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Research Article

The Lack of the Knowledge about the Postprandial Blood Glucose by the Education using the Single Absolute Tool for the Diabetic Dietary Therapy in Japan

Summary

The diabetic dietary therapy is the primary strategy to control and prevent the progression of diabetes and its complications.

Energy counting based on diabetic food exchange lists, in which 1 exchange unit is equivalent to 80 kcal, has been used as the single absolute tool in dietary education in Japan for patients with diabetes for 1993 to 2013 by Japan Diabetes Society. And the 5th and 6th editions of this material had put emphasis on only energy intake and made light of the fact that the postprandial blood glucose levels depend on carbohydrate intake. This approach may have created a misunderstanding among Japanese people that postprandial blood glucose levels are dependent on energy intake.

We herein conducted a pilot survey to determine whether 19 diabetic patients undergoing maintenance hemodialysis were aware that “the dietary intake of carbohydrates, not energy has a major effect on postprandial blood glucose levels, while dietary fat and protein have a minimal effect” just before starting carbohydrate counting education to these patients, and repeated the survey with 15 allied health professionals and 22 physicians nationwide who were qualified as Fellows of the Japanese Society for Dialysis Therapy.

The results obtained revealed that 18 out of the 19 patients, all allied health professionals, and 21 out of the 22 physicians misunderstood that energy intake was responsible for raising blood glucose levels after meals, irrespective of the types of nutrients consumed.

These results revealed that most of medical staffs as the representatives of the Japanese public people and the diabetic dialysis patients did not know the important element in the diabetic dietary therapy.

Introduction

In Japan, the number of dialysis patients has reached 304856 at the end of 2011. The most common primary cause of renal failure among new dialysis patients was diabetic nephropathy (44.3%). Diabetic nephropathy was also the most common primary disease among the entire dialysis patient population (36.7%), exceeding chronic glomerulonephritis (34.8%), which had been the highest until at 2010 [1]. As the same of Japan, the most common primary disease among dialysis patients is diabetes mellitus in Southeast Asian developing countries [2]. The diabetic dietary therapy is the primary strategy to control and prevent the progression of this disease and its complications.

Because of this reasons, the methodology of diabetic diet is the most important matter.

Carbohydrate counting, a strategy used in dietary therapy for diabetes, is based on “the postprandial rise in blood glucose levels being primarily affected by ingested carbohydrates”. This method has been widely accepted and used since 1993, when its usefulness was

demonstrated in the United States, owing to the advantage being easily understood by patients [3-6]. In terms of renal failure, the US National Kidney Foundation provides information about carbohydrate counting on their website under the title of “Carbohydrate counting with chronic kidney disease” and recommends it as a common dietary therapy for patients with chronic diabetic nephropathy and end-stage renal failure [7]. In contrast, energy control/counting using Japanese original food exchange lists, in which 1 exchange unit is equivalent to 80 kcal, has been used in dietary education in Japan for patients with diabetes [8,9]. Therefore, this information on the US National Kidney Foundation website [7], namely, the difference between the approaches employed in the United States and Japan, were unexpected as we considered blood glucose levels to be dependent on energy intake. Furthermore, Life with Diabetes, a guidance book for patients that was published in the United States in 2004, stated that dietary carbohydrate, not fat or protein, determined postprandial blood glucose levels [6].

This pilot study investigated whether health professionals, including physicians, and patients in Japan shared the



misunderstanding that “it is energy intake that affects postprandial blood glucose levels.”

Subjects and Methods

This study involved 19 diabetic patients undergoing maintenance hemodialysis at Eijin Clinic (10 men and 9 women; mean age, 61.7 ± 10.3 years; mean dialysis period, 3.5 ± 4.0 years; 15 insulin users and 4 nonusers), in whom dialysis had been initiated at the Nephrology Departments of 1 university hospital and 2 general hospitals. These patients were asked whether they were aware that the dietary intake of carbohydrate, not energy (calorie), had a major effect on postprandial blood glucose levels, while dietary fat and protein had a minimal effect during their first instruction session in the basics of carbohydrate counting between March and July 2012. They were shown 2 photos at one time, one of 150 g of cooked rice (240 kcal) and one of grilled loin steak topped with butter (620 kcal), and were asked: 1) which diet results in a higher postprandial blood glucose level, and 2) whether they were aware that the dietary intake of carbohydrate, not energy (calorie), had a major effect on postprandial blood glucose levels, while dietary fat and protein had a minimal effect. These questions were administered to 10 nurses and 5 clinical engineers working in the dialysis unit of the clinic, as well as to 22 physicians (Fellows of the Japanese Society for Dialysis Therapy) recruited nationwide during the same time period.

Results

Although 4 patients responded to the first question, based on their experience, with the statement that cooked rice raised blood glucose levels more quickly, only 1 out of the 19 patients provided the correct answer that carbohydrate, not energy, intake determined postprandial blood glucose levels, while dietary fat and protein were minor determinants. The remaining 18 patients believed that the source of blood glucose was dietary energy intake. All health professionals, except for one Fellow of the Japanese Society for Dialysis Therapy who was also a board certified diabetologist registered by the Japan Diabetes Society, misunderstood that dietary energy intake was the primary factor responsible for raising blood glucose levels after meals, irrespective of the types of nutrients consumed.

Discussion

The present pilot study revealed that dialysis patients and health professionals, including physicians, working in dialysis care misunderstood that energy intake was directly linked to postprandial blood glucose levels, irrespective of the types of nutrients consumed, and most of the respondents were not aware that the primary dietary source of blood glucose was carbohydrates. The Japan Diabetes Society was aware of the important defect of the 5th and 6th editions of their original educational tools for Japanese diabetic patients, medical workers, and moreover Japanese people. The 7th edition of food exchange lists, revised in 2013, stated that “it is carbohydrates that raise blood glucose levels after meals”, which may help bring this

correct information to a larger proportion of the general public in Japan [8,9].

Diabetic nephropathy was also the most common primary disease among the entire dialysis patient population in Asian developing countries [2]. However, there are not any dietitians and any dietary guidelines for the diabetic diet therapy in some of these countries. The past bitter experience in Japan, which this study showed, may be useful for them to select the better dietary methods.

The limitations of this study include the use of both maintenance hemodialysis patients, in whom dialysis had been initiated at three institutes, and allied health professionals from a single facility, and the small sample of dialysis physicians surveyed. However, the nationwide recruitment of these physicians may support the generality of the results.

Conclusion

The low level of awareness in Japan suggested in this study will be improved in the future, given that current dietary education for diabetic patients focuses on carbohydrates as the primary dietary determinant of postprandial blood glucose levels. In order to achieve further improvements, individualized, rather than uniform, dietary guidance and nutrition education materials need to be provided to each patient.

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