Relevance of Nutrition Intervention in Diabetes Management: A Perspective from Indian Clinical Experts

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Abstract

Poor glycemic control in diabetes patients is a major hurdle in the management of disease and its associated comorbidities. Pharmacotherapy alone is not sufficient to curb the risk of associated complications. The role of nutrition along with physical exercise in achieving optimal glycemic con-trol is overlooked for many years in India. Nowadays, medical nutrition therapy (MNT) has evolved as an integral therapy in achieving better glycemic control. However, there is a lack of uniformity in health care practitioner's perception and lack of recommendations in a structured manner regard-ing its use. Through a series of regional advisory board meeting, insights were gained into current practices in diabetes management to uncover the gaps in nutrition for better patient outcomes, and understand patient knowledge, attitude and perceptions towards nutrition in general and diabetes-specific formulas (DSF) in particular. The key viewpoints were as follows: i) Good self-care practice and creating awareness inpatients about glycemic variations is important. ii) Experts highlighted the importance of referring patients to a clinical nutritionist or dietician. Patients should be introduced to diabetic educators and education through charts regarding different foods with low glycemic index is advised. iii) Portion control, healthy eating patterns and avoiding a high carbohydrate diet is beneficial. iv) MNT should be included in patients diet plan as a partial if not full meal replacement. Diabetes-specific formulas should be palatable and affordable to ensure patients compliance. These formulas can be taken in combination with meals in proportionate amounts. v) Diabetes-specific nutrition improves multiple health outcomes and the mindset of Indian patients towards nutritious food needs to be changed.

Keywords: **Diabetes mellitus, Diabetes Management, Medical Nutrition Therapy, Lifestyle Intervention, Diabetes Nutrition.**

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Introduction

There has been an alarming increase in the number of diagnosed cases of diabetes amongst young Asian populations, posing a serious risk to public health and increasing the economic burden. India, in particular, is witnessing an incessantly growing population of people living with diabetes; well on the way to earning the dubious distinction of being the diabetes capital of the world.

Diabetes is a leading cause of death, primarily due to poor glycemic control [1]. Poor glycemic con-trol does not always imply hyperglycemia; it can also be hypoglycemia or glycemic variability. Poor diabetes control leads to the development of various macro and microvascular complications such as myocardial infarction, ischemic stroke, peripheral arterial disease, kidney disease etc. The rapidly increasing incidence of uncontrolled diabetes in the Indian population is a matter of immediate concern for healthcare practitioners (HCPs) as well as society, and there is a huge responsibility to minimize the incidence [2]. Therefore, the need of the hour is to identify strategies for better glycemic control, and to reduce the risk of associated complications in these patients.

Along with pharmacotherapy, nutrition has become a key element of diabetes management. Particularly, dietary modifications are necessary to curb the risk of postprandial hyperglycemia. Foods with low glycemic index, high fiber content, rich in monounsaturated and polyunsaturated fats will help achieve better glycemic control. However, maintaining dietary consistency for the long-term is a challenge and individualized dietary plans are necessary to achieve optimal glycemic control. In the last few decades, medical nutrition therapy (MNT) has evolved and gained attention as an auxiliary therapy in achieving better glycemic control. Substantial evidence demonstrates that the use of diabetes-specific nutrition formulas improves overall diabetes outcomes including reduction in HbA1c, postprandial blood glucose, and peak blood glucose concentrations [3]. A recently published pilot study also demonstrated beneficial effects of a diabetes-specific nutrition supplement and lifestyle intervention in improving glycemic control and reducing glycemic response in over-weight and obese Asian Indian adults with type 2 diabetes mellitus [4]. In spite of the established advantages of MNT in diabetes management, it is not recommended by HCPs to patients uniformly, or in a structured manner. Abbott Nutrition International, India organized a series of regional advisory board meeting to gain insights into current practices in diabetes management, uncover the gaps in nutrition for better patient outcomes, and understand patient knowledge, attitude and perceptions towards nutrition in general and diabetes-specific formulas (DSF) in particular.

Methodology

A series of five regional advisory board meetings, involving clinical experts from the field of diabetes care were convened between 15 November 2019 and 22 December 2019 at Chennai, Hyderabad, Bangalore, Delhi and Kolkata. The topics for discussion as per the agenda were common across locations, which included gaps and opportunities in diabetes management, role of nutrition in optimal glycemic management and perceived role of diabetes specific nutrition. The key discussion points were based on scientific evidence and collective clinical judgment from practice. All the meeting participants provided their individual insights based on clinical experience in the management of diabetes. Bases on indepth discussion among these clinical experts, minutes of the meetings were prepared by medical writers with a purpose to develop an opinion-based statement to bridge the gap between diabetes management and nutrition. During the meeting, individual and unique viewpoints for each section suggested by individual HCPs or HCP groups have been summarized in this statement. The suggestions that were made in three or more meetings have been considered as individual viewpoints.

Discussion

1. Diabetes current management: Gaps and opportunities

Poor glycemic control may lead to complications like neuropathy, nephropathy, retinopathy, cardiovascular complications, diabetic foot, poor wound healing, and gastroparesis [5-8]. Therefore, poor glycemic control is a key target for diabetes management therapies. A concept of living healthy with diabetes, where both physicians as well as patients are required to be on the same platform to achieve the goal of better glycemic control, is the cornerstone of diabetes management. Key barriers to effective diabetes management are enlisted in box 1.

The current knowledge gap regarding diabetes management between patients and physicians has decreased owing to improved education and increased awareness about the benefits of a nutritious diet in the regulation of glycemic fluctuations. A fraction of the population is highly motivated to control diabetes

Box 1: Key barriers to effective diabetes management [9, 10]

Patients' barriers

- Lack of awareness and education
- Non-adherence to medication
- Lack of information about symptoms: Many patients are unaware of lifelong nature of the disease and if asymptomatic, they think they are fine.
- Lack of financial support: Feeling of guilt because some think that their family members have to bear the financial burden for their care, particularly in India
- Lack of attention from family members
- No motivation or time for exercise
- Refusal by patients to accept their disease condition even after the HbA1c is >8%.
- No specialized diabetes care centers

Physicians' barriers

- Time constraint
- Cost
- Many doctors do not talk about diet or lack knowledge about nutrition

with the implementation of healthy nutritious dietary habits and regular physical exercise instead of medication. However, a large part of the population, especially in rural India, is unaware of the potent role of nutrition in diabetes management. All the experts agreed that along with pharmacotherapy, a healthy diet and exercise are vital to provide better control over glycemic fluctuations in patients with diabetes. However, the lack of awareness regarding the role of nutrition and lifestyle modifications in diabetes management is a major hurdle and needs to be addressed.

The key aspects of diabetes management are lifestyle modification and pharmacological therapy. Even though, pharmacotherapy benefits in the tight regulation of blood glucose levels, it is a two-edge sword sometimes leading to hypoglycemia and related complications. Therefore, lifestyle modification is emphasized as an inherent part of diabetes therapy. Previous literature demonstrating the positive effects of the triad of diet, exercise, and pharmacotherapy on improved diabetes control was discussed in detail [5]. Diabetes and its complications are preventable and good lifestyle changes will be a wise investment for the patients (Figure 1).

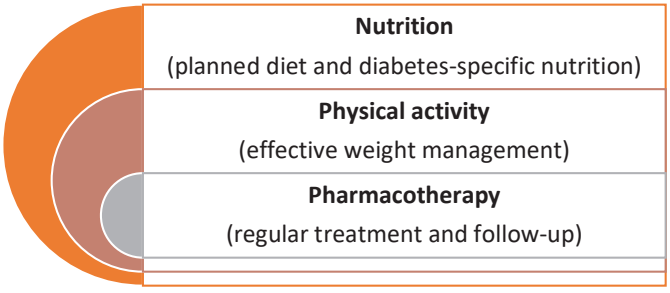

Fig 1. Key components of effective diabetes self-management

Key viewpoints

o Individual viewpoints:

- A patient's perception about diabetes plays a vital role in its management. Each patient should be handled in a different way as they have different lifestyles, culture and work profiles.
- Good self-care practice is the foremost step required for controlling glucose fluctuations.
- Clinical nutritionist or dietician: Sensitizing patients about nutrition and exercise as an integral part of diabetes therapy is essential. Experts highlighted the importance of referring patients to a clinical nutritionist or dietician. They recommend employing a nutritionist or dietician in every diabetic clinic to disseminate information about a diabetes specific diet and provide strategies to inculcate these in the patients' diet.
- Diabetic educators: Internet knowledge has led to a different perception about diabetes among patients. Hence, there is a need to educate them; however, individual education and awareness is difficult in the clinic. Patients should be introduced to diabetic educators.
- Weight gain leads to poor glycemic control in diabetes patients. Proper weight management is required to reduce the risk for cardiovascular diseases. Nowadays, obesity has become a major challenge in diabetes management. Regular counseling of patients to maintain a healthy weight is important.
- Social media awareness can improve patient's acceptability to encourage good lifestyle changes.
- Every patient should be encouraged to have a glucometer at home.

o Unique viewpoints:

- Clinicians recommended that patients should avoid crash dieting or adopting paleo diet for weight reduction due to the risk of other complications and weight gain.
- Education through charts:
  - Providing a chart that includes color coded glycemic index value of foods in the diabetic clinic will

encourage patients to make healthier food choices.

- Diabetes management information charts in simple language as well as multilingual charts should be displayed in the patient waiting area.
- Recipes of various nutritionally rich diets should be provided to patients.

- Motivating patients to maintain a normal BMI is important.
- Patients should be educated about symptoms of hypoglycemia and advised to keep sugar packets handy at all times (particularly patients from rural areas).
- Physicians should consider socioeconomic factors while prescribing medicines or diagnostic tests to patients in order to maintain the patient's compliance with the management approach.
- Social media awareness: Education of patients with self-recorded video regarding different aspects of diabetes management will be beneficial. However, it is also important for clinicians to keep posters in their clinic dissuading patients from relying on fake messages and videos circulating on social media.
- Clinicians should conduct seminars to create awareness about correct management of diabetes through diet and exercise, and about long-term complications associated with glycemic variability in diabetes.

2. Nutrition - the unrecognized complement to medication for optimal glycemic control

Current diabetes therapy is mainly focused on medications to decrease HbA1c levels. However, fear amongst patients about lifetime use of drugs needs to be considered. While dietary regulation in the treatment of diabetes is beneficial for optimal glycemic control, patients should understand the whirlpool of diabetes management components.

MNT comprises nutritional therapy and counseling for optimal disease management, provided by a registered dietician or nutrition professional. In simple words, it is a treatment intervention through an individually-tailored nutrition plan. As a complement to medication, MNT has been shown to reduce HbA1c levels. American Diabetes Association (ADA) has reported that with every 1% drop in HbA1c there will be an approximate 40% reduction in the risk of complications. MNT is integral to managing diabetes, and preventing - or slowing the rate of development of diabetes complications [11, 12].

There is no one-size-fits-all eating pattern for individuals with diabetes. ADA standards of medical care in diabetes-2020 recommends an individualized MNT program provided by a registered dieti-cian for all patients with diabetes [13, 14]. The effectiveness of MNT has been reported to be 1-2% of reduction in HbA1c and around 50 mg/dL reduction in FBS, along with a decrease in total cholesterol, LDL cholesterol, and triglycerides [15].

The abundance of food choices today has resulted in the development of an obesogenic environ-ment which is very harmful to humans. The novel phenomenon of "Nutrition in diabesity management" is divided into three parts;

- Nutrition for glycemia regulation
- Nutrition for weight management
- Nutrition for prevention of cardiovascular diseases

Food choice, portion control, and meal timings constitute a dietary habit. Carbohydrates, proteins and fats are the three key calorie givers that determine a patient's glycemic control. In the last four decades, there has been a drastic change in dietary composition. Noticeably, the proportion of carbohydrates in the diet have increased, affecting glycemic variability. Both, the quality and quantity, of carbohydrates adversely affect postprandial blood sugar levels and overall glycemic control [16]. On the other hand, dietary fibers have a positive effect on postprandial blood sugar [17-19]. Similarly, monounsaturated fatty acids improve glycemic control and lipoprotein profile [20, 21].

In the Indian scenario, nutrition is not given its due importance during the management of diabetes. This can be attributed to several reasons, including lack of time for doctors to discuss nutrition in detail with every patient due to heavy patient load, limited expertise to appropriately guide patients, patients' inability to pay dietician consultation charges, patients' misconception of increase in medications despite following a recommended diet, and patients compliance to recommended therapy options [15].

Key viewpoints:

o Individual viewpoints

- Traditional Indian diet provides phytochemicals, dietary fibers, vitamins, carotenoids, phenolic compounds, complex carbohydrates, etc.
- Complex carbohydrates should be preferred over refined or simple carbohydrates.

- Low glycemic index foods are recommended as they are relatively slowly digested and released slowly for sustained energy.
- MNT improves glycemic control and should be included in the patients' diet plan.
- European Society for Parenteral and Enteral Nutrition (ESPEN) and ADA recommends the use of a DSF either as a full meal replacement, or partial meal replacement.
- Adherence to the appropriate diabetes-specific diet is a challenge among many patients, hence a diabetes-specific formula (DSF) is essential.

o Unique viewpoints

- Dietary fiber should be consumed from fruits, vegetables, and legumes. Two servings of fruits and three servings of vegetables in daily diet will aid in providing phytochemicals that reduce the risk of chronic diseases.
- Cooking oils should be used carefully. Mustard oil, and canola oil contains a good amount of omega-3-fatty acids. Sunflower oil, safflower oil, and corn oil are rich in polyunsaturated fatty acids. However, coconut oil, butter, and palmolein oil should be avoided as it contains a high amount of saturated fatty acids.
- In non-vegetarian foods, fish or chicken should be preferred over mutton. Preferred cooking methods include baked, grilled or marinated. Egg-yolk consumption should be limited to one egg-yolk per day.
- It is necessary to restrict protein intake in patients with kidney disease. Lean meat, poultry eggs, fish and seafood are good sources of high biological value proteins. Low biological value proteins can be obtained from peas, beans, lentils, soya, etc.
- The experts also recommended low purine diet and seek dietician support in patients having borderline or high uric acid levels.
- Portion control, healthy eating patterns and avoiding a high carbohydrate diet is beneficial for optimum glycemic control in diabetes. Experts recommended to keep small gaps between two meals and eat a controlled portion of food. Small frequent meals for type 1 diabetes and time regulated eating habits for type 2 diabetes were recommended.
- The food rich in nutrition should be palatable. Junk food should be avoided.

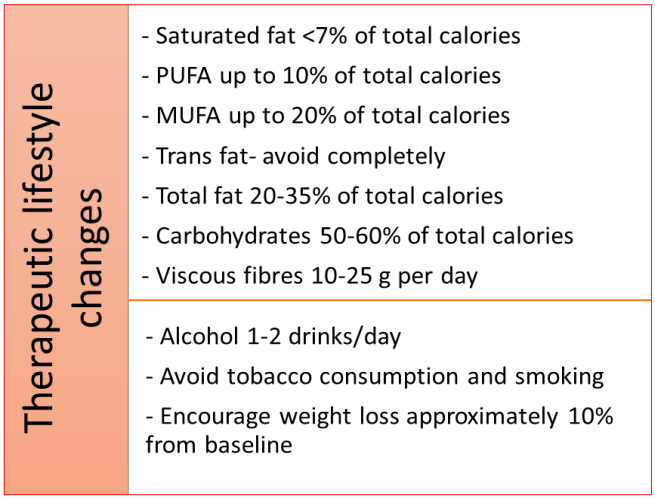

Figure 2: Therapeutic dietary and lifestyle modifications

3. Role of diabetes-specific nutrition in better glycemic control

Nutrition is one of the vital pillars of a healthy lifestyle and crucial for prevention of various diseases. As discussed above, diet with good nutritive value has multidimensional benefits such as weight reduction, lowering of blood pressure, maintaining balanced cholesterol, better glycemic control, and reducing risk of chronic diseases, ultimately leading to the overall health of individuals.

According to the ADA nutritional guidelines for management of diabetes, use of an individualized MNT program, provided by a registered dietitian nutritionist, preferably one who has comprehensive knowledge and experience in diabetes care, is recommended for all people with type 1 or type 2 diabetes, prediabetes, and gestational diabetes mellitus [22].

Standard nutrition formulas have limited efficacy in patients with diabetes. Diabetes-specific formulas are specific and specialized formulas that do not compromise glycemic control. It contains carbohydrates with low glycemic index, healthy fats (mono/polyunsaturated fatty acids), and fiberstol-2 or other slowly digestible sources of carbohydrates, which reduce blood glucose and results in better glycemic control [3, 23]. A meta-analysis showed that both short-term and long-term use of DSF were associated with improved glycemic control than standard formulas [3]. A pilot study by Mohan V, *et al*. showed that a diabetes-specific nutritional supplement was useful in improving glycemic control and reducing glycemic response in overweight and obese Asian Indian adults with type 2 diabetes mellitus [4]. A recently published systematic

review by Ojo and Brooke provided further evidence that DSFs are effective for managing glycemic status of hospitalized patients with diabetes on enteral nutrition tube feeding by improving postprandial glucose levels, HbA1c levels and insulin responses [24]. Therefore, hyperglycemia can be reduced by using DSF as a supplement or meal replacement therapy. Using DSF as part of a balanced meal plan can improve patient health and lower the cost of care.

Key viewpoints:

o Individual viewpoints

- Patient's non-compliance with DSF is a major issue. To improve compliance following solutions were suggested by clinical experts:

  > Taste is a very important and pertinent factor to ensure daily intake. Taste should be palatable to increase the acceptability of DSF by patients.

  > The DSF should be affordable to patients from all socioeconomic classes.

  > It is important to educate patients regarding DSF use and its benefits.

- DSF can be taken in combination with meals in proportionate amounts. Splitting the dose of DSF in supplement form is possible.

o Unique viewpoints

- DSF should be palatable and introduced in newer forms. In India, currently, only powder form is available, while other countries have these formulas as packaged drinks too.
- Variability in preparation of DSF is necessary. It was suggested to develop recipes that can be included in daily foods of patients; for example, in the form of kheer, or roti flour.
- Including DSF in the evening snack will reduce the sugar rush after dinner. In patients who skip breakfast or have delayed lunch, these formulas play a pivotal role in maintaining the patient's overall nutrition and health.

Conclusion

Diabetes-specific nutrition improves multiple health outcomes. It increases GLP-1 secretion, improves glycemic control, reduces body weight, improves blood pressure, reduces insulin requirement, reduces healthcare cost, lowers mortality, and improves pregnancy outcomes. The mindset of Indian patients towards nutritious food needs to be changed because a holistic approach to eating healthy will help diabetes patients achieve better glycemic control and reduce the risk of complications.

References

1. Kumar SP, Sandhya AM. A study on the glycemic, lipid and blood pressure control among the type 2 diabetes patients of north Kerala, India. *Indian Heart J 2018*;70:482-5.
2. India State-Level Disease Burden Initiative Diabetes Collaborators. The increasing burden of diabetes and variations among the states of India: The Global Burden of Disease Study 1990-2016. *Lancet Glob Health 2018*;6:e1352-2.
3. Elia M, Ceriello A, Laube H, Sinclair AJ, Engfer M, Stratton RJ. Enteral nutritional support and use of diabetes-specific formulas for patients with diabetes: a systematic review and meta-analysis. *Diabetes Care 2005*;28:2267-79.
4. Mohan V, Kalpana N, Lakshmipriya N, Anitha P, Gayathri R, Vijayalakshmi P, *et al*. A pilot study evaluating the effects of diabetes specific nutrition supplement and lifestyle intervention on glycemic control in overweight and obese Asian Indian adults with type 2 diabetes mellitus. *J Assoc Physicians India 2019*;67:25-30.
5. Rawshani A, Rawshani A, Franzén S, Sattar N, Eliasson B, Svensson AM, *et al*. Risk factors, mor-tality, and cardiovascular outcomes in patients with type 2 diabetes. *N Engl J Med 2018*; 379: 633-44.
6. Colette C, Monnier L. Acute glucose fluctuations and chronic sustained hyperglycemia as risk factors for cardiovascular diseases in patients with type 2 diabetes. *Horm Metab Res 2007*;39:683-6.
7. Gallwitz B. Implications of postprandial glucose and weight control in people with type 2 diabe-tes: Understanding and implementing the International Diabetes Federation guidelines. *Diabetes Care 2009*;32:S322-5.
8. Fowler JM. Microvascular and macrovascular complications of diabetes. *Clin Diab 2008*; 26:77-82.
9. Fort MP, Alvarado-Molina N, Peña L, Mendoza Montano C, Murrillo S, Martínez H. Barriers and facilitating factors for disease self-management: A qualitative analysis of perceptions of pa-tients receiving care for type 2 diabetes and/or hypertension in San José, Costa Rica and Tuxtla Gutiérrez, Mexico. *BMC Fam Pract 2013*;14:131.
10. Sina M, Graffy J, Simmons D. Associations between barriers to self-care and diabetes com-plications among patients with type 2 diabetes. *Diabetes Res Clin Pract 2018*;141:12631.
11. American Diabetes Association, Bantle JP, Wylie-Rosett J, Albright AL, Apovian CM, Clark NG, *et al.* Nutrition recommendations and interventions for diabetes: a position statement of the American Diabetes Association. *Diabetes Care 2008*;31:S61-78.
12. Evert AB, Dennison M, Gardner CD, Garvey WT, Lau KHK, MacLeod J, *et al.* Nutrition therapy for adults with diabetes or prediabetes: A consensus report. *Diabetes Care 2019*;42:731-54.
13. Parker AR, Byham-Gray L, Denmark R, Winkle PJ. The effect of medical nutrition therapy by a registered dietitian nu-

tritionist in patients with prediabetes participating in a randomized con-trolled clinical research trial. *J Acad Nutr Diet 2014*;114:1739-48.

14. American Diabetes Association. 3. Prevention or delay of type 2 diabetes: Standards of medical care in diabetes-2020. *Diabetes Care 2020*;43:S32-6.
15. Data on File: Minutes of the Meetings conducted at Bengaluru (15-Nov-2019), Hyderabad (17-Nov-2019), Kolkata (08-Dec-2019), Chennai (15-Dec-2019), Delhi (24-Dec-2019)
16. O'Connor LE, Campbell WW. A novel fiber composite ingredient incorporated into a beverage and bar blunts postprandial serum glucose and insulin responses: A randomized controlled trial. *Nutr Res 2016*;36:253-61.
17. Tabatabai A, Li S. Dietary fiber and type 2 diabetes. *Clin Excell Nurse Pract 2000*; 4: 272-6.
18. Brennan CS. Dietary fibre, glycemic response, and diabetes. *Mol Nutr Food Res 2005*;49:560-70.
19. Chen C, Zeng Y, Xu J, Zheng H, Liu J, Fan R, et al. Therapeutic effects of soluble dietary fiber consumption on type 2 diabetes mellitus. *Exp Ther Med 2016*;12:1232-42.
20. Garg A. High-monounsaturated-fat diets for patients with diabetes mellitus: A meta-analysis. *Am J Clin Nutr 1998*;67:577S-82S.
21. Thomsen C, Storm H, Holst JJ, Hermansen K. Differential effects of saturated and monoun-saturated fats on postprandial lipemia and glucagon-like peptide 1 responses in patients with type 2 diabetes. *Am J Clin Nutr 2003*;77:605-11.
22. American Diabetes Association. 5. Facilitating Behavior Change and Well-being to Improve Health Out-comes: Standards of Medical Care in Diabetes-2020. *Diabetes Care 2020*;43(Supplement 1): S48-S65.
23. Mesejo A, Montejo-González JC, Vaquerizo-Alonso C, Lobo-Tamer G, Zabarte-Martinez M, Herrero-Meseguer JI, *et al.* Diabetes-specific enteral nutrition formula in hyperglycemic, mechanically ventilated, critically ill patients: a prospective, open-label, blind-randomized, multi-center study. *Crit Care 2015*;19:390.
24. Ojo O, Weldon SM, Thompson T, Crockett R, Wang XH. The effect of diabetes-specific enteral nutrition formula on cardiometabolic parameters in patients with type 2 diabetes: A systematic review and meta-analysis of randomised controlled trials. *Nutrients 2019*;11:1905.

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