Diabetes Research: Open Access

Editorial

DOI: https://doi.org/10.36502/2021/droa.6182

# Recent Tendency of Nutritional Standard for Diabetes Mellitus with Chronic Kidney Disease (CKD) and Arteriosclerotic Cardiovascular Disease (ASCVD)

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**Received date**: 17 September 2021; **Accepted date**: 22 October 2021; **Published date**: 28 October 2021

**Citation:** Bando H. Recent Tendency of Nutritional Standard for Diabetes Mellitus with Chronic Kidney Disease (CKD) and Arteriosclerotic Cardiovascular Disease (ASCVD). Diab Res Open Access. 2021 Oct 28;3(2):33-37.



## Abstract

Ministry of Health, Labor and Welfare, Japan proposed new edition of standard nutritional guideline. Target BMI is 20-24.9 for 50-64 years, and 21.5-24.9 for >65 years. Japanese Elderly Diabetes Intervention Trial (J-EDIT) study reported U-shaped association between BMI and mortality, and elevated mortality in elderly with energy intake below 30 kcal/kg/day. American Diabetes Association (ADA) showed consensus report that i) weight can be reduced by 5% as immediate goal, ii) various eating patterns can be applied such as low carbohydrate diet (LCD). Patients with diabetes and chronic kidney disease (CKD) cannot decide ideal intake amount of protein and salt.

## Keywords

Ministry of Health, Labor and Welfare Japan, Japanese Elderly Diabetes Intervention Trial (J-EDIT), Low Carbohydrate Diet (LCD), Chronic Kidney Disease (CKD)

## Abbreviations

J-EDIT: Japanese Elderly Diabetes Intervention Trial; LCD: Low Carbohydrate Diet; CKD: Chronic Kidney Disease

Non-communicable diseases (NCDs) have been recently prevalent worldwide [1]. They include diabetes mellitus (DM), hypertension, dyslipidemia, obesity, hyperuricemia. Furthermore, arteriosclerotic cardiovascular disease (ASCVD) has been in focus. As related to these, adequate daily nutrition and its balance would be important. In Japan, we have various nutritional research for maintaining health long years [2]. The Ministry of Health, Labor and Welfare, Japan has proposed new edition of standard nutritional guideline, and then some essence of them will be introduced [3].

The crucial points in the edition would be i) focus to elderly people concerning frailty and less intake of protein, ii) management of life-style related diseases including DM, hypertension, dyslipidemia and chronic kidney disease (CKD). Regarding these diseases, each medical association has proposed each nutritional standard [4]. However, the contents have not been

integrated and associated because of some equivocal perspectives.

At present, the pathophysiology and actual eating status of diabetes are various, then uniform nutritional guidance cannot be indicated (**Fig-1**). The research concerning obesity and all-cause mortality was conducted from 239 prospective study with 10.6 million cases from 4 continents [5]. The result showed the relationship of them supporting the strategies to deal with excess adiposity in populations. From the survey of BMI and mortality, the lowest mortality rate ranges 20-25 for Asia and other countries. The target BMI would be 20-24.9 for 50-64 years, and 21.5-24.9 for > 65 [3]. It is difficult to decide suitable BMI range alone, because of other related factors.

Formerly, clear evidence was not shown for desirable proportion of nutrient intake for DM. Consequently, its proportion would be determined flexibly due to individuals on their age, physical exertion, complications, physical exertion and preferences [6]. For Type 2 DM (T2DM), energy expenditure, dietary intake and physical activity were

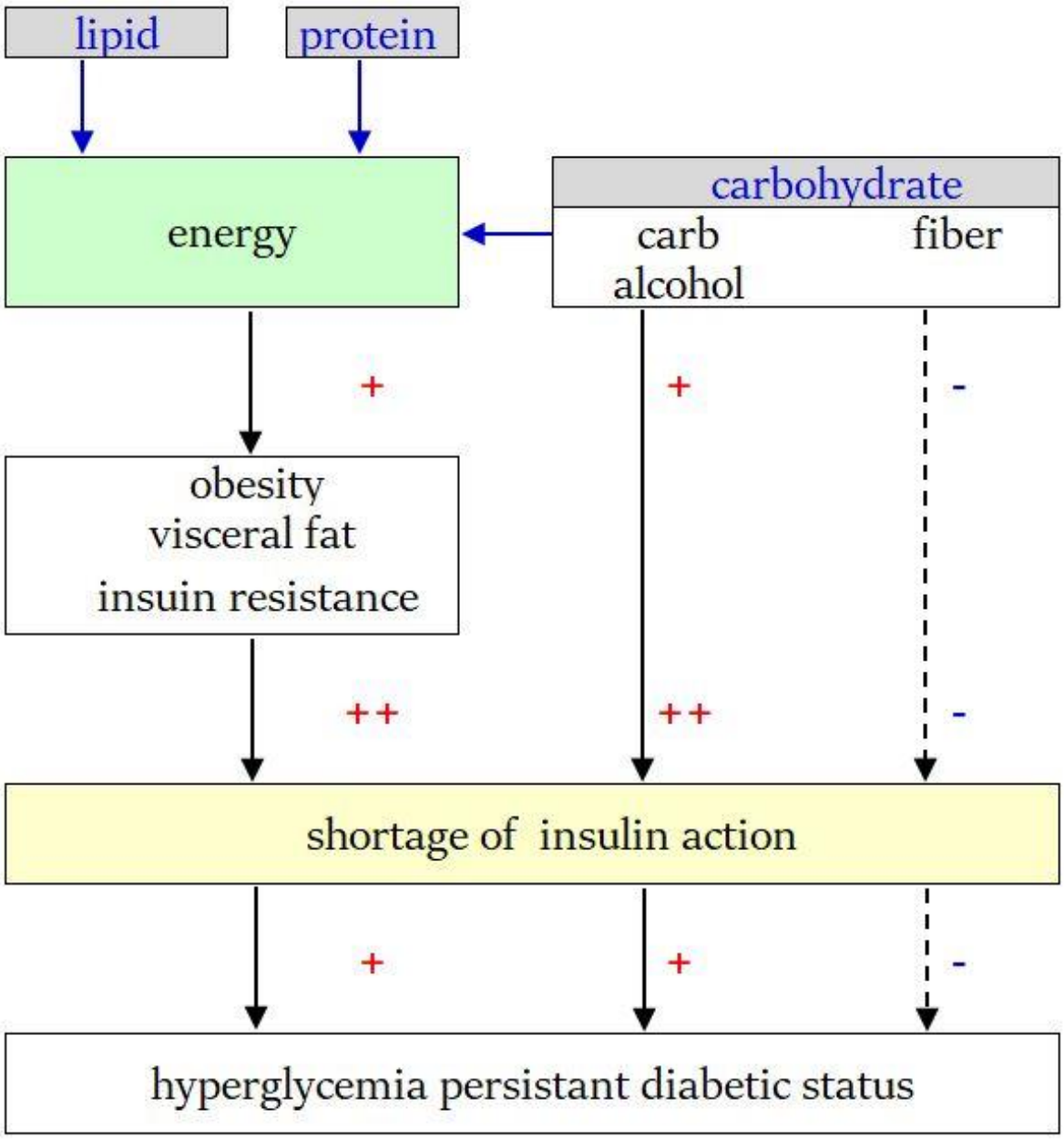


Fig-1: Relationship among nutrients, energy, diabetes and NCDs

studied using the doubly labeled water (DLW) method [7]. As a result, former 2 values were not significantly different between T2DM and controls. For energy balance research, there was a study of Clinical Evaluation of Energy Requirements in Patients with Diabetes Mellitus (CLEVER-DM). Among the data of CLEVER-DM, total energy expenditure (TEE) was investigated for diabetic patients and controls. The research was conducted using physical activity level (PAL) and DLW [8]. Consequently, TEE showed comparable and no difference between DM and controls.

Recent diet consensus report of American Diabetes Association (ADA) showed that reducing obesity by optimizing total energy intake is important for diabetes prevention and management. It can be reduced by 5% as immediate goal [9]. Regarding weight reduction in obesity and DM, low carbohydrate diet (LCD) has been attracting attention instead of previous calorie restriction (CR), where LCD has been spreading widely [10]. The guideline of ADA 2021 proposed several nutrition therapy recommendations. Among them, item 5.14 has evidence level B, in which i) reducing overall carbohydrate intake has demonstrated the most evidence for improving glycemia and ii) it may be applied in various eating patterns for individual needs and preferences [11].

For elderly DM patients, low-intensity physical activity (LPA) would become a key determinant of TEE. Consequently, increasing LPA for frailty prevention and encouraging nutritional intake will be recommended [12]. A study was conducted from 756 patients for analyzing the relationship between baseline nutrient intake and total mortality [13]. As a result, U-shaped association was found between them, suggesting that optimal energy intake may range widely for preventing excessive nutrition and/or malnutrition. A recent study of Japanese Elderly Diabetes Intervention Trial (J-EDIT) reported elevated mortality in elderly diabetes with energy intake below 30 kcal/kg/day [13].

As regards to T2DM, relationship between protein intake and mortality risk was investigated. Cases were 2494 elderly patients from two prospective longitudinal studies [14]. Protein intake amount (/kg/day) was categorized into quartile groups. Adjusted hazard ratio (HR) was 2.26, when compared with highest and lowest quartiles. By subgroup analyses, significant relationships were found between low protein intake and mortality in the group of more than 75 years or less than 65 years. The results suggested that adequate protein intake would be required in elder DM patients.

For J-EDIT study, diabetic complications and sodium intake were investigated [15]. Cases were 912 patients aged 65-85, and analyzed for quartiles. Among the group of decreased vegetable intake (<269 g/day), incidence ratio of retinopathy was studied for quartiles of sodium intake from 2.5g to 5.9g/day (group 1,2,3,4). HR in 2,3,4 quartiles was 0.87, 2.61 and 3.70, respectively. Consequently, increased sodium intake for low vegetable intake situation may bring high incidence of retinopathy in elderly T2DM.

Elderly people often have multiple organ disorders such as CKD. Therefore, it is indispensable to evaluate the nutritional intake balance, amount and swallowing function [16]. Patient with frailty and renal disorder shows nutritionally contradictory directions, then to indicate ideal nutritional treatment is difficult. Furthermore, there are also different food cultures, a wide variety of ingredients and individual taste preferences [17]. Each main nutrient has certain requirement, but enough evidence was not present for satisfactory nutrient ratio. No evidence was found that certain nutrient intake ratios are absolutely effective for diabetes. Therefore, some kinds of diets patterns have been reported, such as CR, LCD, carbohydrate-reduced high-protein diet, Mediterranean diet, and so on [18,19].

Diabetes mellitus seems to have underlying common pathophysiology of chronic illnesses. Therefore, the nutrient balance is crucial medical issue to be examined for prevention and treatment. Some examples are as follows: carbohydrate for HbA1c [20], lipid for arteriosclerosis [21], salt/protein for diabetic nephropathy, and total energy intake for obesity [22]. These methods cannot be simultaneously conducted. Generally, therapeutic diet for diabetes includes the fundamental nutritional perspectives. Furthermore, each patient has complications and various conditions,

and then each treatment will be hopefully individualized in the future.

## Conflict of Interest

The author has read and approved the final version of the manuscript. The author has no conflicts of interest to declare.

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**Keywords: Ministry of Health, Labor and Welfare Japan, Japanese Elderly Diabetes Intervention Trial (J-EDIT), Low Carbohydrate Diet (LCD), Chronic Kidney Disease (CKD)**