

# Recent Tendency of Nutritional Therapy for Diabetes Including Low Carbohydrate Diet (LCD)

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## ABSTRACT

**Keywords:** Calorie Restriction (CR); low carbohydrate diet (LCD); Look AHEAD (Action for Health in Diabetes); American Diabetes Association (ADA); Mediterranean Diet

**Abbreviations:** CR: Calorie Restriction; LCD: Low Carbohydrate Diet; ADA: American Diabetes Association; G-I-N: Guidelines International Network; AHEAD: Action for Health in Diabetes; MACE: Major Cardiovascular Events; MNT: Medical Nutrition Therapy

## Editorial

As for nutritional therapy, the discussion concerning Calorie Restriction (CR) and Low Carbohydrate Diet (LCD) has been continued. Among them, LCD has shown predominance of efficacy for glucose variability in the diabetes. Author and colleagues have continued clinical research of CR and LCD for years, in which the effect of LCD has been shown [1]. Recent study also indicated the clinical efficacy of LCD by systematic review [2].

On the other hand, the development of standards for guideline would give medical organizations to ensure that recommendations come from various evidence and help medical staffs recognize high-quality guidelines [3]. For this process, the Guidelines International Network (G-I-N) becomes a network of guideline developers across the world. Consequently, clinical practice guidelines have been developed for years, and increasingly prominent for broad areas. Among them, those become most beneficial tools for standard decision making in various specialties [4]. A variety of guidelines were categorized by organizations as consensus-based or evidence-based background.

There is a significant report of the Look AHEAD (Action for Health in Diabetes) trial for 4901 participants [5]. They studied the prediction effect of intensive lifestyle intervention for Major Cardiovascular Events (MACE) risk, which include all

possible treatment-by-covariate interaction terms. As a result, hazard ratio from quartile 1-4 was 0.64, 0.81, 1.13 and 1.37, respectively. It proved to be a significant treatment benefit of intensive lifestyle intervention. Consequently, Look AHEAD study showed the efficacy of reducing cardiovascular events by lifestyle intervention, associated with medical history, physical examination, and laboratory values [5]. There was a significant Consensus report by American Diabetes Association (ADA) in 2019 [6]. It was intended to give clinical professionals basal evidence-based guidance concerning individualizing nutrition therapy for diabetes or prediabetes. Several important strategies for improving and maintaining glycemic targets would include weight control, improving cardiovascular risk factors (blood pressure, lipids, etc.) within individualized targets.

There is not an ideal eating plan or eating type for the management and prevention of diabetes. Because diabetic people show a broad spectrum of diabetes and prediabetes, associated a variety of co-occurring conditions, personal preferences, cultural situations and socioeconomic backgrounds. According to various research for diabetes, there are several choices of eating patterns, which can lead people to healthier goals and quality of life. As one of the standard guidelines, Medical Nutrition Therapy (MNT) was shown as the fundamental diabetes management plan by the ADA. Further-

more, MNT will be reassessed by several health care providers in frequent times for changing life stages and health situations in the future [7,8]. Current consensus report includes guidelines on pre-diabetes, which was not informed in last edition in 2014 [9]. The characteristic point of this edition would describe prediabetes, type 1 and 2 diabetes mellitus. Nutrition treatment for gestational diabetes and children is shown in other ADA publications, which is Standards of Medical care in Diabetes in 2019 [8].

The present consensus report has revealed the fundamental comment as follows [6]. They are

- a. Reducing overall carbohydrate intake for diabetic individuals has demonstrated the most evidence for improving glycemia and may be applied in a variety of eating patterns that meet individual needs and preferences, and
- b. For select T2DM adults not meeting glycemic targets or where reducing ant glyceic medications is a priority, reducing overall carbohydrate intake with low- or very low-carbohydrate eating plans is a viable approach. There are some consensus recommendations for eating patterns [6]. They include
  - a. A variety of eating patterns are acceptable for the management of diabetes,
  - b. Health care providers should focus on the key factors that are common among the patterns, until the evidence surrounding comparative benefits of different eating patterns in specific individuals strengthens. Some examples are shown, including
  - c. Emphasize non-starchy vegetables.
  - d. Minimize added sugars and refined grains, and
  - e. Choose whole foods over highly processed foods to the extent possible.

The report includes 9 types of nutritional therapy, which are described in the following.

- a. U.S. Department of Agriculture (USDA): Dietary guidelines for Americans: it emphasizes various vegetables including fruits, grains lower fat dairy and protein foods [10].
- b. Mediterranean Diet: It emphasizes plant-based food, fish, seafood, olive oil, dairy products in low to moderate amounts, typically fewer than 4 eggs/week, red meat and wine in low frequency and amounts and rarely concentrated sugars or honey. It reduces risk of diabetes, A1c value, triglycerides and risk of major cardiovascular events. There are several evidences concerning clinical efficacy [11,12].
- c. Vegetarian or Vegan: It emphasizes plant-based vegetarian eating, and devoid all flesh foods without egg or dairy products. It can reduce risk of diabetes, A1c value, body weight, and lower LDL-C and non-HDL-C [13,14].

d. Low-Fat: It emphasizes vegetables, fruits, starches, lean protein sources, and low-fat dairy products. It has some effects for reducing risk of diabetes and body weight [15,16].

e. Very Low-Fat: It emphasizes fiber-rich vegetables, beans, fruits, whole intact grains, nonfat dairy, fish, and egg whites and comprises 70–77% carbohydrate (including 30–60 g fiber), 10% fat and 13–20% protein. It would lower blood pressure and body weight [17].

f. Low-Carbohydrate Diet (LCD): It avoids starchy and sugary foods such as rice, pasta, bread, potatoes, and sweets. There is no consistent definition of LCD. In this review, LCD is defined as reducing carbohydrates to 26–45% of total calories. Its effects include A1C reduction, weight loss, lowered blood pressure, increased HDL-C and lowered triglycerides [18-20].

g. Very Low-Carbohydrate Diet (VLCD): It often has a goal of 20–50 g of nonfiber carbohydrate a day to induce nutritional ketosis. In this review, a VLCD eating pattern is defined as reducing carbohydrate to less than 26% of total calories [18-20].

h. Dietary Approaches to Stop Hypertension (DASH): It emphasizes vegetables, fruits, and low-fat dairy products and includes whole intact grains, poultry, fish, and nuts. In contrast, it reduces in saturated fat, red meat, sweets, and sugar-containing beverages. It can reduce risk of diabetes, body weight and blood pressure level [21,22].

i. Paleo: It emphasizes foods theoretically eaten regularly during early human evolution. It includes lean meat, fish, vegetables, shellfish, eggs, nuts and berries, and avoids grains, dairy, salt, refined fats, and sugar. It probably has mixed results and inconclusive evidence [23,24].

## Conclusion

In conclusion, further recommendations for individualization of goals can be observed in the ADA Standards of Medical Care in Diabetes 2019 [8]. Important focus of management for diabetes would be

- a. Achieving and maintaining body weight goals and
- b. Making delay or prevention of complications of diabetes. This article would be expected to become a reference of nutritional therapy for diabetes in the future.

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