

EXCHANGE LIST: A SYSTEMATIC REVIEW WITH EMPHASIS ON HISTORY AND DEVELOPMENT OF A MEAL-PLANNING EXCHANGE LIST WITH CULTURAL RELEVANCE

Mahnaz Cosser Ali Khan

(Phd Scholar)

Punjab University, Lahore, Pakistan

Head of Department Food Science and Human Nutrition

Kinnaird College for Women, 93 Jail Road, Lahore

Abstract

Objective

In recent years, the concept of food exchange list has burst out in both volume and importance for its use in the dietary management of chronic non-communicable diseases (NCDs); because of the sheer volume and diversity of this literature, a review article was deemed necessary to provide focus and clarity to the area.

Methods

A search was done using PubMed & Google Scholar till January 2016. Key words used were Food Exchange List, Diabetics, Development & Meal Planning.

Results

The present paper reviews literature on history and development of a meal-planning exchange list for traditional dishes with a special focus on its cultural relevance. Moreover, its use as an effective tool for meal management has also been deliberated.

Conclusion

Food exchange list is a user friendly tool for a healthy diet and dietary modification due to disease. This tool may help to customize meals for people as it provides information regarding various food items in different groups. It is also instrument for helping achieve weight loss goals, reducing blood & plasma glucose levels, maintaining lipid profile & effectively combating other diet related diseases & those ailments in which diet plays a significant role in maintenance & prevention from reoccurrences.

Key Words: Meal planning tool, exchange list, traditional dishes

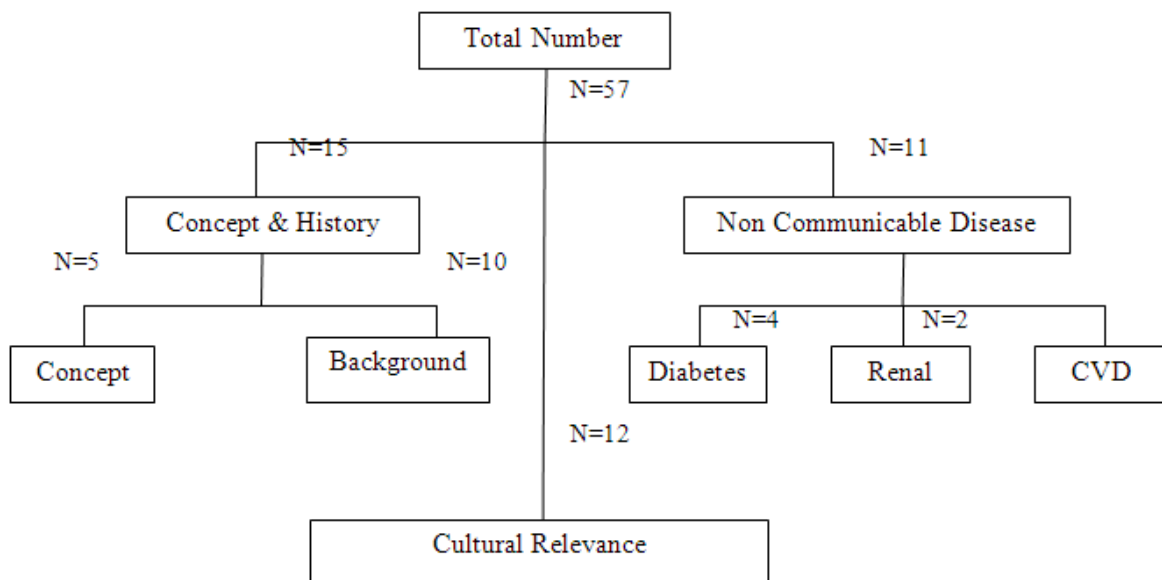
1. Introduction

The article summarizes literature in dietetics & meal planning. Meal planning guidelines have been developed for the purpose of achieving adequacy to dietary patterns. The meal plan is a guide which shows the number of food choices to be eaten at each meal & snack. Exchange List for Meal Planning was initially developed for diabetics in 1950 for managing the disease along with giving variety to diet. (Caso,1947)

2. Methods

A search was done using PubMed & Google Scholar till January, 2016. Key words used were Food Exchange List, Diabetics, Development & Meal Planning Exchange List. A total of 57 papers were relevant to the study were identified as shown in figure 1.

Figure 1



3. Food Exchange List

An exchange is a substitution, choice or serving. Foods have been divided into groups according to types & amounts of certain nutrients they contribute to the diet. Each food group consists of a list of measured or weighed foods of approximately the same nutritional value & within each food list, 1 exchange is approximately equal to another in terms of energy, carbohydrate, protein, & fat(Wardlaw, 2003)

Before 1950 planning a diet of a diabetic was chaotic & problems which led to noncompliance or inconsistency in food recommendations included long methods to calculate the composition of food & size of the recommended portion was stated in impractical measures. Thus by combining food groups of similar composition the first food exchange list evolved & is represented in Table 1.

Table 1 1950 Food Values For Calculating Diabetic Diets

Group	Amount	Weight (grams)	Carbohydrates (grams)	Protein (grams)	Fat (grams)	Energy (calories)
Milk, whole	½ pt	240	12	8	10	170
Vegetable, Group A	As desired	-----	-----	-----	-----	-----
Vegetable, Group B	½ cup	100	7	2	-----	36
Fruit	Varies	-----	10	-----	-----	40
Bread exchanges	Varies	-----	15	2	-----	68
Meat exchanges	1 oz	30	-----	7	5	73
Fat exchanges	1 tsp	5	-----	-----	5	45

4. Amendments

The exchange list was revised in 1976 which focused more on the energy content & in decreasing fat & cholesterol intake. Exchange list modifications included sub division of the milk category based on the fat content & included non-fat, low-fat, & whole milk to the milk exchange group; the vegetable group included all vegetables except starchy vegetables & listed all vegetables as ½ cup serving size, contributing an average of 25 kilocalories, for vegetable exchange; starchy vegetables were included in the bread exchange; the meat exchange category included medium & highfat meats & other protein-rich foods while the fat exchange was revised to show level of saturation as saturated or polyunsaturated fat (American Diabetes Association (ADA).1994) Nutrient analysis within the revised exchange list was carried out for various macro & micro nutrients using food composition data & the mean values were the same for the macro-nutrients within the food groups except for milk (Wyse BW. 1979)

The next revision of the food exchange list was in 1986 & food were categorized in 6 groups according to its energy content & a user friendly tool “Healthy Food Choices” was developed for meal planning. Emphasis was placed on reducing the sodium intake & increasing the fiber intake by placing symbols to food high in these.(Franz et al, 1986)The nutrient value assigned to some exchanges was also in cooperated in the 1986 food exchange list (Table 2).

Table 2 Comparison of Nutritional Values per Serving of the 1986 and 1976 A.D.A. Exchange Lists (Easton, 1991)

	1986				1976			
Food Group	CHO	Protein	Fat	Energy	CHO	Protein	Fat	Energy
	grams	grams	grams	kcal	grams	grams	grams	kcal
Starch/Bread	15	3	--	80	15	2	--	70
Meat/meat Substitute								
Lean	--	7	3	55	--	7	3	55
Med.fat	---	7	5	75	---	7	5.5	77.5
High Fat	---	7	8	100	---	7	8	100
Vegetables	5	2	--	25	5	2	--	25
Fruits	15	--	--	60	10	--	--	40
Milk								
Skim	12	8	----	90	12	8	----	80
Low fat	12	8	5	120	12	8	5	120
Whole	12	8	8	150	12	8	8	150
Fat	---	---	5	45	---	---	5	45

The food exchange list was again modified in 1995 based on the American Diabetes Nutrition Recommendations 1994. The goals of the revision included providing flexibility in food choices by grouping carbohydrate sources in one section; updated the list of food database by including fat modified foods, vegetarians’ foods & fast food items to allow more accurate calculations of exchanges from nutrient information on labels, recipes & prepared foods. The most significant revision was the order & grouping on the list. The Carbohydrate Group included foods from the starch list, fruit list, milk list & other carbohydrates (a new list of foods was added), each list represented food with 15 grams of carbohydrates & could be interchanged with each other in a meal plan.(Wheeler et al, 1996) No major change was made in the vegetable group, Meat & meat substitute group was divided into very lean, lean, medium fat & high fat meats & meat substitutes The fat group was divided into monounsaturated, polyunsaturated & saturated fats with emphasis to reduce total fat especially saturated fat.(Holler, 1996)

Any dietary tool can only be valid if it keeps up with the current research & consequently food exchange list was again revised in 2003. The food list was updated & other carbohydrate list was elaborated & renamed as sweet, desserts & other carbohydrates list. However the nutrient value of 1995 & 2003 list remained the same.(American Diabetes Association (ADA), 2003)

The fifth revision of the Exchange List for Meal Planning came in 2008 with a new title of *Choose Your Foods: Exchange List for Diabetes*.(Wheeler et al, 2008) This tool was designed to assist in translating evidence based nutrition recommendations into healthful eating choices.(Geil P. 2008) This edition saw changes in the categorization of food groups although the energy content & macronutrient per serving remained the same. The “ Starch+ fat” category was moved from the starch list & placed in the other Starch list & marked with a label indicating extra fat or prepared with extra fat. Dried fruits were added in the fruit list with a 2 tablespoon count as one fruit choice or exchange. A new category of “Dairy –Like Foods” was included in the Milk Group. Similarly “Plant –Based

Proteins” like beans, soy-based foods were included in the Meat & meat Substitutes category. The Non starchy Vegetables was widely expanded & so was the Sweet, Desserts & Other Carbohydrates Group.(American Diabetes Association (ADA), 2008)The free food category was renamed & called “Modified –fat Food with Carbohydrate” & the Combination Foods & Fast food lists were subdivided for ease of use; an alcohol list was also added & choices were listed against 100 kcalories.(American Diabetes Association, 2008)

5. Culturally Relevant Food Exchange List

Traditional foods hold significant cultural values & contemporary dietary patterns are established on these values. The major aspect of developing dietary habits is the influence of culture & trend of eating traditional foods. However, there are other factors dominant in changing the dietary patterns. The information available for traditional foods help people monitors their intakes. Therefore, the nutritional values especially the macronutrient content of traditional foods should be provided to all the consumers.(Trichopoulou et al, 2007)

Health issues are the most common concern in all parts of the world. Researchers have been & are conducting studies to alleviate these problems. In 2009, a study was conducted in Mali, Africa to evaluate the traditional diets of diabetic patients leading to the development of Malian exchange list(Coulibaly et al, 2009).additionally obesity a major cause metabolic disorders including Diabetes paved the way for the development of the Samoan food exchange list. The nutrition related issues of this nation could not be addressed properly due to lack of culturally relevant exchange lists therefore; a new exchange list with traditional foods items was developed including commonly consumed food in Samoan(Shovic. 1994). Many countries have thus developed food exchange list according to their cultural needs. Since no standard of traditional foods existed in Nigeria before 2000, consequently a food exchange list development became obligatory.(Fadupin et al, 2000)Local Nigerian foods were standardized &Nigerian food exchange list was created for diabetic patients & those requiring dietary supervision. Fadupin further extended his research in 2009 by assigning different local foods both raw & cooked to their relevant food groups.(Fadupin, 2009)

The researches have been carried out to develop the weekly menu for the traditional diet for different countries, leading to the development of national food Based Dietary Guidelines. The dietary guidelines for Greece were developed &included adequate levels of fiber; low levels of saturated fat & increased intake of fruits & vegetables.(Moschandreas&Kafatos. 1999)A weekly menu, representative of the Greek traditional diet, was also developed & the analysis of many traditional Greek foods has also been conducted. The main purpose was to register the traditional foods according to their macronutrient content.(Trichopoulou et al, 2006)

A different aspect was addressed for development of food exchange list in Taiwan where an 80 kilocalorie rice unit was established. The target population for this food exchange list was Chinese patients living in Taiwan who suffered drawbacks from the old exchange list due to several reasons including the food classification on non-nutritional grounds, major nutrient unawareness & discrepancy in food categories. The new exchange list was based on new groups that were carbohydrates, proteins & fats. Rice the staple food of Chinese nation was the basis of this research in each group which is why it is best suited to the Chinese.(Hung CT. 1989)

Jordan is also amongst the country which shows an alarming increase in the prevalence of these diseases.(Quam et al. 2006) In Jordan, the development of a national food exchange list has made it possible for the food & nutrition professionals to include traditional dishes in meal plans.(Bawadi et al.2009)

A culturally sensitive tool was also developed for Mexican individuals with diabetes, this tool also uses the food groups of USDA Food Pyramid as a base of developing “Apple of Health”. However, the apple of health includes beans in both grains & meat group as it is the second source of protein for middle & low income classes. (Jiménez et al.)

The food exchange lists have been modified for different cultures yet little data is found for the Pakistani culture. The issue was only addressed recently by Khan where chapatti, a staple food of Pakistan was assessed for its size & corresponding weight so that it could be incorporated as part of the food exchange list. This study focuses on the nutrient content of only chapatti as it is served with the main course of every Pakistani cuisine yet its size & weight has not been standardized & difference in thickness of the chapatti will lead to varying nutrient content & consequently number of exchanges. The study concluded that a small chapatti (15 cm across and 4 mm thick) contributes 37.5 grams carbohydrates and consequently 2.5 carbohydrate exchange while a medium (19 cm across and 4 mm thick) & large chapatti (24 cm across and 4 mm thick) contain 56 grams and 75 grams and yields 4 and 5 carbohydrate exchange respectively. (Khan et al. 2015)

6. Tool for Meal Planning

Food Based Dietary Guidelines are an appropriate tool for effective nutrition education, intended for improving nutrition knowledge, attitudes & dietary behaviors both at an individual and community level. (Love et al. 2001)

However, to convert these dietary guidelines into a more accurate dietary tool which could measure the amount of energy along with the macro-nutrient intake is accentuated. Exact menus and food amounts are a prerequisite to ascertain nutrient adequacy of any Food Based Dietary Guidelines. (Kersting et al. 2005)

The usefulness of the ADA exchange list for Type 2 diabetics was assessed in planning breakfast for type 2 diabetic patients were given four different breakfast plans which contained almost the same amount of macronutrients i.e. carbohydrates, fats & proteins which helped in controlling blood glucose levels within the body. (Nutall et al. 1983) Additionally, the exchange list can be used as a means of providing medical nutritional therapy to clients. (Kuroda & Matsuhisa. 2012) As stated earlier, the diabetic exchange list has the benefits of giving healthy food choices to patients. There are researches which are investigating if diabetic patients can have the choice of eating sugary items such as ice creams and apple pies. (Cabot EE. 1971)

The major aspect in nutrition is the understanding of the exchange list and availability of the macro & micro nutrients available from the local foods and for this purpose exchange list will be required. Working in reduced resources requires local foods to be incorporated in the menu planning & overcoming under nutrition. (Bryce et al. 2008)

Furthermore, the efficacy of the exchange list was documented in a study conducted in Korea in 2009. Exchange lists were compared with Bowl-Based meal plans in diet planning for Korean diabetic patients. The results depicted no difference in the understanding of the instructions & observance of the plan. In addition, there was difference in the carbohydrates, fat & protein intake of both groups. It was analyzed that bowl based plan was equally effective in menu planning even though it required little time for instructions giving. (Ahnet et al. 2009)

7. Conclusion

Food exchange list is a user friendly tool for inculcating healthy eating habits besides managing those chronic non communicable diseases, for which dietary modification is a corner-stone

of treatment. Nevertheless food exchange list should be developed by each country so as to make it culturally sensitive & revised periodically.

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