an appropriate dietary exchange system built on these identified food items.

To ensure that the exchange lists are consistent instruments for carbohydrate counting for Caribbean immigrants similar to the Diabetes exchange list or Food List for Diabetes.

Previous research addressing culturally specific food exchange research has addressed local food in Africa, including Nigeria, [14] and Mali [15]. Middle Eastern food exchanges have also been developed for traditional Jordanian cooking [11,16] Greek-Mediterranean foods [17] and traditional dishes of the United Arab Emirates [18]. Thai [19], Korean [20] and Samoan cuisine [21] have also seen the development of food exchange lists. Of note, research has also addressed the development of exchange systems for specific conditions, such as amino acid deficiencies (Phenylketonuria and maple syrup urine disease) in order to define dietary exchange options for individuals in Central America with these conditions [22].

Culturally appropriate materials that provide dietary exchange information on the traditional foods of Jamaican diet are not currently available and, thus, this research fills a specific need and contributes to the cumulative body of knowledge.

Background regarding Jamaica

Jamaica is an island commonwealth that is part of the Greater Antilles, which are located in the Caribbean Sea. Along with Cuba, Haiti, the Dominican Republic, Puerto Rico, Jamaica, Trinidad and Tobago as well as the Bahamas and Barbados, Jamaica is considered part of the Caribbean, a region comprised of over 700 island regions. Jamaica gained independence from Britain in 1962, and English remains the official language [23].

The exact population of individuals of Jamaican heritage residing in the United States is unknown though the US Census estimates it as over 1 million [24]. At the same time, it is believed that as many as 22 million individuals of Caribbean heritage reside in the US, primarily along the eastern seaboard [25] It is estimated that Caribbean immigrants account for 9.6% of the population that is foreign born [26].

Across the Caribbean, trends have demonstrated increasing rates of T2DM accompanied by elevated rates of obesity [27-29]. In Jamaica, T2DM is the second most common non-communicable chronic disease [30] with prevalence estimated at 7.9% for the years 2007-2008 [27]. In 2011, Irving et al. estimated a prevalence of 17.9% for T2DM in the 15 plus age group [31]. Research indicates that despite improved health care standards, control of T2DM generally remains inadequate, particularly in reference to dietary control [32].

Very little research has specifically addressed the nutritional or health status of black immigrants in the United States, of whom the majority come from the Caribbean [33]. A 1999 study, however, found that the prevalence for T2DM among 25-74 year-old Jamaicans in the United States was estimated at 12% [34]. Current rates, however, are unknown as there is insufficient data among Jamaican immigrants in the US.

In general, research has demonstrated that immigrant populations in the United States are vulnerable to a variety of health-related deficiencies associated with increasing acculturation into the American lifestyle [35]. Given these various trends, the development of culturally sustainable lifestyle interventions to reduce chronic disease rates and their associated risk factors are highly warranted.

Methods

The methodological basis for the development of a dietary exchange lists has not been extensively examined. Wheeler et al. outlined the procedure for the 2008 update to Choose Your Foods [7]. While the types of foods that were included were based on focus group input, macronutrient determinations were less straightforward. Most component parts were determined based on The United States Department of Agriculture's Nutrient Database for Standard Reference. Information from this source was not always available, however, and thus nutritional labels from several brands were

averaged. The authors concluded: "This should reassure users that each food in a list, in the serving size given, is reflective of the rounded averages; however, it is also a reminder that while the means are close to the average values, the standard deviation indicates a range for each group" [7].

For the exchange list described herein, ingredients to be included were found via a survey of available supplies at a grocery store dedicated to Caribbean consumers in suburban Maryland. Upon authorization of the store owner, perusal of this location revealed the most common produce, dairy, breads, crackers, desserts & sweets, drinks and snacks (for a listing of these items, see **Tables 1-7**, below).

Table 1 Vegetables: starchy and non-starchy.

Item	Amount per 1 Carb Exchange
Beetroot (cooked)	1.5 cups
Carrot (cooked)	1.5 cups
Canned corn	1/3 cup
Corn-on-the-cob	½ cobb (4 ½ inches)
Canned green peas	½ cup
Pumpkin (cooked)	1.5 cup
String beans	1.5 cups
Turnip, (cooked)	1 cups
Broccoli	1 ¾ cups
Brussels sprouts	1 ¾ cups
Banana, green	½
Breadfruit – raw	¼ cup
Breadfruit – fried	1 slice
Coco/eddoe (malangas)	½ cup
Dasheen, taro	½ cup
Plantain, ripe	1/6 cup
Plantain, green	¼ medium, raw
Plantain, green, fried	1 piece
Potato, English	1/3 cup
Potato, strips, no oil	1/3 cup
Sweet potato	½ cup
Yam, boiled yellow	1/3 cup

Table 2 Different types of breads.

Item	Amount per 1 Carb Exchange
Bread, white	1 small slice
Hard dough	½ slice
Bagel	1/3 large bagel
Bun	½ slice
Roll	½ small roll
Roti/pita	½ small roti
Bammy (Cassava bread)	1/5 medium
Bread crumbs	1 1/3 bread crumbs
Fresh Daily Hard Dough bread	½ slice
Fresh Daily End Bread	½ slice
Fresh Daily Pinch Bread	½ slice
Golen Krust Caribbean Bakery Hard Dough Bread	¾ slice
Golden Krust Duck Bread	¾ slice
Golden Krust Whole Wheat Bread	1 slice
Fresh Daily High Fiber Whole Wheat Bread	½ slice
Fresh Daily High Fiber Whole Wheat Bread	½ slice
Salara	¾ piece

Table 3 Different varieties of cookies/biscuits.

Item	Amount per 1 Carb Exchange
Mipo Sandwich Cookies	½ pack (38 g)
Burton's Foods Rich Tea Biscuit	2 biscuits
Coco Malt Chocolate Malt Cookies	2 1/2 cookies
Burmudez rough tops coconut drops	3 cookies
Cadbury luxury cookies double chocolate chunk	1 cookie
Cadbury Finger original	5 cookies
Lee chocobis biscuits hazelnut cream	1 ½ pieces
Mcrities digestives milk chocolate	1 ½ biscuit
Goya Maria cookies	3 cookies
Goya gluten free Maria	2 cookies
La Fe Maria cookies	3 cookies
Goya Maria cookies	3 cookies
Goya Maria cookies chocolate	3 cookies
Goya Palmeritas	4 cookies
Depon peanut chip cookies	2 cookies
Excelsior Jamaica Ginger biscuits	2 ½ pieces
Excelsior whole wheat biscuits	2 ½ biscuits
Parrot coffee milk biscuits	½ ounce
Parrot coffee milk sandwich biscuits	1 piece
Butterkist Festival almond cookies	3 cookies
Butterkist shortbread butter cookies	3 cookies
Butterkist butter cookies	3 cookies
Royalty malted milk biscuits	2 ½ biscuit

Butterkist coconut cookies	2 ½ cookies
Royalty Digestives	1 ½ biscuits
Burton's foods digestive sweetmeal biscuits	1 ½ biscuits
Ovaltine cookies	2 ½ cookies
Wibisco shirley coconut biscuits	2 ½ cookies
Wibisco shirley biscuits	2 ½ biscuits
Bumudez rough tops biscuits	3 biscuits

Table 4 Different varieties of crackers and snacks.

Item	Amount per 1 Carb Exchange
Wibisco Eclipse crackers	3 crackers
Excelsior cream crackers	3 crackers
Excelsior water crackers	2.75 crackers
Crix whole wheat crackers	6 crackers
Lasco water crackers	2.75 crackers
Jacob's cream crackers	2.75 crackers
Kraft's classics cream crackers	2 crackers
Plantain Chips	25 chips
Banana Chips	½ cup
Beef Patty	1/3 patty
Coconut chips	
Royalty cream crackers	3 crackers
Wibisco Eclipse whole wheat crackers	3 ¼ crackers
Plantain Chips	25 chips
Banana Chips	½ cup
Beef Patty	1/3 patty

Table 5 Different varieties of desserts and sweets.

Item	Amount per 1 Carb Exchange
Guava or Strawberry Jam	1 Tablespoon
Custard, baked	¼ cup
Cornmeal pudding	¾ serving
Sweet Potato pudding w/ boniato	1/3 piece
Dulce de Tamarindo	1/2 oz
Aloe Vera Dessert	1/3 bag
Tamarind Balls	16 g
Toolum	21 g

Table 6 Different varieties of cakes and buns.

Item	Amount per 1 Carb Exchange
Golden Krust Sugar Bun	¼ bun
Golden Krust Coco Bread	¼ bun
Fresh Daily Round Spice Bun	1/3 slice
Fresh Daily Cinnamon Buns	2 oz.
Fresh Daily Bulla Cake	¼ cake
Golden Krust Rock Cake	1/3 cake
HTB Spiced Bun	1/6 bun
Caribbean Sunshine Spiced Bun	1 oz.
Golden Krust Spice Bun	½ slice
Fresh Daily Spice Fruit Bun	¼ slice
Caribbean Sunshine Bun	1/5 slice
HTB Spiced Bun	1/5 inch slice
Caribbean Sunshine Easter Bun	1/12 bun
Golden Krust Tutti-Frutti cake	¼ piece

Table 7 Different varieties of fruits.

Item	Amount per 1 Carb Exchange
Ackee, canned with brine	4 ½ oz. or 11/3 servings
Fruit cocktail, with syrup	1/3 cup
Fruit cocktail, lite	½ cup
Mango, raw	½ cup
Pineapple	¾ cup
Avocado	1 cup
Guava,	¾ cup
Jackfruit	1/3 cup
Mammee apple	Approx.. 4 oz
Papaya, raw	1 cup
Mango, raw	½ cup
Custard apple	2 oz.
Naseberry	½ fruit
Passion fruit	1/3 cup
Otaheite apple	2 oz.
Star apple	3.5 oz.
Sweetsop (sugar apples)	2 oz.
Watermelon, raw	1 ¼ cup
Ortanique	4 oz.
Pomegranate, raw	½ cup
Oranges, raw	3/4 cup, sections
Starfruit	2 cups
Sea grapes	28 oz.
Sorrel	15 oz.

Choakoh Jack Fruit in Syrup	1 piece
Sweet Tamarind	20 g
Red Sweet Mango	75 g

Composite dishes common in Jamaica were obtained through the services of a professional chef of Caribbean origin who was employed to compile a list of typical Jamaican meals. Those dishes identified were subsequently created in the Food Science Lab at the University of Maryland (College Park) under the supervision of this same professional chef and the UMD Dietetics Program Director. In addition, comparable recipes were selected from a variety of recipe books addressing Jamaican cooking traditions; multiple sources were utilized so as to compare nutrient and serving size variations [36-40].

Overseen by the researchers, undergraduate dietetics students purchased the raw ingredients for the recipe database from a local Caribbean market referenced above. Individual items identified as well as materials obtained for composite dishes were then analyzed for nutrient content. First, the data on the food labels were recorded for reference and each item was then categorized into a food category, such as starches, fruits, milk, etc. Next, macronutrient composition of each item listed on the food label was organized as per the ingredient's indicated serving size. Second, total calories of each macronutrient category was assessed using Atwater's standard energy value of foods [41]. In this method one gram of carbohydrate, fat and protein fat is considered equivalent to 4-9-4 kilocalories respectively. The total energy listed for macronutrients was then compared to the estimated values provided on the food label.

Third, the dietetics students were trained to weigh and record the weight of the individual ingredients of the composite dishes being prepared by the professional chef as well as the final weight of the cooked dishes. This was done in grams and converted to ounces and pounds using the Eat Smart Precision Pro - Multifunction Digital Kitchen Scale (Mettler Toledo, ML1501W/03 Serial number B008012976). The edible yield for foods that contained inedible portions such as bones, peels etc. was calculated by subtracting the inedible parts before and after cooking as per the recipe. All the recipes were then standardized to appropriate serving sizes.

Next, after determining appropriate serving sizes for the selected recipes, the ingredient weights were entered into Super Tracker for analysis. Different individuals analyzed the same recipes to assess possible variability in the findings. The output of this diet analysis provided average amounts of calories, macronutrients, and micronutrients per recipe. Traditional Jamaican foods not listed in the USDA database were acquired from a variety of reference materials, referenced in the bibliographic section of this article [36,42].

Finally, average energy and nutrient content was calculated per composite dish based upon the published recipe collection utilized and macronutrient content for the specific recipe were standardized to a fixed amount of carbohydrate (15 g). Foods were then categorized into different groups such as vegetables (starchy and non), breads, crackers, desserts and sweets, drinks, fruits and snacks (**Tables 1-7**; composite dishes **Tables 8-10**).

In this manner, individual items identified in the Caribbean grocery store as well as composite Jamaican dishes could be incorporated into a Caribbean exchange system listing.

Table 8 Different varieties of drinks.

Item	Amount per 1 Carb Exchange
Jamaican Kola Champagne	4 oz.
Jamaican Cream	4 oz.
Jamaican Pineapple soda	4 oz.
Coco Rico Coconut Soda	4 ½ oz
Vimto	5 ½ oz
Fiery Ginger Beer	7 oz.
Solo Cream Soda	5oz
Solo Kola Champagne	5 oz.
Solo Orange	5 oz.
Solo Banana	5 oz.
Solo Red	5 oz.
Solo Grape	5 oz.
VitaMalt Classic	3 oz.
PowerMalt Extra Energy	3 oz.
Tom Boy Caribbean Lemonade	4 oz.
Tom Boy Guyuna and West India Cream Soda	4 oz.
Tom Boy Guyuna Kola Champagne Soda	4 oz.
Ginseng Up Ginger Brew	3 ¾ oz
Ginseng Up Original	5 oz.
Ginseng Up Cola	4 ½ oz
Ginseng Up Kola Champagne	4 oz.
Ginseng Up Apple	4 oz.
Ginseng Up Grape	5 oz.
VitaMalt Ginger flavor	3 oz.
BEST Mango Juice 50% juice	2 ¾ oz.
BEST Guava Juice 50% juice	3 oz.
BEST Cocktail Juice Drink 35% juice	3 oz.
Grace Tropical Rhythms Pineapple Guava 16 fl oz.	4 oz.
Grace Tropical Rhythms Guava Carrot 16 fl oz	4 oz.
Grace Tropical Rhythms Mango Carrot	3 ½ oz.
Grace Tropical Rhythms Sorrel Ginger	3 ½ oz.

Grace Tropical Rhythms Island Mango	3 ½ oz.
Grace Tropical Rhythms Pineapple Ginger 16 fl oz.	3 ½ oz.
Lemon Twist Shandy	3 ½ oz.
Malta India Low Sodium	3 ½ oz.
Malta Goya	3 ¼ oz.
Tiger Malt Ginger non-alcoholic	3 ½ oz.
Tiger Malt Gold non-alcoholic	3 ½ oz.
VitaMalt Classic	3 oz.
Power Malt Extra Energy	3 oz.
Tom Boy Caribbean Lemonade	4 oz.
Tom Boy Guyuana and West India Cream Soda	4 oz.
Marty's Mellow Mood	4 ½ oz.
Best Mango Juice	2 ½ oz.
Foco Pennywort	5 oz.
Goya Sugarcane	3 ½ oz.
Foco Mango Juice	3 ½ oz.
Foco Lychee Juice	4 ½ oz.
Foco Passion fruit	4 ½ oz.
Goya Coconut	5 ¼ oz.
Tropical Rhythms fruit punch	3 ½ oz.

Table 9 Different varieties of composite dishes.

Item	Amount per 1 Carb Exchange
Pepper Shrimp	1.5 lean protein
Curry Shrimp	1 carb; 1.5 lean protein choices; 2 fat
Ackee and Salt Fish	0.5 carb; 4 lean protein; 3.5 fat
Fried Fish and Bammy	0.5 carb; 8 protein; 4 fat
Beef Stew	0.5 carb; 5.5 protein; 12 fat
Jerk Pork	8.5 High-fat protein
Curry Chicken	9 medium-fat protein
Jerk Chicken	0.5 carb; 10 lean protein
Kidney (Brown Stewed)	1.1 carb; 3 medium-fat protein
Codfish and Beans	2 carb; 2 medium-fat protein
Steamed Fish	2.5 nonstarchy vegetables; 8 lean protein; 1.2 fat
Jerk Chicken	0.5 carb; 7.5 medium-fat protein; 3 fat
Coconut Shrimp	0.5 carb; 1.5 lean protein; 2 fat
Stuffed and Baked Chochos	1.5 nonstarchy carb; 1/3 starchy carb; 2 lean protein; 1.2 fat; 0.85 high-fat protein
Chicken Fricassee	1 carb; 4.5 lean protein
Pot roast	2 carb; 8 medium-fat protein; 5 fat
Callaloo	2 fat; 2 protein
Bok Choy and Chicken	1 non-starchy vegetable; 2 lean protein
Okra and codfish	1 carb; 1 medium-fat protein; 1 lean protein; 1 fat
Sardine Scrambled Omelet	3 high-fat proteins; .5 carb; 3 fat
Stewed Fish	4 lean protein; 1 fat
Pumpkin soup	2 carb; 5 lean protein; 12 fat

Table 10 Different varieties of composite snacks.

Item	Amount per 1 Carb Exchange
Fried Egg Sandwich	2 carb; 2 medium-fat protein; 3 fat
Coconut Chips	8 fat; 2/3 carb
Pawpaw Pepper Sauce	0.25 carb
Festival(like a cake)	1.7 carb
Coconut Bread	2.3 carb
Spinach Salad with Breadfruit Chips	1.5 carb; 1 fat
Boiled Green Bananas	1.4 carb
Coconut Cream Pie	3 carb; 3 fat; 1 protein
Banana Fritter	1.5 carb; 1 fat
Cornmeal Fritters	2.5 carb; 0.5 nonstarchy vegetables; 6 fat
Oxtail Soup	1 medium-fat carb; 2 carb
Mango Chutney (sauce/gravy)	6.5 carb; 0.5 plant-based protein
Red Pea Soup	3 carb; 2.5 lean protein
Pumpkin Vegetable Curry Stew	1.5 carb; 1.5 fat; 0.5 protein
Pineapple Jam	1 carb
Pineapple upside-down cake	4 carb; 3 fat
Avocado Salad	2/3 carb; 2 fat
Pepper pot soup	2.6 carb
Bread pudding with run sauce	4.5 carb; 4 fat
Flour Dumplings	1.5 carb
Lime Squash	2 carb
Banana Cake	4 carb; 2 protein; 19 fat
Vegetable Patties	2.5 carb
Baked Banana	2 carb
Rice and Peas	6 carb; 3 protein; 12 fat
Codfish Fritters	3.13 carb; 1.85 lean protein; 3.6 fat
Turned Cornmeal (1)	1.5 carb; 4 fat
Turned Cornmeal (2)	2 carb; 6.5 fat
Boiled Yam and potatoes	5 carbs
Turned Cornmeal #1	2 carb; 6.5 fat; 1 medium-fat protein
Turned Cornmeal #2	4 carb; 6.5 fat; 1 medium-fat protein

Wheat Flour Cornmeal Boiled Dumplings	4 carb
Fried Dumplings/Johnny Cakes	1.13 carb; 0.3 lean protein
Turned Cornmeal	1.3 carb; 0.5 medium-fat protein
Jerk Sauce	0.5 non starchy vegetable-carb

Results

Results of the nutrient analysis demonstrated that 98% of the Caribbean food labels were accurate in nutrient composition with just 2% of the foods surveyed not meeting the estimated values provided by the labels. Based on this conclusion, the researchers were able to conclude that these culturally-specific imported foods followed the standard food label guidelines as stipulated by the FDA and USDA [43].

Those items identified as typical for this population as well as composite dishes were inputted into a dietary exchange layout set up to mimic that used for diabetics in the United States (**Tables 1-7** offer common items; **Tables 8-10** are an accounting of popular composite dishes in Jamaica). Research was undertaken to determine the appropriate serving size for each exchange. While certain staple foods of the Jamaican diet were ubiquitous in the American diet (i.e. white rice), other items were sufficiently unique (callaloo). Traditional influences on the Caribbean diet are diverse and include aspects of African, American Indian, European and East Indian food ways. Though spices are typically unique to each island culture, a number of carbohydrate rich items are held in common throughout the region such as rice, mango, okra and plantains [23].

The exchange list produced from this exercise **(Table 1-9)** may be useful as a specific tool for carbohydrate counting by individuals of Caribbean origin or ethnic heritage who struggle with diabetes or metabolic syndrome. In this capacity, it offers a means to better understand the relationship between diet and risk of chronic disease by providing a clear explanation of the amount of carbohydrates in typical Jamaican dishes. But this exchange list is also useful for nutritionists and RD's to understand typical foods consumed by those of Jamaican descent. It can also be used to design a nutritional intervention program by modifying the nutritional composition of the dishes to improve dietary quality for this population. Moreover, the dietetic exchange system can also be utilized as a tool for the assessment of food intake.

Dietary exchange approaches also offer a means to introduce culturally appropriate alternatives for individuals struggling to change their consumption patterns. For example, typical Jamaican fare often includes white rice; it has been asserted that most individuals of Caribbean ethnicity "do not feel satisfied" unless rice is included in their meal [44]. The exchange list offers several alternative suggestions that are more appropriate for those struggling with blood sugar levels. In particular, brown rice is a highly-preferred choice given that fiber, micronutrient and anti-oxidant levels are elevated (when compared to white rice) and that it is naturally low in dietary fat and sodium. Though the serving sizes are the same, brown rice is a whole grain, in that it contains the entire grain kernel. Research has consistently demonstrated that consumption of whole grains (including brown rice) contributes significantly to maintaining a healthy body weight, important for the prevention of diabetes as well as other chronic conditions [45]. Likewise, high consumption of white rice has been noted as a risk factor for diabetes, likely due to its' high glycemic index [46].

Since many of the dietary staples can be identified as relatively high in starch, it is important for the nutrition professional to have an understanding of the ways that such items fit into the Jamaican diet and what appropriate serving sizes are. There are many foods – common in Jamaica -- that an American-trained nutritional professional might not be familiar with and this tool serves as an excellent introduction.

Jamaica has no particular national food dish, such as the Moules-frites of Belgium or the roast beef of England. Ackee and saltfish is the closest thing possible to a dish that is believed to be infused with national character [23]. Ackee is a relatively bland fruit which is often compared to a banana. Rarely eaten raw or even by itself, ackee is often a component of many composite dishes. When combined with salt fish, which is a form of salt preserved cod, it forms a flavorful stew-like dish.

Another popular food for Jamaicans is bammy, the Jamaican name for a flatbread made of cassava (also known as yucca). It is widely available and versatile and is eaten with meals or by itself as a snack. Preparation of bammy is a labor intensive process so it is now commonly purchased and is typically toasted or fried [37].

Another food likely unfamiliar to the American-trained RD is Callaloo. Callaloo is the name of both a vegetable and a very common dish typically made with salt fish, tomatoes, onion, escallion, scotch bonnet peppers and oil, and which is often accompanied by breadfruit or boiled green bananas. Also known as amaranth and dasheen, callaloo, is a leafy green reminiscent of spinach. A rich source of calcium, vitamin A and iron, [44] this vegetable is found and consumed across the Caribbean.

Conclusions and Implications

The weakness of this study lies in the fact that the analyzed data addressed only one country (Jamaica) out of the many entities that comprise the Caribbean. Moreover, new appreciation for the relationship of culture and food demonstrates that food ways are not static, particularly in the age of the internet. Thus, the Jamaican recipes addressed in this study likely capture a snapshot of a continually changing phenomenon.

Likewise, while the dietary exchange created for this analysis provides an important educational tool for both RD's and clients alike, it must be acknowledged that there has been minimal analysis of the actual effectiveness of such approaches on changing consumption patterns.8 Evaluating

the efficacy of this dietary exchange constitutes the next step in moving this dietary exchange list forward.

The strengths of this study are numerous, including the fact that very few culturally-specific food exchange lists have been published with clearly stated methodologies and outcomes. Through the process outlined herein, a tool for carbohydrate counting comparable to the diabetes exchange list was developed that was deemed suitable for individuals consuming a traditional Jamaican diet. Moreover, by perusing this list nutrition professionals are offered tremendous insight into what individuals of Caribbean origin or heritage may be consuming.

Helping individuals who are struggling with stabilization of blood sugar to understand portion control, nutritional makeup and insulin response to these items will be a significant challenge. Tools such as the dietary exchange list described herein provide an excellent example of supportive measures that can be drawn into this endeavor. Nutrition and dietetics is sorely in need of more studies addressing the components of culturally specific diets such as the one offered here.

Jamaican food exchange list

Because many processed foods and composite dishes will have widely varying nutrient and energy composition, this list should be utilized as a guideline for the RD and client. **Tables 1-10** are intended to demonstrate food items as well as composite dishes that are most commonly incorporated into traditional Jamaican meals.

References

1. Boeing H (2013) Nutritional epidemiology: New perspectives for understanding the diet-disease relationship? European J Clin Nutr 67: 424-429.
2. Wheeler ML, Franz M, Barrier P, Holler H, Cronmiller N, et al. (1996) Macronutrient and energy database for the 1995 Exchange Lists for Meal Planning: a rationale for clinical practice decisions. J Am Diet Assoc Nov 96: 1167-1171.
3. Franz MJ, Barr P, Holler H, Powers MA, Wheeler ML, et al. (1987) Exchange lists: revised 1986. J Am Diet Assoc 87: 28-34.
4. Matteucci E, Giampietro O (2015) Dietary strategies for adult type 1 diabetes in light of outcome evidence. Eur J Clin Nutr 69: 285-290.
5. Coulston AM, Rock C, Monsen ER (2001) Nutrition in the prevention and treatment of disease. Academic Press, San Diego, California.
6. Geil P (2008) Choose your foods: exchange lists for diabetes: the 2008 revision of exchange lists for meal planning. Diabetes Spectrum 21: 281-283.
7. Wheeler ML, Daly A, Evert A, Franz MJ, Geil P, et al. (2008) Choose your foods: Exchange lists for diabetes, sixth edition, 2008: Description and guidelines for use. J Am Diet Assoc 108: 883-888.
8. Sidahmed E, Cornellier ML, Ren J, Askew LM, Li Y, et al. (2014) Development of exchange lists for Mediterranean and healthy eating diets: implementation in an intervention trial. J Hum Nutr Diet 27: 413-425.
9. Weech M, Vafeiadou K, Hasaj M, Todd S, Yaqoob P, et al. (2014) Development of a Food-Exchange Model to Replace Saturated Fat with MUFAs and n-6 PUFAs in Adults at Moderate Cardiovascular Risk. J Nutr 144: 846-855.
10. Fox M (2015) Global food practices, cultural competency, and dietetics. J Acad Nutr Diet Mar 115: 342-348.
11. Bawadi HA, Al-Sahawneh SA (2008) Developing a meal-planning exchange list for traditional dishes in Jordan. J Am Diet Assoc 108: 840-846.
12. Gregg J, Saha S (2006) Losing culture on the way to competence: the use and misuse of culture in medical education. J Assoc Am Med 81: 542-547.
13. Centrone Stefani M, Humphries DL (2013) Exploring culture in the world of international nutrition and nutrition sciences. Adv Nutr 4: 536-538.
14. Fadupin G (2009) Food exchange lists of local foods in Nigeria. Afr J Diabetes Med 17: 15-18.
15. Coulibaly A, O'Brien HT, Galibois I (2009) Development of a Malian food exchange system based on local foods and dishes for the assessment of nutrient and food intake in type 2 diabetic subjects. South Afr J Clin Nutr 22: 31-35.
16. Bawadi HA, Al-Shwaiyat NM, Tayyem RF, Mekary R, Tuuri G (2009) Developing a food exchange list for Middle Eastern appetisers and desserts commonly consumed in Jordan. Nutr Diet 66: 20-26.
17. Djuric Z, Vanloon G, Radakovich K, Dilaura NM, Heilbrun LK, et al. (2008) Design of a mediterranean exchange list diet implemented by telephone counseling. J Am Diet Assoc 108: 2059-2065.
18. Habib HM, Ali HI, Ibrahim WH, Afifi HS (2011) Nutritional value of 10 traditional dishes of the United Arab Emirates. Ecol Food Nutr 50: 526-538.
19. Luewanitwong S, Taechangam S, Pachotikarn C (2009) Development of an additional THAI food exchange list. Annals Nutr Metabol 55: 699-699.
20. Paik HY, Lee HK (1990) Korean food exchange system. Diabetes Res Clin Practice 9: 103-107.
21. Shovic AC (1994) Development of a Samoan nutrition exchange list using culturally accepted foods. J Am DietAssoc 94: 541-543.
22. Soto ZJ (1993) Exchange food list for phenylketonuria and maple-syrup-urine-disease. Archivos Latinoamericanos De Nutricion 43: 211-216.
23. Higman BW (2008) Jamaican food: history, biology, culture. University of the West Indies Press, Jamaica.
24. http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_13_1YR_B04003&prodType=table
25. Ghosh P (2012) Caribbean-Americans: an invisible minority seeking identity and affirmation. International Business Times.
26. Livingston IL, Neita M, Riviere L, Livingston SL (2007) Gender, acculturative stress and Caribbean immigrants' health in the United States of America: An exploratory study. West Ind Med J 56: 213-222.
27. Ferguson TS, Tulloch-Reid MK, Wilks RJ (2010) The epidemiology of diabetes mellitus in Jamaica and the Caribbean: A historical review. West IndMed J 59: 259-264.
28. Ferguson TS, Tulloch-Reid MK, Younger NO, Knight-Madden JM, Samms-Vaughan M, et al. (2010) Prevalence of the metabolic

syndrome and its components in relation to socioeconomic status among Jamaican young adults: a cross-sectional study. BMC Public Health 10: 307.

29. Ferguson TS, Younger N, Tulloch-Reid MK, Forrester TE, Cooper RS, et al. (2010) Prevalence of the metabolic syndrome in Jamaican adults and its relationship to income and education levels. West Indian Med J 59: 265-273.
30. Peter J, Riley CK, Layne B, Miller K, Walker L (2012) Prevalence and risk factors associated with erectile dysfunction in diabetic men attending clinics in Kingston, Jamaica. J Diabetol 2: 1-10.
31. Irving R, Tusié-Luna MT, Mills J, Wright-Pascoe R, McLaughlin W, et al. (2011) Early onset type 2 diabetes in Jamaica and in Mexico: Opportunities derived from an interethnic study. Rev Invest Clin 63: 198-209.
32. Wilks RJ, Sargeant LA, Gulliford MC, Reid ME, Forrester TE (2001) Management of diabetes mellitus in three settings in Jamaica. Pan Am J Public Health 9: 65-72.
33. Lancaster KJ, Watts SO, Dixon LB (2006) Dietary intake and risk of coronary heart disease differ among ethnic subgroups of black Americans. J Nutr 136: 446-451.
34. Rotimi CN, Cooper RS, Okosun IS, Olatunbosun ST, Bella AF, et al. (1999) Prevalence of diabetes and impaired glucose tolerance in Nigerians, Jamaicans and US Blacks. Ethn Dis 9: 190-200.
35. Derose KP, Escarce JJ, Lurie N (2007) Immigrants and health care: sources of vulnerability. Health Affairs 26: 1258-1268.
36. Thompson P (2012) Caribbean Calorie Counter: Conscious Eating Guide. Pelican Publishers, Kingston, Jamaica.
37. http://cooklikeajamaican.com/jamaican-bammy/
38. Quinn SL (2006) Lucinda's authentic Jamaican kitchen. Wiley, Hoboken, NJ.
39. Reynolds-James K (2012) Jamaican recipes cookbook. Vineyard Publishing, Kingston, Jamaica.
40. Sullivan C (2003) Classic Jamaican cooking: Traditional recipes and herbal remedies. Serif, London.
41. Atwater W, Bryant A (1900) The availability and fuel value of food materials. US Government Printing Office. Agriculture Experiment Station 12th Annual Report. Washington, D.C.
42. Thompson P (1990) Caribbean Calorie Counter. Nutrition and Diet Services, Kingston, Jamaica.
43. US Department of Health and Human Services (2013) A food labeling guide: guidance for industry. Center for Food Safety and Applied Nutrition, Washington, D.C.: US Department of Health and Human Services. pp: 1-130.
44. Holdip J (2006) Common Caribbean foods and your health. Cajanus 39: 1.
45. Liu S, Willett WC, Manson JE, Hu FB, Rosner B, et al. (2003) Relation between changes in intakes of dietary fiber and grain products and changes in weight and development of obesity among middle-aged women. Am J Clin Nutr 78: 920-927.
46. Sun Q, Spiegelman D, van Dam RM, Holmes MD, Malik VS, et al. (2010) White rice, brown rice, and risk of type 2 diabetes in US men and women. Arch Internal Med 170: 961-969.