

Nutritional Diabetes Education: More than Just Nutrients



Pablo Hernandez^{1*}, Freddy Contreras² and Manuel Velasco³

¹Human Nutrition Professor, Central University of Venezuela, Venezuela

²Professor of Pathophysiology, Central University of Venezuela, Venezuela

³Professor of Pharmacology, Central University of Venezuela, Venezuela

Submission: September 14, 2017; **Published:** September 16, 2017

***Corresponding author:** Pablo Hernandez, Human Nutrition Professor, Central University of Venezuela, Venezuela, Tel: +58-414.256 1345; Email: doctuscumliber@gmail.com

Abstract

There is sufficient evidence to support the positive effectiveness of nutritional diabetes education with collaborative information, lifestyle, and skills teaching interventions among patients with diabetes improve patients' nutritional and clinical status, effectiveness of treatment, quality of life and survival. Nevertheless, it is not just talk about nutrients; the nutritional diabetes education is more complex. A patient who receives the information turns it into knowledge through mental processes and is in control of what they learn and what they do with the information. Thus, an effective nutritional diabetes educator finds ways to develop the skills to 'sell' their messages by tailoring them to suit the individual. The better informed, more accomplished diabetes educators will succeed in helping their patients to maintain better control. This review summarizes current research findings on the nutritional management of DM and diabetes education, in order to promote an improvement in everyday application of nutritional diabetes education.

Keywords: Diabetes mellitus; Diabetes education; Nutritional therapy; Self-management

Introduction

Diabetes has become a major public health problem for the global increasing prevalence of diabetes. There will be 366 million people with diabetes in 2030, a growing public health concern across the world [1]. Therefore, robust strategies aimed at the prevention and treatments of diabetes are needed.

In early 1920s, Joslin emphasized the importance of diabetes education and in the 1970s Miller demonstrated with evidence a link between reduced hospital admissions for ketoacidosis and hypoglycemia and diabetes education [2]. Actually researches suggest knowledge is important, in general, low level of knowledge is associated with unfavorable nutritional behaviors [3]; however, knowledge alone is not enough to encourage people to engage in effective self-care. We must focus on a good therapeutic relationship. Patients with diabetes often fear that disappointing results at their nutritional visit will earn disapproval or judgment, but the most welcome standpoint of the current experts in nutritional diabetes education is to be nonjudgmental and thoroughly supportive of those whom they

serve, those with diabetes. Also, encourage diabetes educators to reflect on what they read and what they need to know to develop the courage to really teach, rather than just provide information. It is not just talk about nutrients; the nutritional diabetes education is more complex. A patient who receives the information turns it into knowledge through complicated mental processes and is in control of what they learn and what they do with the information. Thus, an effective nutritional diabetes educator finds ways to develop the skills to 'sell' their messages by tailoring them to suit the individual. To do so, the educator must be open to new information sourced from numerous places and must know how to apply the information effectively [4].

The better informed, more accomplished diabetes educators will succeed in helping their patients to maintain better control of their diabetes. The goal is to bring wealth of valuable information that can support them in the daily challenge of living with a chronic disease whose complications can, indeed, be life-threatening. Importantly, the physical aspects of people's reactions cannot be separated from their emotional,

social, economic and environmental circumstances. Thus, the educator's social and emotional intelligence is as, or more, important than their knowledge of diabetes, the disease [5]. This critical review of the literature summarizes the current results on the nutritional management of DM and education, in order to promote an improvement in the daily application of nutritional, education by dietitians, nutritionists and health professionals in diabetes.

Energy and weight management

In the programs of diabetes self-management education, Nutrition plays a principal role, because is a key component in the long-term health and quality of life. Recent guidelines in nutritional treatment of diabetes have heightened the need for a medical nutrition therapy (MNT) for all people with diabetes at -or soon after-diagnosis for improve the diabetes control and avoid complications [6].

The MNT includes a nutritional therapy realized by a professional in nutrition and dietetics [a registered dietitian (RD) in US, a Licensed Nutritionist-Dietitian (LD/N) or a similarly credentialed nutrition professional in Latin America], also includes a comprehensive diabetes self-management education (DSME) program realized by a Diabetes Educator [7]. The American Association of Diabetes Educators also recognizes the importance of healthful eating as a core self-care behavior [6].

There is sufficient evidence to support the positive effectiveness of nutritional education with collaborative information intervention, lifestyle intervention, and skills teaching intervention among patients with diabetes [8-10]. Although nutritional intervention and health education can improve patients' nutritional status, clinical status, effectiveness of treatment, quality of life, daily functioning, and survival. Attention to food portions and weight management, combined with physical activity, can help to improve glycemic control. A recent review found that engagement in diabetes education led to a statistically significant decrease in HbA1c levels, especially a combination of group and individual education results in the largest decreases in HbA1c [11]. In addition, it is important to provide not only written material, but verbal material as well. This is even more pertinent in rural populations where illiteracy is highest. A study in India stated that a home based education with video teaching reduces the cost of the program with clinical benefits [12]. In a study of Latino patients, education on lifestyle modification was provided through video presentations, verbal explanations, and written material. Lifestyle modifications that were discussed include smoking cessation and exercise for 30 minutes, three times per week. At the conclusion of the study, HbA1C scores of participants decreased by 0.5% or more in 71% at 6 months, 63% at 12 months, 57% at 18 months, and 64% at 24 months [13], so the time of the intervention it is also important.

In a nutritional level, if the person with diabetes is overweight (BMI 25.0-29.9kg/m²) or obese (BMI ≥30kg/m²), the goal of nutritional diabetes education is recommend a healthful eating pattern in order to reduce energy intake and increase of physical activity [7]. A weight loss of 10% of initial body mass is modest, but includes several benefits for persons with diabetes as improved glycemic, blood pressure, and/or lipids. This goal can be achieved by reducing moderately the energy consumption in 300 to 500Kcal/day and increasing the energy expenditure between 200 to 300Kcal/day.

The motivational counseling is important to achieve this goal. Studies by Hawkins [14] and Samuel Hodge et al. [15] have shown motivational counseling decreases HbA1C and body weight levels in diabetic patients. Motivational counseling consists of counseling visits, group sessions, phone or e-mail contacts, postcards reflecting on experiences, discussing nutritional problem solving, and encouraging participants. Consistent counseling and follow-up are the keys to success for a better nutritional status, as long as the patient has access to the appropriate resources.

Motivational counseling should also be included to encourage and empower the diabetic patient to take control of his or her life and disease process. With proper education, the diabetic patient will be able to make informed choices, and this has been shown to alter the course of the disease process. In summary, it is necessary to provide nutritional diabetes education that is culturally sensitive and accessible for the patient. This education may be in group classes or one-on-one counseling. The nutritional diabetes education must be presented in a variety of formats such as online classes, brochures/pamphlets, hands-on demonstrations or videos depending on the abilities and/or limitations of individuals [16].

Macronutrients

The Mediterranean diet is a common dietetic pattern for the diabetes treatment [17]. The 2000-2300Kcal a day that need an adult man are distribute in 55% from carbohydrates (cereals, grains, legumes, fruits, vegetables), preferably complex, with a low glycemic load, 30% from fats (oil, margarine, nuts and seeds) and 15% from proteins (meat, poultry, fish, eggs and dairy products). It is a good dietetic option because are based on a greater consumption of vegetable rather than animal proteins, increase the mono and polyunsaturated fats and promotes a high intake of dietary fiber (vegetables and fruits), on an high consumption of fish and legumes and a moderate alcohol consumption.

Although extensive research has been carried out on macronutrient distributions of energy, the recently guidelines found that there is no ideal mix of macronutrients for a better diabetes control, so these proportions should be individualized [7]. In order for a community diabetes education, we can use a more didactic image as a healthy plate.

Thus a healthy diet especially focus the attention to the selection and preparation of foods, rather than the proteins, fats and carbohydrates, should increase the change of habits. Especially, if it is in an educational program than determine how to address the barriers to change. In this order of ideas,

the patient needs to know how to make the change, why it is required and has adequate support to make that lifestyle change [18]. Therefore, the diabetes healthy plate Figure 1 is a simple and effective way for nutritional diabetes education.



Figure 1: The diabetes healthy plate.

In the diabetes healthy plate the macronutrients are translate in 6 food groups (vegetables, starches, meats, fats, fruits, and drink). Each is described below:

A. Vegetables: It is refers to non-starchy vegetables, defines as those containing about 5 grams of carbohydrate per serving(i.e. broccoli, lettuce, tomatoes, etc.), while the vegetables than contains about 15 grams of carbohydrate per serving are denominated starchy vegetables and are classified in the Starches group (i.e. potatoes and other tubercles, corn, and legumes as black beans, etc.).

B. Starches: Includes food with high content of carbohydrates (near 15g per serving) as grains, starchy vegetables, and dry beans and peas. The educator must promote the intake of whole grains because they have an elevated content of dietary fiber and help maintain normal blood sugar and lipids levels. It is important emphases as key message that actually, there is no evidence to suggest the use of low-carbohydrate diets (with a restriction to below 130g/day) in people with diabetes [7].

C. Meats: Is a group of foods with a high protein content. Includes meats (beef, pork, etc.), poultry (chicken, turkey, etc.), fish (salmon, sardine, etc.), cheese, eggs and soybeans derivate (textured vegetable protein, tofu, etc.). A key recommendation is to eat lean cuts of meat or remove the skin from poultry before eating it, for reduce the intake of saturated fats. Also is important promote blue fish consumption, especially sardines or salmon at least twice a week, in order to increase the omega 3 intake.

D. Fats: It is important to have an adequate daily intake of healthy fats and oils, because they have several important functions in the body, so, diabetic people can choose a healthy lipid option. This group includes healthy fats as margarine, fruits with a high content of fat as avocado or olives (near 5g of fat per serving, especially monounsaturated), vegetables oils (olive, canola, etc.), nuts and seeds (also they are a good source of proteins).

E. Fruits: Include the most of fruits, preferably whole and fresh. The fruits are excellent source of fiber, several vitamins, minerals and photochemical than are healthful for persons with diabetes.

F. Drink: This group completes the healthy plate. It includes low-calorie drinks like water, unsweetened tea or coffee. Also is recommendable to intake a glass of fat free milk or yogurt a day for complete the calcium requirement. Is unnecessary to have a glass of milk in each meal.

The principal idea of the diabetes healthy plate is to start with a 9 in plate (22.86 cm). A half should be covered in non-starchy vegetables, the other half should be split evenly between a 25% for meats and 25% for starches; additionally we should add a fruit portion, a healthy fat portion and a drink. In this way, the persons with diabetes are able to correctly plan breakfast, lunch, and dinner meals and improved their nutritional control without count calories or grams of proteins, fats and carbohydrates.

Another important topic is the control of the portions. Serving portions must be individualized and prescribed by a

dietitian [7]; in nutritional diabetes education, we can promote the dietetic plan using a general approximation to daily portions with effective methodologies as handy or common items guides.

Handy guide: this methodology uses the hand as a useful guide to controlling the food portions [19,20]. In example, the palm of their hand should equate to the amount of meat that they should eat, approximately 3 ounce of meat. For vegetables the guide is the two double handfuls, etc. **Common items guide:** uses the some regular household items as visual aids to properly estimate portions sizes [21]. In example: 1-cup raw leafy vegetables are like a baseball and one small potato is like a computer mouse, etc. Nutritional diabetes education using portion sizes guides and healthy alternative cooking methods were reduced the HbA1C levels nearly 1.0% [22]. Illiterate patients would benefit most from hands-on demonstrations and videos.

Diabetes educators also can use several others educational material for their patients. For example the 'ABCs of diabetes' (HbA1C, blood pressure, and low-density lipoprotein cholesterol values). This tool was mailed to participants in a study conducted by Dettori et al. [23], and they found at study end than participants achieved up to a 0.5% reduction in HbA1C. Another educational tool for nutritional diabetes education is provider-led discussions, in which patients are involved to talk about their personal experiences to help others in the group. It is a very successful education workshops [24]. The telemedicine or televisions (online discussions) were also implemented with diabetes educators using goal-setting for lifestyle change to lower HbA1C. All of these provider-led discussions had great success, with a reduction up to 0.7% in HbA1C scores [25].

Beyond nutrients

There are others important topics in the nutritional diabetes education beyond nutrients, like promote an optimal use of left and right cerebral hemispheres. It may help patients to cope with their disease and has a better knowledge. The left-brain is analytical, centered on the use of words and of numbers the elaboration of lists, sequences and linear analysis. While, right-brain hemisphere participates in the holistic and creative approach, centered on imagination, intuitive free thinking, emotional participation, etc. [26].

Nutritional diabetes educators have the responsibility to provide information (left brain), but also stimulate the creative right brain with enjoyable and memorable educational programs. In example, you can teach about the food group classification and the daily portions than people needs (left brain) and enjoy with a practice session or a competition of choose a healthy plate, which includes creative thinking, color combination and food preferences (right brain). This approach is successful both in young and older adults [27]. A study with an education program of nutritional guidance and application about meal preparation or diabetes cooking led to improve eating habits, glycemic reductions, and blood pressure lowering effects. This

study combined diet principles with creative and reasonable food choice for the better collocation of diets at each meal [28].

There has long been a call for diabetes educators to increase their level of knowledge about cultural differences, especially the food diversity for improve dietary compliance in populations and manage the different interpretations of health and illness by diverse communities [29]. For migrant or refugee communities is essential an effective health communication (diabetes prevention education, health promotion and management approaches) that is culturally suitable [30].

The proximity between the educator and the patient is fundamental. In intensive education programs, more chances and time are providing for health educators and patients to interact with each other. Not only is sufficient knowledge about diabetes control present in lectures every day, but discussion opportunities are also provide after class for communication with educators and among patients. Participants must have opportunities to establish excellent mutual-trust relationships with educators. The congregate active atmosphere encouraged everyone to take his or her disease under control. The group motivation might contribute to the confidence and initiative of patients against diabetes.

Frequently, diabetes educators avoid opening the emotional window because they fear they do not have the skills to deal with an emotional outburst [31]. The nutritional diabetes educator, do not need to be a psychologist, because do not need to solve the problems or change the person's emotions. The diabetes educator is to create an environment in which emotional reactions are valid and the patient can be expressing it freely. Often, patient only need an opportunity to express their emotions, frustrations, anger, etc. and have their feelings validated by their health professional.

Finally, given the complex relationships that exist between patients with diabetes and their family members it is important for diabetes educators to understand the role of the individual's family context in their diabetes management. It is appropriate to include the family members in the nutritional diabetes education program [32], encourage them to attend some classes and/or building meal plans in familiar groups. Their inclusion could help ensure both the person with diabetes and their family has a shared understanding ways to manage the diabetes. Family members also can help as peer leaders serving as a 'complement' to clinical care and diabetes self-management education and/or as a positive role model, someone who manages the day-to-day challenges of diabetes and remains well, enjoying the things they like.

Conclusion

The nutritional diabetes education is an important part of the therapeutic education in Diabetes. The educator demonstrates real knowledge and skills when they transform very complex

and complicated nutritional and diabetes information into simple concepts the individual and their family can understand. It is necessary to promote the nutritional diabetes education between the health professionals in the context of a clinical condition that can be improved by empowering the individual to achieve effective self-management.

The Dietitian, Nutritionist or health professional that works with nutritional diabetes education must view beyond nutrients and realize an educational program that includes memory and brain stimulation, lifestyle changes, cultural diversity, good relationship and the family members.

Acknowledgement

The authors wish to express a sincere thanks to Esther Subero and Claret Mata by the image design of the Healthy Diabetes Plate for this publication.

References

1. (2013) Diabetes Atlas brussels: International Diabetes Federation.
2. Assal JP, Mühlhauser I, Pernet A, Gfeller R, Jörgens V, et al. (1985) Patient education as the basis for diabetes care in clinical practice and research. *Diabetologia* 28(8): 602-613.
3. Rustad C, Smith C (2013) Nutrition knowledge and associated behavior changes in a holistic, short-term nutrition education intervention with low-income women. *J Nutr Educ Behav* 45(6): 490-498.
4. Beck JK, Traficano SE (2014) Diabetes educator mentorship program: mentors requested. *Diabetes Educ*.
5. Burke SD, Sherr D, Lipman RD (2014) Partnering with diabetes educators to improve patient outcomes. *Diabetes Metab Syndr Obes* (7): 45-53.
6. Funnell MM, Brown TL, Childs BP, Hass LB, Hoseney GM, et al. (2010) National standards for diabetes self-management education. *Diabetes Care* 33(Suppl 1): S89-S96.
7. Evert A, Boucher JL, Cypress M, Dunbar SA, Franz MJ, et al. (2013) Nutrition therapy recommendations for the management of adults with diabetes. *Diabetes Care* 36(11): 3821-3842.
8. Coppola A, Sasso L, Bagnasco A, Giustina A, Gazzaruso C (2016) The role of patient education in the prevention and management of type 2 diabetes: An overview. *Endocrine* 53(1): 18-27.
9. Chapman Novakofski K, Karduck J (2005) Improvement in knowledge, social cognitive theory variables, and movement through stages of change after a community-based diabetes education program. *J Am Diet Assoc* 105(10): 1613-1616.
10. Wang H, Song Z, Ba Y, Zhu L, Wen Y (2014) Nutritional and eating education improves knowledge and practice of patients with type 2 diabetes concerning dietary intake and blood glucose control in an outlying city of China. *Public Health Nutr* 17(10): 2351-2358.
11. Chryvala CA, Sherr D, Lipman RD (2016) Diabetes self-management education for adults with type 2 diabetes mellitus: A systematic review of the effect on glycemic control. *Patient Educ Couns* 99(6): 926-943.
12. Suseelal T, John KR, Moses A, Premkumar J, Logaraj M, et al. (2015) A study to assess the cost effectiveness of home based education programme among clients with diabetes mellitus (DM) at selected villages in Kancheepuram district, Tamil Nadu, India. *Int J Pharm Sci Res*.
13. Yeo G, Villalobos F, Robinson G (2011) Outcomes and challenges of familias saludables: A Rural Latino Chronic Disease Screening and Management Project. *Hispanic Health Care International* 9(3): 137-143.
14. Hawkins SY (2012) Improving glycemic control in older adults using a videophone motivational diabetes self-management intervention. *Research & Theory for Nursing Practice* 24(4): 217-232.
15. Samuel Hodge CD, Keyserling TC, Park S, Johnston LF, Gizlice Z, et al. (2009) A randomized trial of a church-based diabetes self-management program for African Americans with type 2 diabetes. *The Diabetes Educator* 35(3): 439-454.
16. Contreras F, Sánchez M, Martínez MS, Castillo MC (2017) Management and education in patients with diabetes mellitus. *Med Clin Rev* 3: 1-7.
17. Esposito K, Maiorino MI, Bellastella G, Chiodini P, Panagiotakos D, et al. (2015) A journey into a Mediterranean diet and type 2 diabetes: a systematic review with meta-analyses. *BMJ Open* 5(8).
18. Delamater AM (2006) Improving patient adherence. *Clinical Diabetes* 24(2): 71-77.
19. (2013) Canadian Diabetes Association Just the basics. Tips for healthy eating.
20. Gibson A, Hsu M, Rangan A, Seimon R, Lee C, et al. (2016) Accuracy of hands v. household measures as portion size estimation aids. *J Nutr Sci* 5: e29.
21. Trucil L, Vladescu J, Reeve K, DeBar R, Schnell L (2015) Improving portion-size estimation using equivalence-based instruction. *The Psychological Record* 65(4): 761-770.
22. Anderson Loftin W, Barnett S, Bunn P, Sullivan P, Hussey J, et al. (2005) Soul food light: culturally competent diabetes education. *The Diabetes Educator* 31(4): 555-563.
23. Dettori N, Flook BN, Pessel E, Quesenberry K, Loh J, et al. (2005) Improvements in care and reduced self-management barriers among rural patients with diabetes. *J Rural Health* 21(2): 172-177.
24. Tshiananga JKT, Kocher S, Weber C, Erny Albrecht K, Berndt K, et al. (2012) The effect of nurse-led diabetes self-management education on glycosylated hemoglobin and cardiovascular risks: a meta-analysis. *Diabetes Educ* 38(1): 108-123.
25. West SP, Laguna C, Trief PM, Izquierdo R, Weinstock RS (2010) Goal setting using telemedicine in rural underserved older adults with diabetes: experiences from the informatics for diabetes education and telemedicine project. *Telemed J E Health* 16(4): 405-416.
26. Barabino B, Malavia M, Assal J (2007) the creative elaboration of a real-life experience and its transformation in a work of art. *Journal of Medicine and the person* 5: 10-15.
27. Contreras F, Hernandez C, Hernandez P, Diaz L (2015) Design and implementation of a Diploma in Therapeutic Education in Diabetes (ETD) aimed at health professionals in Venezuela. *Vitae* 64: 1-12.
28. Li Y, Xu M, Fan R, Ma X, Gu J, et al. (2016) The effects of intensive nutrition education on late middle-aged adults with type 2 diabetes. *Int J Environ Res Public Health* 13(9): 897.
29. Anderson LM, Scrimshaw SC, Fullilove MT, Fielding JE (2003) Task force on community preventive services. A systematic review. *American journal of preventive medicine* 24(Suppl 3): 68-79.
30. Hawthorne K (2001) Effect of culturally appropriate health education on glycemic control and knowledge of diabetes in British Pakistani women with type 2 diabetes mellitus. *Health education research* 16(3): 373-381.

31. Mosely K, Malik Aslam A, Speight J (2010) Overcoming barriers to diabetes care: perceived communication issues of healthcare professionals attending apilot Diabetes UK training programme. *Diabetes Research and Clinical Practice* 87(2): 11-14.
32. Torenholt R, Schwennesen N, Willaing I (2014) Lost in translation--the role of family in interventions among adults with diabetes: a systematic review. *Diabet Med* 31(1): 15-23.



This work is licensed under Creative Commons Attribution 4.0 Licens
DOI: [10.19080/CRDOJ.2017.4.555631](https://doi.org/10.19080/CRDOJ.2017.4.555631)

**Your next submission with Juniper Publishers
will reach you the below assets**

- Quality Editorial service
- Swift Peer Review
- Reprints availability
- E-prints Service
- Manuscript Podcast for convenient understanding
- Global attainment for your research
- Manuscript accessibility in different formats

(Pdf, E-pub, Full Text, Audio)

- Unceasing customer service

Track the below URL for one-step submission

<https://juniperpublishers.com/online-submission.php>